Attachment C-1 Land Use Regulation

Land Use Regulation

Type: Planning

Implementation Time: 3 months to >1 year

Goal:

To align municipal ordinances and policies with community agriculture needs
To promote local food production to achieve economic self-sufficiency goals
To produce economic benefits, both directly as local food is produced and indirectly as businesses catering to food production sell goods and services, and property values increase
To integrate community ag goals into other sustainability initiatives
To assist people with overcoming economic barriers to accessing land for food production

Audience: Elected officials, landowners, government staff, local and regional Board and Committee members, advocacy organizations

Overview:

Municipal land use regulations – including ordinances and policies - are an important component in promoting or hindering community agriculture. In many cases, activities around community agriculture may not be explicitly permitted in zones, or may be grouped with prohibitions on large-scale agriculture. Updating definitions and provisions in ordinances can help remove these barriers. In addition, several tools are available for municipalities that can establish community agriculture amenities as conditions for development density bonuses, or protection of prime farmland.

Questions:
Are there any existing municipal ordinances or policies which hinder community agriculture?
Are new ordinances or policies needed to promote community agriculture goals?
What barriers are there, if any, to changing these policies or ordinances?
Who are the key stakeholders in the decision-making process?
How proactive does the town need to be for enhancing community agriculture ordinance or policy?
How does community agriculture relate to ordinances and polices regulating or supporting commercial agriculture activity?
What are permitting requirements for installations (i.e.. parking)?

Implementation:

A. Community Gardens: Ordinances or administrative policies has a significant effect on community garden development and management:
    a. Community gardens may not be permitted in all zones.
        i. Consider expanding the districts where community gardens are a permitted use.
        ii. Consider provisions to require soil testing as part of permitting process for community gardens to screen for soil contamination.
        iii. Determine if ordinances regulating farm stands, sales, donation kiosks, etc. may unintentionally have adverse effects on community garden operations.
        iv. Siting – accessory support structures, fencing, etc. like sheds may not be allowed, but are very integral to spaces being successfully.
    b. Operation and maintenance

i. Community garden operation and maintenance should be adequately funded and requires organizational support.
ii. In some cases, gardens are municipally managed, or this function may be delegated to non-profit community organizations.
iii. Operational costs may be offset by member dues, sponsorships, or organization fundraising, however municipal subsidy can improve equity.
iv. Establish details such as: Clarifying allowed or prohibited behavior, hours of operation, visitors allowed, pets, consistent with other public space uses. Clear signage strongly encouraged.

Question: Which existing ordinances may apply to open space planning? Does any language restrict activities that may include community agriculture projects?

Question: Does any language prevent the construction of fences or sheds?

B. Open space regulation / policy
   a. Regulations may prohibit use of public space for food production
      i. Conduct a review to determine if policies or ordinances allow use of public space for these purposes (even if otherwise allowed as a permitted use in zoning).
      ii. Provide municipal staff and Board members information regarding the benefits of community agriculture as a permitted use even when commercial agriculture would not be
C. Regulation of Development
   a. Prime agricultural lands have been recognized as a finite resource that should be protected when possible.
      i. Consider ordinances and policies that identify prime agricultural land as a zoning overlay. (Attachment i.)
         1. Consider ordinances which limit development in this zone beyond typical residential / agricultural low-density zoning, ensuring consistency with goals included in comprehensive plans.
         2. Consider requirements for any development in the overlay to maintain or include the provision of community agriculture space as an exaction for development on this space. (Attachment ii.)
            a. For residential development: Home gardens, food forests, etc.). If necessary, update permitted uses in zoning.
            b. For institutional or commercial: Consider requiring creation of community agriculture features, such as edible landscaping, community gardens, or food forests.
            c. Whenever possible, site amenities in most accessible locations.
               i. For example, requiring installation of community gardens without interest may be counterproductive if facility is underutilized.
               ii. If no immediate demand exists for an amenity such as community food forest or garden, consider policies that "bank land for future development of these amenities.

   b. Consider creation of a community wide or overlay "agricultural subdivision" or "Agrihood" option (Attachment iii.) for developers which:
      i. Offers density bonuses and clustering opportunities in exchange for the creation of dedicated land for community agriculture use.
      ii. Maintains existing agricultural use on or adjacent to developed land.
      iii. This concept may be integrated into existing cluster subdivision ordinances, better defined "usable open space"

iv. Considers perennial agriculture as a good option for agrihoods. Good aesthetic appeal, habitat, ecological benefits, erosion control, and lower maintenance than annual-based agriculture

D. Adapt Technical Standards for Land Development
   a. Review requirements and allow adjustments to support edible landscape concepts
   b. Allow waivers for tree planting requirements in exchange for active local food production.
   c. Tie edible landscaping into meeting screening and buffering requirements, for example encouraging edible hedgerows

Costs:

Personnel time:
   a) Partner Coordination
   b) Ordinance & Policy Review
   c) Public input

Partners to Support Implementation:

A. Conservation Commission
B. Open Space Committee / Commission
C. Planning Board
D. Municipal Council
E. Economic Development Board or Committee
F. Nonprofit community agriculture support organization
G. Nonprofit food security organizations
H. CCSWCD
I. Town's Downtown Network (local town business alliance/association)
J. Local businesses
K. Local farms/nurseries
L. Municipal Parks & Recreation Staff
M. Neighborhood Associations
N. Master Gardeners
O. Developers
P. Landscape professionals (permaculture)

Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachments:

i. Example Ordinances:
   a. City of Lewiston
   b. Cumberland County, PA
ii. Maine Farmland Trust Checklist
iii. Models for agriculture subdivisions / "agrihoods"

No. 12-04
Effective: 04/05/2012

AN ORDINANCE PERTAINING TO COMMUNITY GARDENS

THE CITY OF LEWISTON HEREBY ORDAINS:

Appendix A of the Code of Ordinances of the City of Lewiston, Maine is hereby amended as follows:

APPENDIX A

ZONING AND LAND USE CODE

ARTICLE II. DEFINITIONS

Sec. 2. Definitions

Community garden~~s~~ means the ~~non-commercial~~ use of a lot(s) or a portion thereof for the purpose of growing vegetables, flowers~~, landscaping~~ and/or other cultivated plants which are intended for consumption and/or use primarily by the surrounding neighborhood as regulated under Article XII, Section 4.

ARTICLE XI. DISTRICT REGULATIONS

Sec. 5. Riverfront (RF).
(c) *Permitted uses.*
(32) ~~Community gardens~~ Reserved;

Sec. 9. Downtown residential district (DR).
(c) *Permitted uses.*
(33) ~~Community gardens~~ Reserved;

Sec. 13. Centreville district (CV).
(c) *Permitted uses.*
(38) ~~Community gardens~~ Reserved;

Sec. 17. Mill district (M).
(c) *Permitted uses.*
(38) ~~Community gardens~~ Reserved;

ARTICLE XII. PERFORMANCE STANDARDS

Sec. 4. ~~Reserved~~. Community garden standards.

The following standards shall apply to the establishment or creation of any community garden in City of Lewiston:

1. A community garden may be located in any zoning district with the exception of the Resource Conservation district.
2. Unless located in the Rural Agricultural district, a community garden may be no larger than 20,000 square feet.
3. Unless permitted by the underlying zoning district, on-site sale of community garden products shall be prohibited.
4. The site shall be designed and maintained to prevent any chemical pesticide, fertilizer or other garden waste from draining on to streets or adjacent properties.
5. Accessory structures including buildings or signs shall comply with requirements of the underlying zoning district.
6. Cultivated areas shall be prevented from encroaching onto adjacent properties.
7. The property shall be maintained free of high grass, weeds, and debris. Dead garden plants shall be removed by no later than November 30th of each year. This is not intended to prohibit composting or soil enhancing cover crops.
8. Use of mechanical equipment shall be limited to that customarily identified as household lawn and garden equipment. Use of said equipment shall be restricted to the hours 7:00 a.m. to 7:00 p.m.
9. The community garden shall be subject to applicable odor provisions contained in Article XII, Section 19(4).
10. It shall be the responsibility of the property owner that uses a lot or a portion thereof as a community garden meets the above referenced performance standards. If leased or used by other individuals or organizations, it shall be the responsibility of the property owner to ensure the above referenced performance standards are met.
11. It shall be the responsibility of any person, including, but not limited to, the property owner, their agent, individuals, organizations, or other person having an interest in establishing a community garden on a lot(s) or a portion thereof for a community garden to obtain a Use Permit from the City prior to commencing said use of land.

REASONS FOR PROPOSED AMENDMENT

Article II, Section 2 of the Zoning and Land Use Code defines *Community gardens* as the non-commercial use of a lot or a portion thereof for the purpose of growing vegetables, flowers, landscaping and/or other cultivated plants which are intended for consumption and/or use primarily by the surrounding neighborhood. Said use of land is limited to four zoning districts: Riverfront (RF), Mill (M), Downtown Residential (DR), and Centreville (CV). Staff has been approached by property owners in the downtown and other parts of the city to establish community gardens.

The proposed amendment allows a community garden to be located in any zoning district with the exception of the Resource Conservation district. Community gardens are means of promoting healthy communities which may provide food and create recreational and therapeutic opportunities for a community. In the downtown portion of Lewiston, community gardens may become part of the open space network on vacant land and lots within neighborhoods and strengthen community bonds. The gardens and those who

participate in community gardening contribute to the preservation of open space and can return under used or vacant lots into a productive and sustainable use of land. They can also promote environmental awareness and provide community education. While allowing community gardens throughout the City, there is a need to regulate such land uses to protect neighborhoods, prevent nuisances, protect property values, protect the environment, and ensure the health and safety of the City.

CONFORMANCE WITH COMPREHENSIVE PLAN

1. Enhance the aesthetic quality of the Downtown area (Downtown, Goal #5, p. 22).
2. Evaluate both the short term and long term recreational and/or open space potential of all tax acquired properties that the city has at its disposal . . . (Recreation and Open Space, Policy 1, Strategy B7, p 96).
3. Evaluate tax-acquired properties for their potential as preserved open space for recreational or environmental preservation purposes (Recreation and Open Space, Policy 10 Strategy a3, p.111).
4. Implement non-athletic field components of Franklin Pasture Master Plan. Continue to work on trail system and other outdoor areas for nature interpretation, assembly and public gardens (Land Use Issues, #17, p. 124).
5. Explore amending the Zoning and Land Use Codes to provide more incentives for preservation of open space in new development (Long Range Planning, Policy 3, Strategy B, p. 133).

Cumberland County Planning Department

Urban Agricultural Series

COMMUNITY GARDENS
MODEL ORDINANCE

INTRODUCTION

Communities around the country are looking to promote healthier eating by encouraging agriculture in urbanized areas. In many communities, this takes the form of backyard gardens and community gardens – places on public or private property where neighbors gather to cultivate vegetables and fruits, and even keep bees or raise poultry and small livestock. The food in community gardens is typically grown for the gardeners' own consumption or donation.

This model ordinance was developed by the Cumberland County Planning Department using a variety of ordinances from municipalities in the county and around the state and from ordinances in surrounding states. The model is intended to provide a review of issues involved in regulating Community Gardens in urbanized areas. Municipalities are not recommended to implement this entire ordinance without modification. Rather, municipalities should review this ordinance, examine their local situation, and adopt the regulations that make the most sense for their municipality.

HOW TO USE THIS MODEL

Any text in the following model ordinance in *italics* is an option that a municipality may or may not choose to implement. In these cases, the ordinances that were reviewed for this model were inconsistent in how, and if, they regulated certain aspects of Community Gardens. Municipalities should choose if they want to adopt these regulations in their jurisdiction. Ordinance language not in italics is recommended to be included in municipal ordinances, although some modification may be necessary.

In some cases, there could be multiple ways to regulate a certain aspect of a Community Garden. In these cases the word "OR" has been placed in the text of the ordinance. Municipalities should choose the option that works best with their existing ordinances and regulatory framework.

In some instances, a range of options may be provided. In these cases, the sample range is provided in brackets with the regulations commonly found in other ordinances and an "XX" (15', 20', XX) to indicate that municipalities may want to adopt a different standard. Footnotes are used throughout the model for informational purposes only and are not intended as ordinance text.

COMMUNITY GARDENS

SECTION 1: PURPOSE AND INTENT

- Allow the growing of crops in urbanized areas while minimizing negative impacts to adjacent properties and the community.
- Encourage locally grown produce, promote healthy and nutritional food, and fill gaps in food accessibility for a community.
- Foster community development by providing opportunities for recreation, education/training, special events, social interaction, and economic potential.
- Provide green space in urbanized areas to enhance community character and reduce the impact of pollutants and stormwater runoff.

SECTION 2: DEFINITIONS

Community Garden – Land managed and maintained by a public or nonprofit organization, or a group of individuals, to grow and harvest food crops and/or ornamental plants for use by a group, individuals cultivating the land and their households, or for donation. Community Gardens may be divided into separate plots for cultivation by individuals or used collectively by members of a group. A Community Garden may be a principle or accessory use of a site.[1]

Cold Frame – An unheated outdoor structure consisting of a wooden or concrete frame and a top of glass or plastic, used for protecting seedlings and plants from the cold.

Farm Stand – A structure for the display and sale of products grown on the property upon which the stand is located.

Greenhouse – A structure or portion of a structure made primarily of glass or other translucent material, for which the primary purpose is the cultivation or protection of plants.

Hoop House – A structure made of piping or other material covered with translucent plastic, constructed in a half round or hoop shape.

Farm Stand

Cold Frame

Hoop House

[1] Community gardens may be used to fill different needs: food source, recreation, community activity, and education. This definition is broad enough to encompass all of these types of community gardens.

SECTION 3: PERMITTED USES

A. Community Gardens are permitted by right in every zoning district subject to the requirements of this section.

OR

B. Community Gardens are permitted by right in Conservation, Agricultural, low density residential (Rural, R-1), Commercial, and Industrial zoning districts; and permitted by Conditional Use/Special Exception in medium - high density residential zoning districts (R-2, R-3, Village) subject to the requirements of this section.[2]

C. Community Gardens may include the following uses:

1. The cultivation, growing, and harvesting of any agricultural, floricultural, or horticultural commodity.

2. Greenhouses, hoop houses, cold frames, and similar structures for the growing of plants.

3. Open space for active and passive recreation including children's play areas. *However, playground equipment is prohibited.*

4. Sheds, gazebos, and pavilions, and similar structures as accessory uses.

5. Farm stand as an accessory use for display and sale of agricultural products.[3]

6. Compost bins as an accessory use.

7. Keeping of animals (chickens, beekeeping, XX) as an accessory use.[4]

SECTION 4: SPECIFIC CRITIERA FOR COMMUNITY GARDENS

Community Gardens are subject to the following regulations:

A. <u>Lot size and width</u>

1. Community Gardens shall comply with the minimum lot size and width in the district in which it is located.

[2]Community Gardens may not be appropriate for all zones. Some are permitted by Conditional Use/Special Exception in higher density residential zones due to its close proximity to adjacent residences, especially if retail sales, keeping of animals, or composting is permitted.

[3] Some communities prohibit retail sales in Community Gardens, especially in residential zones. If allowed in residential zones, it is generally permitted through the conditional use/special exception process with specific regulations to minimize its impact.

[4] Allowing animals in community gardens presents a problem of oversight as gardeners may not attend to the garden every day. Some communities specifically prohibit animals for this reason and its impact on adjacent residences. If allowed in residential zones, it is permitted through the conditional use/special exception process with specific requirements. If permitted, chickens and beekeeping are the most common animal uses allowed in Community Gardens.

B. Setbacks

1. All structures must comply with the setbacks for accessory structures in the district in which it is located unless a more restrictive setback is required by this section.

   OR

2. All structures must be setback (5', 10', XX) from a property line.

3. *The keeping of animals as an accessory use shall comply with the minimum setback requirements for animals (See Section I of this model ordinance).*

C. Coverage

1. Lots used as Community Gardens must comply with the coverage requirements of the zoning district in which it is located.

   OR

2. Impervious coverage from buildings and parking areas associated with community gardens is limited to (15, 20, 25, XX) % of the lot.

   OR

3. *For multiple adjoining lots that are under common ownership and used as a Community garden, the limit for the combined area of structures is applied over the entire site rather than each individual lot.*

D. Height

1. The height of structures shall be in conformance with accessory building height of the zoning district.

   OR

2. No structure shall be greater than (12', 15', 25', XX') in height.

E. Parking

1. The applicant shall demonstrate that sufficient parking spaces and loading spaces will be available or provided for all uses proposed.

   OR

2. One (1) parking space is required for every (2, 4, XX) individually plotted cultivated area within the community garden.

3. All parking lots and loading areas shall be designed and maintained in accordance with the off-street and loading provisions in Section (XX).

OR

4. Off-street parking areas may be unpaved or surfaced with gravel or other loose material.

5. If after opening the facility, (municipality) determines that additional space is needed, the governing body can require additional parking/loading space be provided.

6. Off-street parking shall be limited in size to 10% of the lot area.

7. The ingress/egress shall be improved with a dustless surface.

F. Signs

1. Signage for a Community Garden shall be in accordance with Section (XX) of this ordinance.[5]

OR

2. A Community Garden may include 1 sign per road frontage, no larger than (4, 6, 10, XX) square feet in a residential district; and (10, 15, 20, XX) square feet in a non-residential district.[6]

3. Signage for Farm stands/Roadside stands related to Community Gardens shall be in accordance with Section (XX) of this ordinance.[7]

G. Composting

1. Setback regulations for composting containers and materials shall comply with underlying zoning regulations for accessory structures.

OR

2. Any compost container or pile must be located at least (3, 5, 10, XX) feet away from any lot line.

3. Compost materials shall be stored in a manner that is not visible from adjacent residential properties and zoning districts.

[5] Municipality should review their signage requirements to determine if standards already exist to address Community Gardens, such as sign provisions for outdoor public, institutional, or recreational uses.

[6] The municipality should review their signage requirements to determine the appropriate sign size to match the existing character of permitted residential and non-residential signs.

[7] Municipality should review their signage requirements to determine if standards exist to address Farm stands or Roadside stands.

OR

4. *Designated composting areas shall be screened from adjoining residences and residential districts according to buffering and screening provisions in Section (XX) of this ordinance.*

5. Composting areas and structures must be maintained in a way that protects adjacent properties from nuisance odors, the attraction of rodents or other pests, and runoff onto adjacent properties.

6. Composting materials shall only be generated onsite.

7. *Organic waste material for composting may be accepted from outside sources and used on-site, but may not be sold.*

H. <u>Farm Stands</u> [8]

1. Sales on site are limited to incidental sales of plants and agricultural products generated on site.

2. *Sales of produce from a Community Garden shall occur for no more than (3, 4, XX) consecutive days on (2, 3, XX) different occasions during a calendar year in residential zones.*

OR

3. *Sales of produce from a Community Garden shall be regulated consistent with garage sales in residential zones.*

4. Farm stands do not have a minimum front setback requirement, but are not permitted within the street right-of-way.

. **OR**

5. Farm stands must be located at least (5, 10, 20, XX) feet from the street right-of-way.

6. *Only one farm stand is permitted per lot.*

7. *Farm stands must be removed from the premises or stored inside a structure on the premises during that time of the year when the facility is not open for public use.*

[8] If the municipality chooses to allow retail sales, sample regulations are provided. If permitted, many communities limit sales to ensure community gardens remain primarily a noncommercial activity. Conditional use/ special exception process is generally used if permitted in residential zones. If retail sales are prohibited, it should be specifically stated in the regulations.

I. Keeping of Animals [9]

The keeping of animals in Community Gardens is permitted as an accessory use and shall be limited to (chickens/fowl, beekeeping, XX).

1. Chickens/Fowl

    a. All chickens shall be provided with a covered, predator-proof cage or other shelter, designed to be easily accessed and cleaned, and of sufficient size to permit free movement of the chickens.

    b. There must be at least 10 square feet allocated per chicken.

    c. Coops and cages shall be cleaned of hen droppings, uneaten feed, feathers and other waste on a (daily, regular, as necessary) basis to ensure they do not become a health, odor or other nuisance.

    d. All animal feed shall be stored in sealed, rodent-proof containers.

    e. No more than (5, 10, XX) hens are permitted per community garden. Roosters shall not be permitted.

    f. The coops or cages housing chickens may not be located in the front yard areas and shall not be located within (5, 10, XX) feet of the property line.

2. Beekeeping

    a. Beekeeping facilities must be consistent with the Pennsylvania Bee Law and Pennsylvania Department of Agriculture "Best Management Practices for Maintaining European Honey Bee colonies in the Commonwealth of Pennsylvania".

    b. All hives must be properly registered with the Pennsylvania Department of Agriculture, Bureau of Plant Industry, pursuant to applicable Pennsylvania state laws;[10]

    c. Ownership, care and control of the honey bees shall be responsibility of the individual listed on the registration;[11]

[9] If the municipality chooses to allow the keeping of animals, sample regulations are provided. Most do not permit animals due to problems with care and supervision. If permitted, types of animals are usually limited to chickens and/or beekeeping. The conditional use/special exception process is generally used if permitted in residential zones.

[10] Governed by 3 Pa.C.S.A. § 2105 Registration of apiaries. "Bee Law"

[11] Governed by 3 Pa.C.S.A. § 2101-§ 2117. "Bee Law"

d. One hive is permitted for every (2,000, 3,000, 4,000, XX,) square feet of lot area;

e. A maximum of (2, 3, XX) hives may be kept on a lot.[12]

f. Location:
   i. Hives are not permitted within (10, 25, 30, XX) feet of any lot line.[13]
   ii. The front of any hive shall face away from the property line of the residential property/zone closest to the hive;
   iii. No hive shall be kept in front or side yards that abut streets.

g. For all colonies located on a property, a flyway barrier at least six feet in height consisting of a solid wall, fence or dense hedge parallel to the property line and extending at least 10 feet beyond the apiary in each direction is required. *A flyway barrier is not needed if the beehive is kept at least 8 feet off the ground.*

h. A supply of fresh water shall be maintained in a location readily accessible to all bee colonies on the site throughout the day to prevent bees from congregating at neighboring swimming pools or other sources of water on nearby properties.

J. <u>Operations</u>

1. The hours of operation shall be consistent with other outdoor public and institutional uses in the district and protect neighbors from light, noise, disturbance or interruption.

   OR

2. The hours of operation shall be from dawn until dusk and protect neighbors from light, noise, disturbance or interruption.

   OR

3. The hours of operation shall be developed at the discretion of the governing body and protect neighbors from light, noise, disturbance or interruption.

4. The land shall be served by a water supply sufficient to support the cultivation practices used on the site.

5. The site must be designed and maintained so that water and fertilizer will not drain onto adjacent property.

6. All seed and fertilizer shall be stored in sealed, rodent-proof containers.

7. Processing or storage of plants or plant products is prohibited on site.

[12] Keeping at least 2 hives per lot helps maintain healthy honeybee colonies, Pa. State Beekeepers Assoc.
[13] Pa. Dept. of Agriculture, Best Management Practices for Maintaining Honey Bee Colonies recommend 10' setback; other sources varied from 15' to 30' setbacks.

8. Gardening tools and supplies may be stored within an accessory building that is in compliance with Section (XX).

9. A Community Garden shall be conducted in such a way that no traffic congestion, noise, glare, odor, smoke, vibration, fire hazards, safety hazards, electromagnetic interference, or otherwise, shall be noticeable at or beyond the property line.

   OR

10. A Community Garden shall comply with the Performance Standards in Section (XX).

11. Community Gardens and their users shall comply with all federal and state regulations concerning the use and storage of pesticides.[14]

SECTION 5: PERMITTING PROCESS FOR COMMUNITY GARDENS [15]

Applicants proposing a Community Garden must submit a zoning permit application or land development plan (if required) identifying the following:

A. Location map and property address.

B. Name and contact information of person or organization

C. All existing and proposed structures and buildings.

D. Location and height of proposed structures and buildings including sheds, containers, *animal housing, coops, hives*, compost facilities, landscaping and fencing.

E. Description of the proposed operation and activities; and retail sales (if permitted).

F. Distance between structures/activities and neighboring properties.

G. Driveways, access drives, parking areas, and loading areas.

H. Location and adequacy of sewage facilities (if required).

I. Stormwater plan (if required).

J. Proposed operating dates/times,

[14] Pesticides are regulated under federal and state law: Federal Insecticide, Fungicide, and Rodenticide Act; Federal Food, Drug, and Cosmetic Act; Pa. Pesticide Control Act. A municipality is generally prohibited from regulating pesticides unless a community garden is on municipal property.

[15] The municipality should review the zoning permit requirements and incorporate these requirements as applicable.

K. Estimated number of separate plots to be cultivated by individuals.

L. Buffering and landscaping requirements in accordance with Section (XX).

M. Certify compliance with all applicable local, state, and federal regulations and permits.

Attachment ii.

MAINE FARMLAND TRUST

IS YOUR TOWN FARM-FRIENDLY?

Take This Test!

Land Use Ordinances and Regulations

Does your town...

...have a detailed section on agriculture in your comprehensive plan?
☐ Yes ☐ No

Does your town's comprehensive plan refer to "maintaining rural character", but overlook agriculture as a primary component? Agriculture shouldn't be an afterthought! Make sure to include agriculture in the sections on economy, critical natural resources, and land use, too.

...allow agricultural uses in more than one zoning district?
☐ Yes ☐ No

Some towns confine agricultural businesses to the commercial zone only, while other towns prohibit such uses in the commercial zone! Farm enterprises are often hybrids of several different uses; ordinances and regulations should allow farm businesses flexibility to adapt to changing markets.

...allow flexibility in regulations to accommodate the unique needs of agricultural businesses?
☐ Yes ☐ No

Both the land use impact and the off-site impact of a seasonal farm business are much less than that of a full-time business. Do your town's regulations provide for reduced restrictions such as expanded hours of business operation, temporary signs, parking near pick-your-own fields, or on street parking? Pick-your-own strawberries or Christmas tree farm businesses may struggle in a town that treats farms like all other retailers.

...require buffer zones between farmland and residential uses?
☐ Yes ☐ No

The old saying "good fences make good neighbors" has a modern corollary that says "good buffer zones make new neighbors good neighbors." New development should not place the burden on existing farms to give up boundary land as a buffer zone between agricultural and residential uses. New residential development should provide for its own buffer zone and/or landscape plantings for screening neighboring farms.

....allow off-site signs to attract and direct farm stand customers?
☐ Yes ☐ No

Farm stands are often seasonal businesses that need to capture potential sales at harvest time. Signs that give directions to the farm stand and let customers know what's available (such as strawberries, corn, apples) are vitally important.

...provide for the agricultural use of open space land created by innovative residential subdivisions?
☐ Yes ☐ No

Some towns have adopted innovative subdivision regulations like cluster housing, which provide for setting aside open space land within the subdivision. Ideally, such land should be the most valuable agricultural land, be big enough for commercial agricultural purposes, and specifically allow long term agricultural use. Smaller plots of set aside land could accommodate community gardens.

...allow accessory uses to agriculture?
☐ Yes ☐ No

Remember, it's not just the farmland that makes farming possible: businesses related to agriculture (veterinarians, equipment and supply dealers, feed milling and delivery, etc.) have to be close enough to serve farmers' needs.

Adapted from "Is Your Town Farm Friendly - A Checklist for Sustaining Rural Character" presented by the New Hampshire Coalition for Sustaining Agriculture and UNH Cooperative Extension - http://cecf1.unh.edu/sustainable/farmfrnd.cfm

Fair Enforcement of Local Regulations

Does your town...

...have a consistent policy approach for local land use procedures that deal with agriculture?
☐ Yes ☐ No

Update your comprehensive plan to express what agriculture contributes to your town's economy and quality of life through open space, wildlife habitation, watershed purification and natural resource preservation. Make sure your select board, planning board, and code officer recognize the importance of farming and build their policies and practices around that presumption.

...have a good idea of how much agriculture there is in town?
☐ Yes ☐ No

Consider having a town committee conduct a farm inventory, survey or economic impact analysis. You may be surprised at the number and variety of farms in your community – and the impact they have on your local economy!

...allow roadside stands or pick-your-own operations by right?
☐ Yes ☐ No

Consider amending your zoning ordinance so that certain agricultural operations don't need a Special Exception or Variance – or even a permit!

...use zoning definitions such as "agricultural accessory uses" in a broad and inclusive manner?
☐ Yes ☐ No

"Agricultural accessory uses" refers to everything from machinery sheds to housing for seasonal workers. Various agricultural businesses have very different needs that can test the balance of rule and exceptions. Write flexibility into ordinances or regulations that may apply to agricultural land uses so the intent is clearly to promote such uses.

...allow farm stands to sell produce purchased elsewhere?
☐ Yes ☐ No

Some towns have rules that a certain percentage of farm stand produce must be grown on the farm. Such regulation may penalize farm operators who have a crop failure or wish to offer a broad range of products.

...properly assess specialized agricultural structures?
☐ Yes ☐ No

Specialized structures such as silos, milking parlors, and permanent greenhouses depreciate in value over time. Providing assessors with depreciation schedules may enable more accurate valuations, which can lead to lower assessments. Even small reductions in taxes can help farmers financially.

...allow non-traditional or retail-based farm businesses in an agricultural zoning district?
☐ Yes ☐ No

Agricultural businesses don't all look alike. Your town should recognize that newer types of farm businesses such as agri-tourism, horse arenas, landscape nurseries, or greenhouses are more intensive in land use, but still carry valuable elements of rural character that benefit the town.

...address agricultural structures in building and safety codes?
☐ Yes ☐ No

Building practices that are state of the art for a specialized use in agriculture may not fit the specifics of codes meant for housing or commercial structures, while bringing agricultural buildings that are historic structures up to code may destroy the very qualities that make them special.

Adapted from "Is Your Town Farm Friendly - A Checklist for Sustaining Rural Character" presented by the New Hampshire Coalition for Sustaining Agriculture and UNH Cooperative Extension - http://cecf1.unh.edu/sustainable/farmfrnd.cfm

Understanding and Encouraging Farming

Does your town....

...consider farmland a natural resource and encourage conservation easements and purchase of farmland?
☐ Yes ☐ No

Easements and outright purchases of farmland ensure preservation of the natural resource base for agriculture. Farmland costs less to taxpayers than land developed for residential uses, and protecting it will ensure it is available for future generations to farm.

...have any visible demonstration of the value of agriculture?
☐ Yes ☐ No

Does your town have a county fair, an apple festival, or an Old Home Day parade? Making agriculture visible to the general public helps establish the economic, cultural, and resource stewardship value of having active farms in a town.

...respect the state Agriculture Protection Act, which helps protect farmer's rights?
☐ Yes ☐ No

Local control is an important tradition for Maine towns. Conflicts between agriculture and other land uses can be reduced when town officials are informed about Best Management Practices (BMP¹s) that may alleviate nuisance complaints. The University of Maine's Cooperative Extension Service writes BMP's about various agricultural practices based on sound scientific research.

...encourage farmers to take advantage of the current use tax programs to help relieve their tax burdens?
☐ Yes ☐ No

By reducing the tax burden on agricultural land, towns can encourage the maintenance of open space at a relatively low cost. The Voluntary Municipal Farm Support Program is a new tool that towns can use to help further reduce the tax burden on farmers in exchange for keeping land in farming.

...have farmers serving on local planning, comprehensive plan, ordinance review boards, or conservation commissions?
☐ Yes ☐ No

There are few better ways to incorporate agricultural concerns into local land use ordinances and regulations than having farmers serve. Farmers can help your town¹s land use boards keep a broad perspective by asking "Have you thought of the consequences...?"

...have farmers serving on the local Economic Development Committee?
☐ Yes ☐ No

Agricultural businesses are frequently undervalued in terms of their effect on the community. Much of the economic activity generated by farms stays within the community. And the regional economic impacts of farming in Maine are growing each year!

...know where to go to get advice and assistance on farm questions?
☐ Yes ☐ No

Make the connection to resources such as:

- the Department of Agriculture, Food and Rural Resources (industry regulator, statewide perspective)
- UMaine's Cooperative Extension (technical questions, BMP¹s)
- Maine Farm Bureau (non-governmental farm lobby, broad experience); Natural Resource Conservation Service (land and water resource management)
- Maine Farmland Trust (farmland conservation, technical assistance).

For more information on any of these topics, or about farming in Maine, go to www.mainefarmlandtrust.org or call Maine Farmland Trust at (207) 338-6575.

Adapted from "Is Your Town Farm Friendly - A Checklist for Sustaining Rural Character" presented by the New Hampshire Coalition for Sustaining Agriculture and UNH Cooperative Extension - http://cecf1.unh.edu/sustainable/farmfrnd.cfm

MAINE FARMLAND TRUST

IS YOUR TOWN FARM-FRIENDLY?

Your Results...

FARM CHAMPIONS - If you answered YES on 17-21 questions, your town is especially helpful to farmers.

FARM SUPPORTERS - If you answered YES on 11-16 questions, your town knows that farmers are good neighbors who provide lots of benefits to the quality of life, but you may be able to take other steps to encourage them.

FARM AMBIVALENT - If you answered YES on 6-10 questions, your town may be less farm friendly than you think. It's time to get to work helping your fellow citizens understand the importance of protecting its agricultural base.

FARM UNFRIENDLY - If you answered YES on 5 or fewer questions, your town is not farm friendly, but there still may be hope. Seek help immediately from farmers, farm groups and organizations like a local land trust or Maine Farmland Trust.

Presented by Maine Farmland Trust – adapted from "Is Your Town Farm Friendly – A Checklist for Sustaining Rural Character" by the New Hampshire Coalition for Sustaining Agriculture and UNH Cooperative Extension.

Attachment iii.

Table Living Mainstream

By Beth Buczynski

Ever wish you could live at your CSA? Or move to a neighborhood where everyone is as excited about fresh, healthy food as you are?

All over the United States people are embracing local food production in an exciting new way. Called 'agrihoods,' this new type of neighborhood serves up farm-to-table living in a cooperative environment. Instead of being built around a pool or tennis court, these housing developments are centered around a farm, often using the sweat-equity of residents to create a sustainable food system for the entire community.

Of course, community gardens, urban agriculture, and cohousing communities are nothing new. But as the rapidly growing crop of agrihoods demonstrates, families are eager to reimagine these collaborative efforts in a new setting--often at the same or lower prices than a traditional suburban neighborhood.

Although the term is freshly minted, agrihoods are already popping up all over the United States. We've rounded up a dozen established or planned communities so you can learn more about how this trend encourages sharing, collaboration, and a healthier, more environmentally-friendly diet.

12 Agrihoods That Are Building (and Feeding) Sustainable Communities

1. Agritopia

THE COMPASSION COMMUNITY READER

Problem Solving

Against the Smart City
How to Develop a City of Compassion Campaign
From Housing to Health Care, 7 Co-ops That Are Changing Our Economy
Defining the Worst Type of Street Design
Land-Use Strategies to Create Socially Just, Multiracial Cities
Diébédo Francis Kéré: How to build with clay... and community
Mohamed Ali: The link between unemployment and terrorism
From Soap to Cities, Designing From Nature Could Solve Our Biggest Challenges
Food Recovery Network Redistributes Extra Campus Food to Feed Hungry
Recovering Unsold Food for the Needy
A Canadian City

Located well inside the Phoenix metro area, Agritopia features 450 residential lots along with commercial, agricultural, and open space tracts. All are specifically designed to reduce physical, social and economic barriers to relationships between neighbors. The central feature is a working farm complete with lambs, chickens, a citrus grove and rows of heirloom vegetables. "By encouraging sharing, making homes more maintenance free, having easy pedestrian access to most of a resident's needs, and making an adaptable community, our lives can be simplified giving us more time to enjoy friends and family," explain the residents.

2. Serenbe Community

Serenbe is a 1,000 acre community located under 30 minutes from Atlanta's Hartsfield-Jackson
International Airport. The develpment's four omega-shaped hamlets

Once Eliminated Poverty And Nearly Everyone Forgot About It
Foundation House Brings Affordable Housing to Nonprofit Workers
Steve Howard: Let's go all-in on selling sustainability
Founder of Time Banking Believes Everyone Has Something to Contribute
The Green Economy
The Greenest City Story
Toby Eccles: Invest in social change
Tiny Houses for the Homeless: An Affordable Solution Catches On
What Makes a Good City?
Why Social Urbanism Matters for Sharing Cities
copycat_city
Not Just a Southern Thing: The Changing Geography of American Poverty
Portland and San Francisco Prove Cities Can Be Sustainable
Shaping Global Partnerships for a Post-2015 World
Simple, Cheap Health Remedies Cut Child Mortality In Ethiopia
What Happened When Some Folks In

are carefully fitted into the natural landscape forming an interface between green, wetland and watershed areas of the site and the surrounding sloping hills. Central to all is Serenbe Farms, a 25-acre working, organic farm and CSA which provides organic produce for Serenbe's three on-site restaurants as well as other businesses throughout Atlanta and The Chattahoochee Hill Country.

3. Prairie Crossing

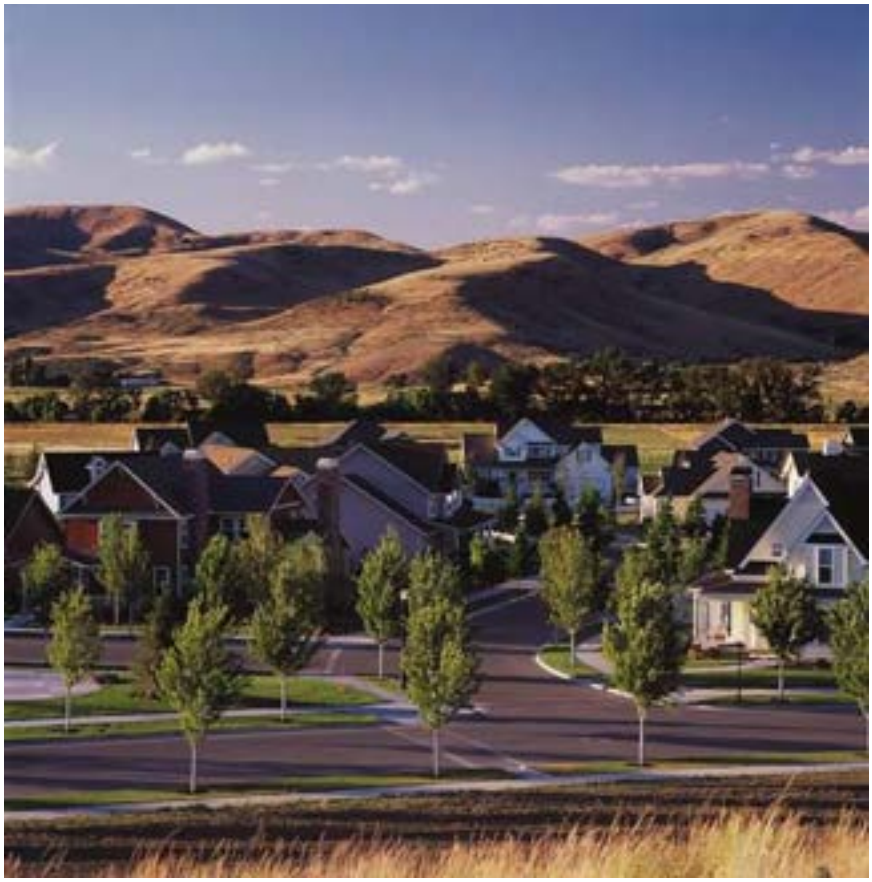
Located in Grayslake, Illinois, this agrihood was designed to combine the preservation of open land, easy commuting by rail, and responsible development practices. In addition to shops, a charter school that emphasizes environmental education and global citizenship, and stables, Prairie Crossing is known for its 100-acre working organic farm which is working to launch the next generation of farmers to grow organic food for the Chicago region.

4. South Village

Denver Gave Cameras To People Who Can't Get Enough To Eat
Why So Many Emerging Megacities Remain So Poor
Seven Practical Ideas for Compassionate Communities
Fighting hate with compassionate actions: Mayors reflect on Charlottesville
The City that Ended Hunger
Dudley Street Neighborhood Initiative
Urban Gardening as a Corrective for Homo Economicus
A Piazza on Every Block: How DIY Placemaking Is Transforming Communities
Building a Good Life in Community
Step-by-Step Procedure for Developing a Compassionate City Campaign
Check List for a Compassionate City Campaign
Compassion Games International
10 Steps Toward an Incredible Edible Town
Compassionate Governance Conference, Louisville, KY, April 2013

This community was designed to combine two of Vermont's most cherished traditions: open space and village living. The agrihood features paths for cycling and cross-country skiing, community gardens, and a 4-acre organic farm that plays a vital role in connecting South Village residents to local food production via a cooperative CSA. Unlike many of the farms we've mentioned, The Farm at South Village boasts a one-acre, 528-panel photovoltaic solar array that produces150kW of carbon-free electricity for the South Village community, the Farm, and the City of South Burlington itself.

5. Hidden Springs



Organizing Processes

- How to Make Better Decisions Together
- Standing Rock Interview
- CEOs for Cities: An Organization that Wants to Help You Solve Your City's Problems
- Effective Groups
- Eleven Principles for Creating Great Community Places
- Ideas for the New City--Urban Omnibus
- Shamengo: Giving Voice to People Who Care
- The Fourth Way
- Using Emergence to Scale Social Innovation
- 21 Technologies That Will Decentralize the World
- What is Placemaking?
- The Six Pillars of Character®
- Why Saul Alinsky, Author of "Rules" for Social Change, Would Probably

This community in Boise, Idaho, was created around an agricultural heritage and with a small town feel. Created on the site of a 135 year-old farmstead, Hidden Springs offers access to 800 acres of open space. In addition to the Dry Creek Mercantile and restaurant, schools, fire department, and salt water swimming pool, the development centers around an organic farm that produces vegetables and herbs for CSA members and customers of the Mercantile.

6. Willowsford

Located in the heart of Loudoun County, Virginia, Willowsford spans over 4,000 acres and is comprised of four distinctive yet interconnected "villages." More than half of this land is designated to remain as open space under the stewardship of the non-profit Willowsford Conservancy. Out of the other half, 300 acres is used to cultivate more than 150 varieties of vegetables, herbs, fruit, flowers and raise several breeds of livestock--many of which are distributed to the community through the CSA program and Farm Stand.

7. Kukui'ula

Break Them Today
People are in the streets protesting Donald Trump. But when does protest actually work?
4 Expert Tips on Launching a Community Organization

Shareable Community Ideas

How the Commons Amplifies the Sharing Economy
If We Could All Tap Into This Quality (Which We Can), The World Would Be A Better Place
How to Start a Grocery Co-op
Techies to Hack Homelessness in San Francisco
Eight components of a "healing city"
In Cleveland, Hoop Houses Turn Empty Lots into Year Round Farms
The Happiness Initiative
Policy Ideas for Shareable Urban Housing
The Share Shelf: Feeding the Hungry, One Leftover at a Time
12 Agrihoods Taking Farm-to-Table Living Mainstream
A Simple Chart to Share With Anyone Who Complains About People On

It doesn't take long to see that Kukui'ula is a bit more upscale than most of the agrihoods we've listed so far. But the same principles of community and sustainable agriculture guide daily life in this Hawaiian paradise. Tucked in a valley beside a 20-acre lake, the Upcountry Farm allows members to plunge their hands into the stunning red earth, cultivating bananas, papaya, chard, citrus, herbs, pineapple, arugula and breadfruit for the community to eat.

8. Bucking Horse

No where are citizens more hungry for the supportive ties of community than my own home state of Colorado. That's why local developer Bellisimo, Inc. is planning something new for its next project in the popular foothills town of Fort Collins. Built around the principles of community, environment, education, health and economics, the Bucking Horse project will strive to create new standards for a healthier lifestyle. The 160 acre agrihood will feature a trail system, healthy retailers (think bike shop and yoga studio), community gardens, and a farm-to-fork restaurant that will serve up produce and other edibles grown on site.

9. Skokomish Farms

Welfare
Amsterdam is Now Europe's First Sharable City
How Public Spaces Make Cities Work
How a New Dutch Library Smashed Attendance Records
How to Design Our Neighborhoods for Happiness
How to Start a Repair Café
Little Free Library Movement
Los Angeles Gets Its First Urban Fruit Trail
How to Share Your Office Space the Right Way
Off-Grid Movement Gains Momentum
Scott Budnick serves breakfast – with a side order of respect – to the homeless
Poverty-Focused Innovation: How to Foster Creating an Agency for the Poor
Public Housing Works: Lessons from Vienna and Singapore

Skokomish Farms is an environmental community built on a former hay farm in the Puget Sound area of Washington state. The community consists of 18 parcels, each of which is divided into a 5 acre homesite with the remaining 35 acres cultivated under a perpetual conservation farm easement. Agricultural activities are managed by a democratically elected farm manager. "You'll enjoy abundant healthy organic and natural produce year-round. We plan to cross-pasture grass-fed livestock, and to raise field crops. In the winter some crops will be grown in greenhouses," explains the website.

10. Harvest

Harvest is an 1,150-acre master-planned, mixed-use development in Northlake, Texas that will eventually be home to approximately 3,200 energy-efficient, single-family houses. At its heart is Tassione Farms, a community garden and orchard where residents will learn how to grow fresh, organic produce and embrace a farm-to-table lifestyle.

Reverse Food Truck Takes in Food to Feed the Hungry
Sharing City Seoul: A Model for the World
To Reduce Prejudice, Try Sharing Passions And Cultures
Won't Want that Sandwich? Can't sell it? Don't Throw it away, though!
Sharing as Direct Action in a New Economy
"Modified Social Benches": An Experiment in Outdoor Socializing
5 Reasons Why Coworking is Awesome
Free Coworking Growing Rapidly Fueled by Open Collaboration
Stranded in Atlanta's Food Deserts
How to Be a Good Neighbour
Supermodel Lily Cole Launches Gift Economy Platform Impossible.com
These Four Cities Are Making Youth Empowerment a Priority
Neighborly advice: What does it take to be a good neighbor?
Toni Griffin: A New Vision for Rebuilding Detroit
Top 15 New Books About Sharing, Cities and Happiness
Ways To Love Where

11. Sendero

This is just one of three unique villages that will eventually make up the 6,000 Rancho Mission Viejo development in San Juan Capistrano, California. Located on 17,000 acres of permanent open space, Sendero residents can choose from a mix of house styles and neighborhoods that wrap around paths, parks, gardens and the Ranch House – the social hub of the village. Down the road, Sendero Farm and the Ranch Marketplace provide easy access to organic vegetables, herbs and flowers grown right on site--including citrus and avocados.

12. Prairie Commons

You Live
We Gathered, We Mapped, We Shared
What Happens When Our Cities Start Talking?
Street Store: The Open Source Pop-up Clothing Swap for the Homeless
What is a Compassionate Community?
What Difference Can Compassion Make?
Community Stories
Pretending to be homeless for a night
Richardson, Texas becomes the second City in the Dallas-Fort Worth Metroplex to Affirm the Charter for Compassion
Can compassion have economic benefits?
Seven Job Creation Strategies for Shareable Cities
10 Ways Our World is Becoming More Shareable
10 principles for making high-density cities better
7 Ways To Reinvent Your City, Burning Man Style
A Guy Who Used to be Homeless Shows Us Exactly What Determination Looks Like
Channeling Change: Making Collective Impact Work

Specifically designed with the senior citizen in mind, Prarie Commons will be a pedestrian-friendly development built around a 15-acre lake in Olathe, Kansas. On-site, Tibbet's Farm will transform the existing single-crop operation into a certified organic farm that produces a variety of fruits, vegetables and small-scale livestock. In addition to the farm, a series of community gardens, a farmers' market, cooking school, restaurants and a small grocery market will "reintroduce the heritage of fresh food into a contemporary development."

Original article here.

Building the Just City
Chris Downey: Design with the Blind in Mind
Austin to Shelter Homeless in a Tiny House Village
Denmark Is Considered The Happiest Country. You'll Never Guess Why.
Can Co-Ops Curb Poverty in New York City?
Cities try a new strategy with immigrants: embrace them
Can kindness movements make a difference?
Enrique Peñalosa: Why buses represent democracy in action
Groups Plan Combined Effort to Help One Another
Healthy Neighborhoods, Healthy Kids

COMPASSIONATE COMMUNITIES

Overview
Participating Communities
Community Partners
Register
Charter Tool Box
Expanded menu
Phase 1
Phase 2
Phase 3

Phase 4
Spirituality and Community Building
Compassion Reader
Newsletter, Reports and Documents
ACC Meeting Archives
Annotated Bibliography
Compassion Games
Video: First First Follower
Community Blog
What Makes a Compassionate City?
Fulfilling Our Responsibilities to the Next Generation

About Us

Charter for Compassion provides an umbrella for people to engage in collaborative partnerships worldwide. Our mission is to bring to life the principles articulated in the Charter for Compassion through concrete, practical action in a myriad of sectors.

Contact

Charter for CompassionPO Box 10787Bainbridge Island, WA 98110

contact@charterforcompassion.org

Make sure you're following us on social media and seeing our posts!

Charter

Historic Moments for the Charter
Who has signed the Charter for Compassion?
Karen Armstrong's 2008 TED Prize
Charter for Compassion in Translation
Why become a Member of the Charter?

Charter Publications & Productions

Archived Newsletters
Charter Blogs
Charter Community Tool Box
Extended Compassion for Racial Healing
Golden Rule Day
Islamophobia Guide Book
Medium.com/charter-for-compassion
Social Justice Handbook
Soundcloud.com/charterforcompassion

Spiritual Assets for Community Building
What Makes a Compassionate City?
Webithon
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Our Pride
Spiritual Paths Institute
United Religions Initiative (URI)

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Attachment C-2 Economic Development

Economic Development

Type: Planning

Implementation Time: 3 months to >1 years

Goals:

To capture synergies between community agriculture & economic development needs, with subgoals:

- Increases to property values – seen as asset marketing tool
- Increased foot traffic to local businesses
- Grow "farm to table" markets and restaurants
- Improved quality of place, vibrancy, security (eyes on the street)

To promote local food production to achieve economic self-sufficiency goals
To build workforce capacity through education
To connect the public with commercial agriculture growth
To recognize opportunity to invest in public spaces, seek funds from grants and volunteers to do improvements and maintenance. Widen pool of community investors.
To grow populations of urban neighborhoods
To enhance branding of community identity

Audience: Local Businesses leaders, Business organizations (Downtown / Village orgs, Chamber of Commerce), Elected officials, Economic Development Committees, government staff, local and regional Board and Committee members, advocacy organizations

Question: Are there any existing municipal ordinances or policies which hinder community agriculture? Are new ordinances or policies needed to promote community agriculture goals? What barriers are there, if any, to changing these policies or ordinances?

Question: Does community have a stated brand / identity or around agriculture as a value?

Question: If agriculture is a value, is the community providing adequate support or investment for this

Question: Is the community considering how community agriculture can enhance other goals

Question: If there is economic development who is benefiting, is equity considered

Question: If property values increase, are there concerns with gentrification

Overview:

Community agriculture initiatives can and should be connected to community economic development planning. Initiatives like edible main streets, community gardens, and food forests can increase foot traffic, thus creating a more vibrant urban ecosystem that local businesses can benefit from (also known as "placemaking"). Increased local production also grows the economic base by putting a valuable commodity directly in the hands of consumers and market growers.

Implementation:

A. Integrate community agriculture into place making initiatives:
    a. Edible Main Street
        i. Create a series of edible plantings / planters in a downtown of village center area.
        ii. Can be promoted through brochures encouraging walking tours.
        iii. Produce selections can tie into local business, for example herbs near a bookstore or tea shop, tomato at a pizza restaurant, etc.

iv. Recommended that this program be a cooperative effort between local business hosts, Downtown organizations or a local nonprofit, and the municipality. Relatively small amounts of base funding can be leveraged with volunteer efforts by local civics organization (such as scouts)
v. See module for more details.

b. Community gardens & Food Forests
   i. Proven strategy for neighborhood economic development, attractive amenity that raises property values.
   ii. Provides supplemental food of greatest benefit lower-income residents
   iii. See Community Garden & Food Forest Modules for more details

Question: Does your community have active placemaking projects? How can they be enhanced with a connection to community agriculture?

B. Provide connections to education programming
   a. Community agriculture as a vocational opportunity, both youth and adult

Question: What types of youth and adult education programming is available in your community? How can they be enhanced with a connection to community agriculture?
Question: Are programs available to provide agricultural trade skills?

C. Connections to tourism sector
   a. Farm to table businesses
   b. Seasonal opportunities / tourism (agritourism uses)
   c. Recognize that business expanding activity to remain viable (for example farms as wedding venues)

Question: What types of tourism are prevalent in your community? How do they connect with local food and/or community agriculture?
Question: Does your community have a history around a particular industry/event which has lead to a unifying community identity? How can community agriculture enhance perception and participation around this identity?
Question: Are there any barriers to businesses engaging in agritourism?

Costs:

Personnel time

Partners to Support Implementation:

A. Municipal Governments
B. Economic Development Board or Committee
C. Nonprofit community agriculture support organization
D. Nonprofit food security organizations
E. CCSWCD
F. Town's Downtown Network (local town business alliance/association)
G. Local businesses
H. Local farms/nurseries
I. Municipal Parks & Recreation Staff
J. Neighborhood Associations

Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachment C-3 Adult Learners

Adult Learners

Type: Program Development, Partner Coordination

Implementation Time: 1-8 months

Goals: To improve awareness and understanding of local food systems as a means of community resilience.
To inspire the community to engage in locally grown food systems.
To increase accessibility to fresh locally grown produce and promote food security.
To promote understanding of ecological relationships as a way to create habitat and food sources that are self-sustaining.
To increase understanding of gardening basics and plant needs and create more successful gardeners.
To build economic and community development
To grow the labor force, grow the local food economy, and create vocational opportunities

Audience: 18 and over

Question: Are there adults engaged with other community agriculture initiatives?

Question: Do other community agriculture efforts have a more targeted audience? Would that audience also benefit from educational programming?

Question: Are any adults engaged with other community agriculture initiatives willing to share their knowledge with other adults?

Question: What type of adult groups (ie. senior centers, garden clubs, Rec programs, etc) exist in your community which would be interested in learning more about community agriculture initiatives?

Overview: This initiative requires the engagement of an intergenerational community body. Therefore, it is essential that educators have activities and strategies to engage adult learners. Adults also tend to know things that can get in the way of learning new things.

Knowing the adult learners' cognitive and social characteristics, educators can create the right content and structure to engage them. Characteristics of the adult learner that this module will attempt to address are the following: 1) Self-direction, 2) Results-oriented, 3) Less-open minded, 4) Integrate knowledge more deeply, takes time, 5) Use personal experience as a resource.

Implementation:

Determine Communication Strategies: Communication strategies and activities that maximize the experience of the adult, leverage their self-confidence, and respect their maturity will help to keep them motivated and willing to learn.

Question: What communication strategies will work best for your target audience?

Establish Group and Project Goals: Finding common ground with language and experience is essential early on in a learning event. Participants should be encouraged to share stories around their experiences or interests in the activities of the day.

Question: What are the goals for the time together, defining key terms, reviewing agenda, and ground rules to orient and facilitate the adult learner to be present and arrive mentally and emotionally? Checking in at each of these to make sure they make sense is necessary to track the adult participants engagement.

Question: How will you communicate what the goals are to the group?

Hands-on experiences and activities with adult learners provides an opportunity for learning and for leading. Groups should be organized strategically to allow a mix of learners and leaders in each group. Assigning groups can be done with a "continuum", where participants line up according to their knowledge in the projects topic matter. From this line, groups of mixed skill levels can be easily assigned. Adult learners should be provided the choice to lead or to learn in community agriculture. A facilitated wrap-up allows for self-reflection on knowledge learned and shared throughout the day. Circles are a way to value experience. Thank participants for attending.

Questions: What's one thing that was memorable about the day? Have we reached our goals today?

These activities can be incorporated into community events where volunteers will be working together to implement some community agriculture initiative, in adult and continuing education courses, in adult enrichment programs that the site of community agriculture installations, edible walk abouts, garden tours, and woven into each of the modules in our program. The goals of the group should be identified prior to the event and shared with participants before.

Questions: What are the goals of the event?

Costs:

Personnel time

Materials:

- Tools
- Agenda/goals
- Design/plans printed
- Helpful illustrations and material lists

Facility costs

Partners to Support Implementation:

A. CCSWCD
B. 207Permaculture
C. Resilience Hub
D. Edgewood Nursery
E. Maine Association of Non-Profits
F. Craig Freshly? Other facilitators
G. Adult Education Programs
H. Rec Programs

Funding Opportunities:

A. Fee for service
B. Ag in the classroom
C. Municipal appropriation

Attachment C-4 Youth Education

Youth Education

Type: Program Development, Partner Coordination

Implementation Time: 1-8 months

Goals: To increase youth understanding of where food comes from and the importance of local food systems.
To inspire youth to engage in locally grown food systems.
To increase accessibility to fresh locally grown produce and promote food security.
To promote understanding of ecological relationships as a way to create habitat and food sources that are self-sustaining.
To increase understanding of gardening basics and plant needs and create more successful gardeners.
To increase the sustainability of our food system in the long term.
To grow the labor force, grow the local food economy, and create vocational opportunities.

Audience: Youth K-12 grade

Overview:

Youth education programming aims to increase understanding through hands-on exploration of the natural world. Activities engage youth to learn about garden techniques that improve soil and produce quality food. Youth will become more connected with where their food comes from and the importance of local agriculture.

Activities can easily meld into existing programs that support youth education or exploration of the natural world. Curriculums include a variety of games and hands-on garden activities to convey concepts which fit into both traditional classroom learning or camp settings.

Implementation:

Phase 1: Identify Youth Groups

Connect with community youth groups to identify which groups would be interested in incorporating community agriculture learning into their existing programming. Schools, Rec Programs, 4-H Groups, Scouts and many other youth groups are common in many communities.

> *Question: What youth groups exist in your community? Do these groups have access to garden space?*
>
> *Question: What is your town's history with agriculture? Is there a long history of agriculture or is introducing local agriculture new?*
>
> *Question: Which age groups have curriculum goals that can be met with agriculture topics?*

Phase 2: Determine Group Needs

Connect with interested groups to determine the audience and how this programming can best fill their needs and the goals of the community.

> *Question: What age ranges will be participating? What type of environment does the group meet in (ie. traditional classroom, summer camp)? Are there limits in what they can physically participate in? When and for how long does the group meet?*
>
> *Question: What existing curriculum can this program be incorporated into? Do they have learning goals to meet? What topics will help to meet those goals?*
>
> *Question: What background information will they have? Have they participated in gardening before?*
>
> *Question: Will lesson or activity topics need to meet curriculum requirements?*

Question: Can produce be incorporated into regular meals for the group?

Phase 3: Deliver Instruction

Lessons can include a selection of activities that explain gardening or ecological concepts in an interactive way as well as tasks that help to maintain the garden. Many lesson activities or lesson plans currently exist (attachment). Activities can be paired together to reaffirm conceptual learning with actual maintenance tasks that accomplish the concept goals – for example a youth "service learning" program can support community agriculture installations around a community while providing a stipend to participants. Educational lessons can also standalone if that better suits the flow of the group or the allotted time frame. Some activities require a garden space, but most concept activities can be done without. If youth have access to a garden, they can actively be gardening and growing their own vegetables. Produce can be incorporated into their lunch or donated to a food pantry.

Question: What materials will be needed for hands-on experiences? If gardens need to be constructed, how will they be built?

Question: What space is available for hands-on gardening? Is it suitable for growing edible produce? Has it been tested for lead? Will it be suitable for experiences needed to meet learning goals?

Question: What time commitments will the group have for maintaining a garden? Will they need support for all maintenance, or can they facilitate it on their own? Will they be able to support the garden from seed to produce?

Costs:

Personnel time:

a) Coordination
b) Lesson Prep
c) Delivery
d) Follow-up/maintenance

Materials:

a) Lesson supplies
b) Seedlings
c) Garden construction
d) Soil
e) Soil amendments
f) Mulch

Partners to Support Implementation:

A. CCSWCD
B. Edgewood Nursery (Aaron Parker)
C. Cultivating Community
D. Resilience Hub

Funding Opportunities:

A. Fee for service
B. Ag in the classroom

Attachments:

i. Youth Curriculum Examples:
    a. Lesson 1: Local Foods
    b. Lesson 2: Decomposers

c. Lesson 3: Mulching
d. Lesson 4: Pollination
e. Lesson 5: Garden Senses
f. Aquaponics – example lessons
g. Ag in the Classroom: "Who Grew My Soup?"
h. Ag in the Classroom "Food Miles"

Maine Foods for Maine Kids!

Help students understand the CONNECTion between their fork and farmer's fields, highlighting the benefits of locally procuded foods.

Objectives:
Students will

- Students will understand the nutritional value of eating local
- Students will understand the effects of buying local verse regional/global on the economy, environment and nutrients
- Students will understand some of the different techniques used to make crops more resilient

Grade level: Middle school/ Teen Rec Camp

Time: 45 min - 1 hour

Materials:
"Food Services" vocab handouts
"Which Apple?" handout *(optional)*
Bag of potting soil
Cups (2 per group)
Apples (6)
Apple Seeds (1 per group - 6)
Station signs

- Soil Station
- Harvest Station
- Apple Packaging
- Food Headquarters
- Travel Day 1
- Travel Day 2
- Travel Day 3
- Market!

Vocabulary:
Local, Regional, and Global economy
Farm Value
Nutrition

Lesson Introduction: (5-10 min)

I. Introduce self and the District. *Hi, my name is _____ and I work at the Cumberland County Soil and Water Conservation District. By a raise of hand, who can tell me if we are in Cumberland County right now? …. Who wants to take a guess or thinks they know what we do at the Soil and Water Conservation District?*

Explain garden projects at Little Falls Activity Center. Get a sense of everyone's background by asking who has ever planted/grown food/ currently growing food at home.

II. Introduce today's topic:
   a. Today we will be talking about where our food comes from and eating locally verse regionally (products that come from a different state) or globally (products that come from a different country).

   b. Ask students the following questions:

      - How many of you shop at the grocery store, whether it be with your parents, by yourselves, or with friends?

      - Have you ever noticed that the cost of some food items change from one month to the next, or from one season to another?

         - Why is that? *When out of season in Maine, have to get from somewhere else and pay the cost to get it here.*

      - What kinds of expenses do you think go into the foods you see in the grocery store? *(Have students brainstorm ideas and write them on the board. Ex: Transport, Packaging; Advertising; Utilities; Labor; etc.)*

ACTIVITY PART I: Apple Production Relay (15 minutes)

I. Instructions : Explain that our next activity is going to be a bit more active, and is actually going to be a race among groups to see whos apple gets to the market the quickest and the freshest. Explain that each group will get a set of directions. Some may be similar some may be different. The directions tell you exactly what to do and in what order. Explain that you will hand out the directions to each group and give them 5 minutes to look them over and decided who is going to do each step within their group. Everyone in the group must participate in atleast one step of the directions!

   a. Point out the different stations around the room
      - **Soil Station** – scoop soil into your cup
      - **Watering** – use the sink: don't need a whole cup of water!
      - **Harvest Station** – grab 1 apple only
      - **Packaging Station** – you must come up and take 1 bag only to your station
      - **Travel Stations** – You must go to the travel station and stand for however long it tells you before returning to your group
      - **Market** – the teacher!

   b. Hand out directions and give 5 minutes

   c. After 5 minutes, go over stations again and what they must do. Point out where the clock is and that they must use it for their timing – no cheating, or the activity wont work!

   d. Show how they will sow the seed before getting started

   e. Ask if anyone has questions, and then say go!

II. Discussion:

a. Talk about whos group took the fastest and whos took the slowest – be sure to have the groups tell you where their apples came from

b. Freshness and nutrition – Ask which apple you think is going to be the most fresh? The most nutritious? Why?
- Talk about how food loses its nutritional value and flavor as it sits
- Discuss how many apples that come from afar that we buy in the grocery store are sometimes a year old! They are injected with a chemical to keep them "good" and have a wax coating.

c. Who's group do you think impacted the environment more? Why?
- Farther away apples take more transportation emissions and energy
- Maybe more packaging from non-local apples

ACTIVITY PART II: Tracking Breakfast

I. Ask students which foods they had for breakfast. See if they can track the different pathways that it would have taken.
II. If time, have students share out. See who had the least steps.
III. Make sure to include the following

• **Farmer (Producer):** A person/company who grows and harvests food on a farm
• **Food Inspector**: A person/company who visits farms or processing centers to ensure that foods are grown and processed safely
• **Food Processor:** A person/company who washes, cuts, mixes, and packages food from the farm
• **Food Transporter:** A person/company who moves food from one location to another, such as by truck, train, ship, or airplane
• **Food Distributor**: A person/company who decides which stores receive the food
• **Advertiser** A person/company who designs the advertisements that promote food to consumers
• **Grocer/Food Retailer:** A person/company who sells food to consumers (such as through a grocery store or supermarket)
• **Consumer:** A person who buys the food that has been grown or prepared
• **Compost/Waste Manager:** A person/company who disposes of leftover food scraps by either composting or throwing food away

Wrap up / Conclusion: (5 minutes)

Decomposition Tag
(Adapted from Do the Rot Thing: A Teacher's Guide to Compost Activities)

Version 1: Grades 4-6

- **Objective:** Students will play a game of tag that demonstrates the role decomposers play in the food web and the overall cycle of life.

- **1. Background**
  - Ask students if they know what compost is. Do they compost at home? Talk about decomposers and their role in nature and composting.
- **2. Round 1**
  - Tell the students that they will be taking part in the decomposition process. Designate one participant as "Death" and have them wear a dark colored armband. Large groups can have two.
  - Designate 2-5 participants as decomposers and have them wear light-colored arm bands. Everyone else will be plants or animals (have them choose their favorite animal/plant!).
  - When the death character tags a plant or animal, they must freeze in place until one of the decomposers walks around them three times, unfreezing them. The decomposers unfreeze the animals and plants at the same rate or faster than the death character freezes them.
  - The game does not end and should go on long enough for participants to experience the concept. It should stop well before participants get exhausted or lose interest.
- **3. Round 2**
  - Without decomposers recycling dead things, life would stop. To demonstrate this, allow the death character to tag and freeze everyone, including decomposers. The game ends, and so does life on Earth, once everyone is frozen except the death character.
  - Ask students to lie down on the ground. Using guided imagery, have them imagine what it feels like to be a seed in the soil, to feel the water and sunlight wash against them as they grow, slowly, into a plant.
- **4. Debrief**
  - Review the life cycle and role of decomposers. Have students talk about what they learned and how they felt during the game.

Version 2: Grades K-3

- **Objective:** Students will play a game of tag that teaches them how food waste is turned into compost and why soil is so important.

- **1. Background**
  - Ask students if they know what compost is. Do they compost at home? Talk about decomposers and how they make compost. Mention that the soil plants grow in is a lot like compost.
- **2. Round 1**
  - Tell the students that they will be making compost together. Designate one participant as the Gardener and have them wear a red colored armband. Large groups can have two.
  - Designate 2-5 participants as decomposers and have them wear green colored armbands. Have everyone else choose their favorite fruit, vegetable, or plant, and they'll play as that.
  - When the gardener character tags a fruit, vegetable, or plant, they have been put in the compost bin and must freeze in place. They must remain frozen until a decomposer walks around them three times, unfreezing them. They then regrow as a different fruit or vegetable and continue the game.
  - The game does not end and should go on long enough for participants to experience the concept. It should stop well before the participants get exhausted or lose interest
- **3. Round 2**
  - Without decomposers recycling things, compost wouldn't form and plants wouldn't grow. To demonstrate this, eliminate the decomposer role and designate 3-5 gardeners. Have everyone else be a fruit or vegetable. The game ends once everyone is frozen and the gardeners have no more compost/soil to grow plants with.
  - Ask students to lie down on the ground. Using guided imagery, have them imagine what it feels like to be a seed in the soil, to feel the water and sunlight wash against them as they grow, slowly, into a plant.
- **4. Debrief**
  - Talk about the importance of decomposers in making compost and soil. We need them to decompose dead plants so new soil can be created. Have students talk about what they learned and how they felt during the game.

Wild Weeds

- **Objective:** Students will play a game of capture the flag to demonstrate how mulching helps soil retain nutrients/moisture and prevents weeds.

- **1. Soil Lesson**
  - Talk to students about the importance of soil in the gardens. What do soils contain that plants need? What does mulch do to protect soil and the important stuff it contains?
- **2. Capture the Flag (Round 1)**
  - Divide students into two groups. One group will represent garden plants, the other will represent weeds.
  - Set up flags on opposite sides of the field. The flags will represent nutrients/moisture in the soil. The plants and the weeds must "compete" with each other for these resources.
  - Clearly mark a center line on the field. If students from one team cross this line, they are in the other team's territory.
  - Students can be tagged by opposing team members if they've crossed the line. If a student is tagged, they must freeze in place and wait for a team member to cross the line and tag them back in. Once they've been tagged, they are free to move around the field again.
  - If a student retrieves the flag and is tagged on their way back, they must drop the flag. It must then be returned to its designated area at the back of the field.
  - The game ends once a team has successfully brought the opposing team's flag across the center line to their territory.
- **3. Capture the Flag (Round 2)**
  - Tell the students that the garden they're all a part of has just been mulched. Because of this, it is now much more difficult for weeds to establish themselves.
  - For this round, move the center line so that the field is split unevenly. The plants should have more territory than the weeds.
- **4. Debrief**
  - Even if the weeds win the second round, ask the weeds which round was harder. Why? How does it relate back to mulching?

Lesson: Mission Pollination!

Students learn about how pollination happens and play a game to see its benefits. They will explore options to help protect pollinators and start seeds to grow their own native wild flowers.

Objectives:
Students will:
- Understand how bees collect and store their food.
- Understand the role that pollinators play in plant reproduction.
- Play a game to understand how pollination works
- Plant a flower seed to bring home

Grade level: Elementary and middle school

Time: 45 min - 1 hour

Materials:
Pollen buckets
Pom Poms
Mittens
Soil
Seeds
Tiny cups
Info stickers

Vocabulary:

Pollination	Transferring pollen from one plant to another to fertilize.
Pesticide	Weed and bug killers that can run off and effect the health of our waterways.
Nectar	Sugary liquid produced by flowers. Bees gather it to store for food.
Pollen	Powdery material produced by the male part of plants. Travels on pollinators to fertilize plants.

Lesson Intro:

I. Introduce self and the District. *Hi, my name is _____ and I work at the Cumberland County Soil and Water Conservation District. By a raise of hand, who can tell me if we are in Cumberland County right now? …. Who wants to take a guess or thinks they know what we do at the Soil and Water Conservation District?*

II. Explain that today we are going to talk about bees and how they work with plants!

III. Life in the hive: Honey bees live in a big group inside a hive. Their whole home is made out of wax cells. Some of the cells are used to raise larvae (baby bees) but most are for storing honey which comes from the nectar. They have a queen bee who is in charge of laying all the eggs in each of the cells. And most of the

other bees are called worker bees. These are all the queens daughters. At different ages they have different responsibilities. So the ones that have just hatched will stay inside the hive and work on cleaning and getting cells ready for a new egg. Others are in charge of feeding the larvae or the queen. Once they are old enough they are taught how to forage for food to bring back to the hive.

IV. Pollination: Explain how bees have very long tongues to drink nectar from the center of flowers. Bees use the nectar for food. They store it inside their body (in the honey stomach) while they are out and then when they get back to the hive it is stored in the wax honey comb. Bees depend on flowers for their food source and the flowers depend on the bees to pollinate them.

V. Plants need for pollination: Flowers need to be pollinated to reproduce and make more flowers. Every flower produces pollen. Sometimes you see layers of yellow dust in the spring-that's pollen! Flowers need pollen from other flowers to be able to make seeds that will grow into new flowers.

VI. Bees role in pollination: Bees have a very important role in helping pollen travel from one flower to another. They visit one flower to collect nectar and while they are doing that the pollen from the flower sticks to their fur. When they fly to another flower they take the pollen with them and some of it falls off into the new flower. The bees will also take some of the pollen back to their hive to store as food. It has lots of nutrients that bees need. The honey gives them lots of energy- it's kind of like eating a lot of pasta or bread. The pollen has the vitamins and minerals that make them strong and healthy- just like your vegetables.

Activity Part I – Buzzy Buzzy Bee

I. Tell students you will now play a game to see how bees are important for pollination. Explain that each round is one growing season (spring-fall). The number of pollen each flower collects
   a. Divide students into two groups
      - Flowers: Each flower gets a bag for collecting pollen and a bowl for giving out pollen
      - Bees: Each bee will visit a flower and collect one piece of pollen. The pollen will be collected at the next flower they visit. They can not leave pollen at the same flower they collected it from. They need to try to visit each flower before repeating.
   b. Set a timer for one minute and let the bees pollinate. After one minute ask the flowers to count the number of pollen they collected. Record the number.
   c. Read a scenario and instruct bees on what they will do differently each round.
   d. Continue until all scenarios have been completed

II. Scenarios:
   a. Bees pollinate normally. All bees and flowers are active.
   b. It is a very cold season. All bees need to wear mittens to stay warm while pollinating.
   c. It is a windy season. All bees spin in circles while flying from flower to flower.
   d. There is a late frost causing half the buds to be destroyed and not grow into flowers. Half the flowers sit down for the round and bees can not retrieve pollen from them.
   e. Someone has used weed and bug killers on their yard. The chemicals make all the bees sick and they have to stay home to rest

III. Discussion – Human Impact
   a. Ask which scenario made the most seeds for the next season. What about the least?
   b. What happened in the scenario that caused the least?
   c. What could they have done differently?
   d. Discuss how pesticides are intended to kill bugs and plants that people don't want in their house or yard. These chemicals don't pick which bugs to hurt and which to save so they can hurt our good

bugs too. They can also wash off of people's yards in the rain and end up in our streams and lakes where they are harmful to other animals that use the water.

Activity Part II – Planting flowers

- **Step 1**: Explain that we are now going to help our pollinators out by planting flower seeds so that when they bloom they will have more plants to gather food from.
- **Step 2**: Each student will write their name on a sticker.
- **Step 3**: They will place their sticker on a small paper cup.
- **Step 4**: They will fill their paper cup with soil.
- **Step 5**: They will place ~3 seeds in the soil.

7/22/2020

Week 4: Textured Treasure Hunt

1. Warm-Up: Garden Growth Journal
    a. Observe plant growth & sketch in journals
    b. Remind students about different parts of plants
    c. Observe different textures & colors
2. Introduction to the Food Forest
    a. Most plants in this garden are edible!
        i. Not all parts of the plant are edible
        ii. The plants have not produced edible parts yet
    b. Introduce campers to lemon balm (or anise)
        i. Everyone picks a leaf to describe the texture and the scent (observations)
        ii. If you rub leaves between your fingers, sometimes you can smell the plants super well!
            1. What do you smell?
    c. Go over how to harvest plants responsibly
        i. Small sample (one leaf, not the whole branch)
3. Time for the Textured Treasure Hunt
    a. Distribute ziplock bags/cups to collect treasure in (call it a treasure box?). All garden samples (treasure) will be collected in the bag/cup.
    b. Texture Missions
        i. Mission 1: Collect something soft (like a puppy!)
        ii. Mission 2: Collect something hard (like stone!)
        iii. Mission 3: Collect something rough (like sandpaper!)
        iv. Mission 4: Collecting something smooth (like an egg?)
        v. Mission 5: Collect something pokey/prickly (like a cactus) - CAREFUL
    c. In the treasure box, there are 3 paint chips/Hand out a paint chip to every student. Find something that matches every color!
4. Treasure Map
    a. Glue your treasure to the appropriate box on your treasure map.
    b. Glue paint chips next to color.
5. Reflection
    a. Come together and share with the group.
        i. What is your favorite texture?
    b. Discuss scent associated with treasure.
    c. Discuss color associated with treasure.
6. Next week: Does your treasure look the same? What changed?

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AQUAPONICS 101

A GUIDE TO UNDERSTANDING AND BUILDING YOUR OWN AQUAPONICS SYSTEM

PRESENTED in PARTNERSHIP with NORTHROP GRUMMAN Foundation

TABLE OF CONTENTS

THIS LESSON WAS DEVELOPED IN COLLABORATION WITH THE FOLLOWING EARTHECHO EXPEDITION FELLOWS:

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EARTHECHO
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AQUAPONICS 101

INTRODUCTION

A series of activities to create an aquaponics system in your classroom!

This curricular guide was developed by EarthEcho International in collaboration with EarthEcho's Expedition Fellows to teach middle school students an alternative farming technique that addresses excessive water use in traditional farming, environmental impacts of fish farms, and urban development due to population growth that leaves less land for food production. Aquaponics 101 is a series of activities that will ultimately prepare your students to design and build an aquaponics system for the classroom. We have provided pre-design challenge activities so your students have the knowledge they need to buildtheir aquaponics system (Know Before You Build). Also included is a step by step guide to set up a system as a teacher resource. This guide supports 21st-century skills by engaging your students in learning the history of aquaponics through various texts, communicating how an aquaponics system works, and engineering your own classroom aquaponics system through an interactive design challenge!

During EarthEcho Expedition: Water by Design, we took an in-depth look at California's water systems, issues, and innovative solutions. As the Expedition Fellows, a group of middle school teachers, engaged with water industry leaders, they evaluated system designs that California water warriors are using to combat drought, biodiversity loss, climate change, and water pollution. They also gained extensive knowledge to take back to their classrooms. The materials in EarthEcho Expedition: Water by Design are a compilation of materials gathered on this week-long journey that included a visit to Future Foods Farms, one of the largest aquaponics farms in California, growing organically produced food in several 2,000-4,000 square foot greenhouses. The magic behind Chef Adam's aquaponic system is the sustainable infrastructure that inspires innovative engineering design. In this guide, Expedition fellows crafted activities inspired by our time with Chef Adam at Future Foods Farms. It demonstrates a real-world issue with a viable solution that promotes not only career skills but life skills as well. Enjoy!

SUMMARY

1. Subject(s): Science, Technology, Engineering, and Math
2. Topic or Unit of Study: Aquaponics, Water, Fish, Plants, Engineering
3. Grade/Level: 6-8
4. Objective: As a result of these activities, students will be able to:

   a) Understand that water is a key element for life on Earth and that human population growth is a major contributor to water scarcity.

   b) Explore and understand how an aquaponics system works, including nutrient cycles.

   c) Analyze how aquaponics may have both long and short-term impacts for humans and the natural environment.

   d) Design and build an aquaponics system.

- **Know Before You Build: History of Aquaponics**
- **Know Before You Build: The Nutrient Cycle**
- **Know Before You Build: Aquaponic Farm- Fish Types**
- **Design Challenge Activity: Building An Aquaponics System**
- **Step by Step Guide for Building an Aquaponics System**

KNOW BEFORE YOU BUILD: HISTORY OF AQUAPONICS

Teacher Summary (Presentation is available for download to be used with students), have your student complete the KWL chart before, during, and after the direct instruction on the history of aquaponics.

Materials:

- Powerpoint Presentation - The History of Aquaponics
- The Rise of Modern Aquaponics - Video
- Graphic Organizer - KWL Chart - Student Handout

The earliest cultures known to use aquaponics were the Aztecs and the Chinese beginning in the 13th century. This style of farming most likely evolved from practices used by earlier civilizations in those regions.

The Aztecs had what are called "floating farms". The Aztecs dominated Mesoamerica during the 14th-16th centuries. The humid, swampy land of Central Mexico — cut by several interconnected lakes — allowed for intensive agriculture. The Aztecs created artificial islands (some of which were movable) called chinampas, upon which they grew maize, beans, squash, chilies, and amaranth. They most likely borrowed this idea from the Mayans. The Aztec farmers could paddle their canoes in the canals dug between the chinampas. Fish waste in the lake nourished the crops.

Aquaponics were also used in early Chinese communities. *Wang Zhen's Book on Farming*, a Chinese agriculture manual from the 13th century, described floating wooden rafts topped with mud and dirt used to grow rice. The Chinese used polycultural farming practices to raise finfish, catfish, ducks, and plants. In an upper pond, finfish consumed the waste that dropped from duck cages built above the pond. Finfish waste cascaded into a lower pond where catfish scooped it up from the bottom. Nutrient-rich water from the catfish pond was used to irrigate rice and vegetable crops. Rizipisci-culture, or the cultivation of rice and fish together, was an idea possibly stolen from India as early as the 6th century. References to its use in the Tang Dynasty (6th century) can be found in ancient Chinese texts. It has since become very common in many rice growing cultures such as Taiwan and Japan.

A timeline of the rise of modern aquaponics:

- Largely came from the need to reduce wastes from fish farms.
- The term "aquaponics" is attributed to the New Alchemy Institute in Massachusetts. This institute was founded in 1969 to study how human support systems are designed.
- New Alchemy Institute founders John and Nancy Todd, and William McLarney designed The Ark, a solar-powered, self-sufficient bioshelter that used aquaponics to grow food in 1969.
- 1970s: Dr. James Rakocy at the University of the Virgin Islands began studying plants as natural filters for fish farms.
- Mid-1980s: Dr. Mark McMurtry and Professor Doug Sanders at North Carolina State University develop the first known closed-loop aquaponics system.
- Mid-1980s: The first large-scale commercial aquaponics facility — Bioshelters, in Amherst, MA — opened. (Still operating today.)
- Early 1990s: Missouri farmers Tom and Paula Speraneo pioneered the use of gravel grow beds instead of sand
- Use the KWL Chart below and have students complete as you review the history of aquaponics.

KNOW BEFORE YOU BUILD: THE NUTRIENT CYCLE

This activity supports investigation of the nutrient cycle in the aquatic environment to prepare students with the basic biological mechanisms driving aquaponic systems.

Aquaponics - The Nutrient Cycle

Engage

Teachers will explain to students that Earth has many different cycles in nature that repeat themselves. There are specific nutrient cycles that all living things depend on for life.

In this lesson, students will take a look at different cycles to ground the concept of a nutrient cycle and the importance of the nitrogen cycle in aquaponics.

Think Pair Share:

Have students list as many cycles they can think of first:

- washing machine cycle
- water cycle

Then have them share with their elbow partner to come up with more ideas.

Next share out with the class. And add the nutrient cycles that pertain to aquaponics.

This will lay the foundation for students to have a better understanding.

Lesson Resource: California Agriculture in the Classroom
Activity: All Aboard the Carousel

Explore

Students will create a 4-Square Model for each of the following vocabulary words:

1. Interdependence
2. Cycle
3. Energy
4. Producers
5. Consumers
6. Decomposers
7. Ammonia
8. Nitrate
9. Oxygen
10. Carbon Dioxide
11. Grow Beds

Sample 4-Square Model:

Word	**Definition**
Cycle	Any complete round or series of occurrences that repeats
Picture 	**Sentence** The water in an aquaponics system **cycles** through the fish tank and grow beds and continues to repeat itself.

Explain

Teacher will explain to students how every living thing need nutrients to survive. Students will learn that nutrients move between living things and cycle through the earth. This lesson will set the foundation for students to learn the nutrient cycle that works within an Aquaponics System.

The Teacher will remind students that an Aquaponics System is a food chain that includes plants, fish, and bacteria living in the same closed system.

Explain Food Chains

Objective: Students will identify how living things consume nutrients by brainstorming food chains that exist in nature and making drawings of their food chains to share with the class.

Discussion Question: How do humans get their nutrients?

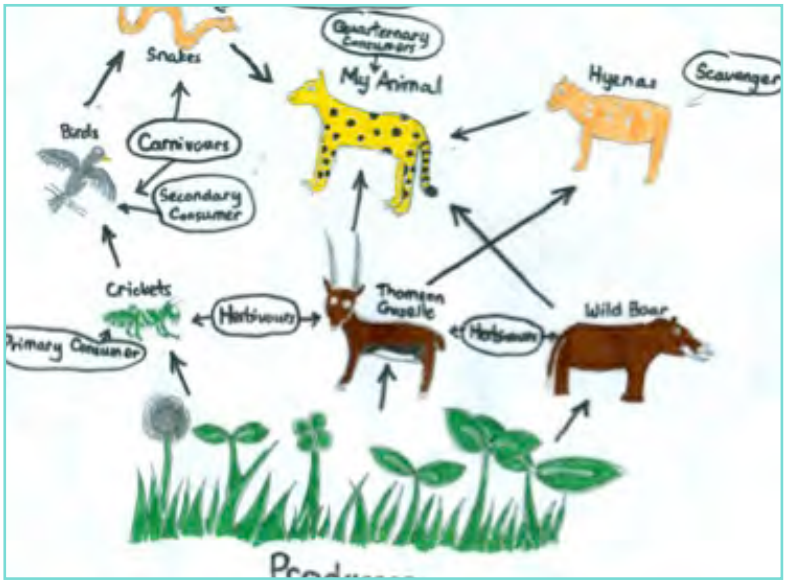
- Have students write their answers in their journals (3 mins)
- Have students discuss their answers with a partner (3 mins)
- Pick 3 students to share their answers (5 mins)

Activity: Create a list of how different living things in nature get their nutrients.

- Create a list on the whiteboard
    - Birds - Worms - Organic Matter
    - Ladybugs - Aphids - Plant Matter
    - Wolves - Rabbits - Lettuce
    - Deer - Plants - Sun

- Give each student a piece of 8x11 white construction paper
    - Students have 20 minutes to create a food chain to represent a living thing found in nature
    - Extension - You can have students use laptops to research specific food chains

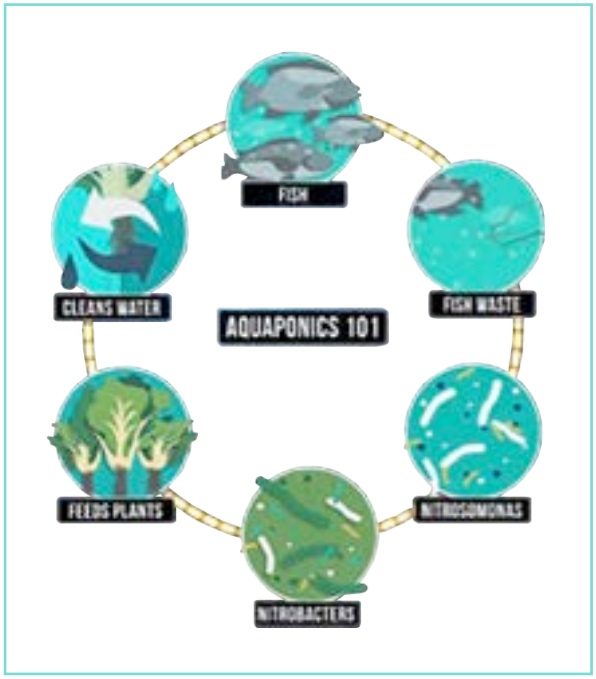
Example of student work:



Reflection: Pick 3 students to share their food chains (10 mins)

Closing: Explain that food chains create a cycle of nutrients and in aquaponics the nitrogen cycle creates the energy transfer needed for plant growth and fish development. Next class students will learn about the nitrogen cycle.

Teacher will explain to students how the Nitrogen Cycle works in an Aquaponics System (see diagram)



Elaborate

Students will write about their "journey" traveling through the nitrogen cycle in an Aquaponics System. In their journals, they must describe the cycle of energy among producers, consumers, and decomposers in the system and how they are interdependent.

Evaluate

Interdependence Worksheet - Student Handout

DESIGN CHALLENGE ACTIVITY: BUILDING AN AQUAPONICS SYSTEM

Engage

After learning about aquaponics, have students discuss in groups why it is important to select fish type/breed for their system.

(Students will understand that choosing an aquaponics fish is important because the fish will ensure the success of their system. The fish life cycle produces all the necessary nutrients for the plants that will be grown in the system.)

Explore

Students will research on their own the different types of fish and figure out the pros and cons of using each fish. Things they would need to consider are:

1. climate their system will be in (some fish, like tilapia, like warm climates, while others, such as trout, prefer cold)
2. resistance to disease/parasites
3. availability
4. reproduction rate

Explain

Teacher will go over fish types ideal to an aquaponic farm (see student handout). Some ideal fish include:

Tilapia	Crappies	Silver Perch	Murray Cod
White Bass	Catfish	Goldfish	Jade Perch
Barramundi	Trout	Koi	Bluegill

Elaborate

After students have researched and studied the pros and cons of using each fish type, have them create a presentation (individually or in small groups) about which fish they believe would be best suited for your system.

Evaluate

After students have researched and studied the pros and cons of using each fish type and presented their findings, they can vote on the fish that they think will make the best choice for their aquaponic farm.

TEACHER BACKGROUND

Water Quality

Critical water characteristics must be carefully measured and maintained within proper ranges to assure optimized performance of the organisms and to secure success. The water quality constituents of highest importance are: temperature, dissolved oxygen, ammonia, and pH. If production guidelines are followed, then pH is the only parameter that requires frequent monitoring (Rakocy, 2006). Aquaponics studies in Appendix C provide considerable guidance on water quality thresholds, monitoring techniques, and management solutions to maintain or restore vital balance between the biological and chemical constituents.

Fish are ectothermic and thus biologically affected by temperature. Temperatures should be steady within 14°C-36°C, with the optimal range from 27°C-30°C (Somerville et al., 2014). Temperature also affects nitrification rates of bacteria, pH, and nutrient absorbability of plant roots.

Maintaining adequate oxygenation is vital to the health of the organisms. Oxygen must be added at a rate that is at least equal to the rate of consumption by the fish and bacteria. Stocking density of the fish is therefore limited by the amount of oxygen that can be dissolved into the water. The recommended dissolved oxygen range is 5-7 mg/L (FAO, 2014). Therefore, it is advised that the backup power system be regularly tested and secondary aeration systems be available.

The principal nitrogenous waste generated by fish is ammonia. Treatment and decomposition of the ammonia into a nutrient that is both beneficial to the plants and non-harmful to the fish is the principal purpose of the re-circulating technique. Ammonia exists in two compounds, ionized and un-ionized. While all forms of ammonia are harmful to fish, un-ionized ammonia is especially hazardous. Levels are dependent upon temperature, pH, and composition of feed and feed rate. If the biofilter is healthy and properly cared for, it will convert the harmful compounds into innocuous or healthy nutrients.

The pH is a measure of the hydrogen ion concentration, which affects many other water quality parameters and biochemical processes of the system. Fish can tolerate wide ranges of pH but levels are best between 6.5-8.5, although nitrifying bacteria may be less productive at levels greater than 7 pH. Testing the alkalinity of the source water is important because an alkaline buffer can protect against the effects of drastic pH changes in a short period.

Pump Design

Water movement is fundamental to transporting nutrients and solids through the system. Without proper water movement, the dissolved oxygen would deplete and waste would accumulate to levels fatal to the fish within hours or less, depending on the system design. Additionally, without adequate water movement through the deep-well grow beds, the water can become anoxic and stunt the growth of the crop.

A recirculating system is dependent on gravity to move water through the system. In circulating the water, returning it to the highest point requires an external energy source. For the SAHS aquaponics system, this external source was designed to be an electrical submersible impeller pump which would need to perform while continuously submerged, include an automatic shut-off capability, have low power demand, and lift water at 10 feet of total head at a flow rate of less than 10 gallons per minute. Height from the bottom of the sump to the top of the fish tank, positive suction head, and losses through the hose were considered in head calculation. The design flow rate was based on the retention times within each phase of the aquaponics system, which are reported in Table 1.

Common guidance suggests that the entire system should be circulated every 1 – 2 hours for densely stocked tanks (Somerville et al., 2014). However, longer residence time in the growth beds is tolerable because it allows for nutrient uptake. The pump performance curve is shown in Figure 10.

Power

The aquaponics system has two power requirements: the aeration system, which supplies the oxygen for the fish and plants, and the sump pump, which re-circulates the water from the grow beds to the fish tank.

Aeration system

In its current state, the system consists of two aerators and a third backup unit. The operational units will be supplying air in the fish tank and the grow bed [brand Aquascape Pond Air 4, (11W, 0.1A per unit)], to ensure a dissolved oxygen (DO) concentration of 4.0-6.0 mg/L, the UVI recommended range. Each aerator supplies 3500 cc/min. of air to the water, distributed through four air discs per aerator. The air discs will be placed in the fish tank and the grow bed.

The connection between the supply of oxygen and the fish is critical to the functioning of the aquaponics system. Without constant power to the air discs, the likelihood of oxygen deprivation to the fish rapidly increases. The survival time of fish without a constant oxygen supply is dependent on a number of factors including: fish stocking density, water and ambient air temperature, and turbidity of the fish tank, but the time frame can be as short as 12-24 hours for tilapia if DO concentration reduces below 4 mg/L (FAO, 2014). The supply of oxygen to the plant roots ensures growth, as nitrifying bacteria become inefficient at dissolved oxygen concentrations below 2 ppm (FAO, 2014).

Sump pump

The ⅛ HP Pump (Superior Pump, model no. 91025) requires a total of 3.6 A of power to supply the (flow rate of 10 GPM) from the grow beds to the fish tank. A backup pump of the same model is available, should failure occur with the operation of the unit

Citation: http://ase.tufts.edu/water/pdf/Practicum_Andros_FinalReprt_2015.pdf

Introduction to design challenge:

- Design challenge student handout
- 11" x 17" poster paper for blueprint design
- Rulers for blueprints
- Internet access, computer carts or lab for research

Once you have a design, if you choose to build a system you will need additional materials from those listed below:

- Ammonia testing strips
- Water testing strips (6 in 1 is recommended)
- Thermometers
- Water pump
- Water aerator
- De-chlorinated water
- Seeds or seedlings
- Coconut husk or gravel as substrate (depending on plant set up)
- Fish tank of some sort (barrel, etc.)
- Fish food (especially when starting off the seeds/seedlings)
- Fish (goldfish, koi, tilapia, etc.)
- Specialized bacteria
- Piping for water to flow between subsystems
- Possibly drip irrigation tubing/system

NOTE: You may need additional materials once the students have created their blueprints.

Designing your System

I. **System Design Criteria & Constraints** - review student handout with system criteria and constraints

II. **Design research** - student handout

III. **Blueprints** - student handout

IV. **Peer Review** - After completion of blueprints, have students lay out their designs and walk around completing a peer review of other's projects. Remind them that the more specific their rationale is, the better the feedback for the group they are reviewing. Have students evaluate 3-5 projects using the rubric below. If you have time, groups should review the feedback and be given some time to make modifications to their designs before submitting them to you.

DIY Aquaponics For Your Classroom (Cheap and Easy):

This simple, inexpensive Aquaponics Unit can be easily engineered by you and your students to fit the needs of your classroom (e.g., space, materials, lighting, budget). The unit is powered by a water pump that pushes water up from an aquaculture tank into higher PVC pipes holding the plants. The unit relies on gravity for the water to flow back into the aquaculture tank.

STEP 1: Build your stand. We used repurposed wood (old staircase), but pallets, PVC pipes, or whatever you have lying around will work. Our stand was 36"W x 48"H.

STEP 2: You will need six 3" PVC pipes that are approximately 40" in length. Using a 2" or 3" hole saw (depending on pot size, we used 2") drill 5 holes approximately 6" apart.

STEP 3: Glue 3" knockout caps on each end of the 3" PVC pipes. Drill ¾" holes in end caps for elbows (these will connect your pipes together) Holes will be drilled in the middle of each end cap for proper water level.

STEP 4: Secure "J" hooks on both sides of frame. The students figured a 1" slope for every 40" of pipe. Snap pipes in place and connect each pipe using ¾" PVC pipe to your elbows.

STEP 5: Prepare your aquaculture tank. Use whatever you have available to hold fish. We used an old stream table, but a used aquarium of any size will work. You will need a pump that will circulate the water through your pipes. We used a 320 gallon per hour pump in our 20 gallon tank. 100 feeder goldfish were added along with a used aerator donated by a parent.

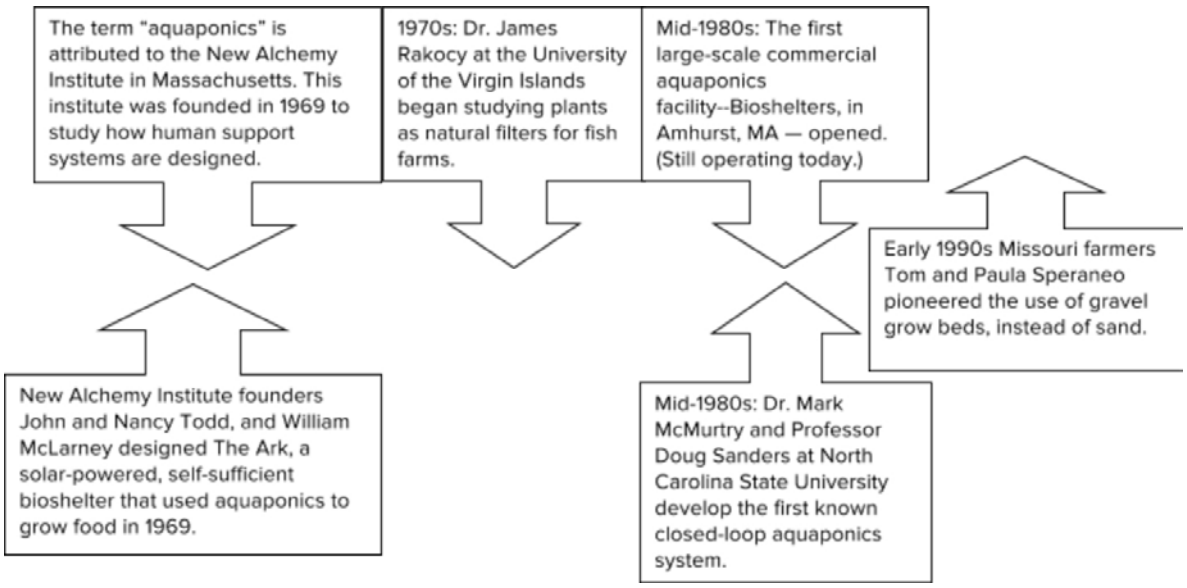
STEP 6: PLUG IN AND CHECK FOR LEAKS! Make any adjustments necessary. We are using 2"x2" grow pots with donated pH neutral expanded clay rocks for our grow media. The students are planting basil, mint, and watercress to begin our garden.

KNOW BEFORE YOU BUILD STUDENT HANDOUT:

Timeline Visual: The Rise of Modern Aquaponics

Student Handout: History of Aquaponics

The Rise of Modern Aquaponics



K-W-L Chart

Title: _____

Before Lesson: Think about Aquaponics. Write what you already know into the K box. Write questions about what you would like to know in the W box.

During Lesson: Make notes that will help you answer your questions.

After Lesson: Write the answers to your questions in the L box. Reread the text as needed

K What I **K**now	**W** What I **W**ant to Know	**L** What I **L**earned

Interdependence Worksheet

Name: _____

1. How do different living things (organisms) in an aquaponics system depend on each other? Use the table below to help you organize your thoughts.

Organism	What's the role? (producer, consumer, or decomposer?)	What do they need from other living things to survive?	How do they get it?	How do they help others?	Where do they get their energy?
Fish					
Plants					
Bacteria					

2. Choose three organisms near your home and explain how they are interdependent with each other and other organisms?

Finding the Right Fish for Your Aquaponic Tank

Aquaponics, a farming method that combines hydroponics (growing plants without soil) and aquaculture (raising fish in a closed system), is poised to become the Next Big Thing in sustainable agriculture. Indoor and backyard small-scale aquaponic systems--like those found at a school--are estimated to number in the thousands, and larger operations, like hobby and commercial farms, are becoming more common as well. The key feature of an aquaponic system is the symbiotic relationship between the fish that produce nutrient-rich waste, and the plants, which filter and use the nutrients for growth. Finding the right type of fish for your tank is one of the most crucial elements of the system.

Water temperature: the Goldilocks Principle

The first consideration when you are choosing a fish species is the temperature of the water in your tank. If your system is indoors in a classroom, or outdoors in a warmer climate, you will want a fish that thrives in warm water, such as tilapia. If your tank is outdoors in a colder climate, you may find success with a cold-water species such as trout. (See more examples in the chart below.) Fish species that are well-matched to the temperature of their tank will grow and reproduce, while fish that are outside the range of their preferred temperature experience stress that will halt their growth, and could lead to death. Though it is possible to adjust the temperature of your tank with a heater or chiller, you can minimize your expenses by choosing a fish species that does not require manipulation of the ambient temperature. Some growers in temperate climates vary their fish depending on the season--swapping out a warm-water fish in the spring and summer for a cold-water fish in the fall and winter.

The choice is clear...or cloudy?

In addition to water temperature, there are other water quality parameters to consider when choosing the fish for your tank. Factors such as turbidity, pH, and dissolved oxygen also play a role in the success of your fish-rearing. It is often best to consider the type of water environment each fish prefers in the wild, and then extrapolate that information to your aquaponic system. Tilapia and catfish originate from ponds, lakes, and marshlands, so they can tolerate lower levels of dissolved oxygen and overall water quality. Trout, on the other hand, come from clear, highly-oxygenated streams, which means they will do better in a tank with these characteristics. These species' preferences will factor into choices you make about tank size, fish crowding, what plants you want to grow, and how closely you want to monitor and maintain tank conditions.

To eat, or not to eat, that is the question.

One of the biggest considerations you will need to make before selecting your fish is whether you are intending to harvest your fish for consumption, or whether you are keeping your fish for ornamental purposes. Commercial aquaponic farmers raise tilapia, perch, trout, or other edible species to maximize the profit from their farm. Issues such as breeding potential, time to plate size, cost of fish food (carnivore vs. omnivore), and consumer taste preferences will often dictate which species they choose. Indoor and small backyard operations may find that ornamental fish such as goldfish and koi are preferable to edible varieties for ease of tank management. Schools that wish to raise edible fish for consumption by students should check with their food service director or county or state health department to learn more about the procedures for harvesting them. Most states require use of a harvesting facility that is approved and inspected by the USDA.

Food for thought: a few final things to consider

When making your final selection for the type of fish you want to raise in your aquaponic tank, you should consider where you are going to purchase the fish and what type of food they will need. Picking a species that is native to where you live is recommended if you have an outdoor tank, because the fish will be acclimated to the surroundings and they won't pose a problem if flooding leads to their accidental release in local waterways. You may also be able to obtain native fish fry or fingerlings (juvenile forms) from local hatcheries. If hatcheries aren't an option, pet stores, local hobbyists, and shipments via the internet are reliable sources for obtaining fish for your tank. Keep in mind that your fish will most likely require supplemental food. Carnivores such as trout need a good source of protein, such as a high quality food pellet, insects, or small crustaceans. Freshwater mussels, shrimp, and crustaceans can actually be raised in the tanks with carnivorous fish. Omnivores such as tilapia will still need supplemental food, but they will also be content to nibble on duckweed and other aquatic vegetation.

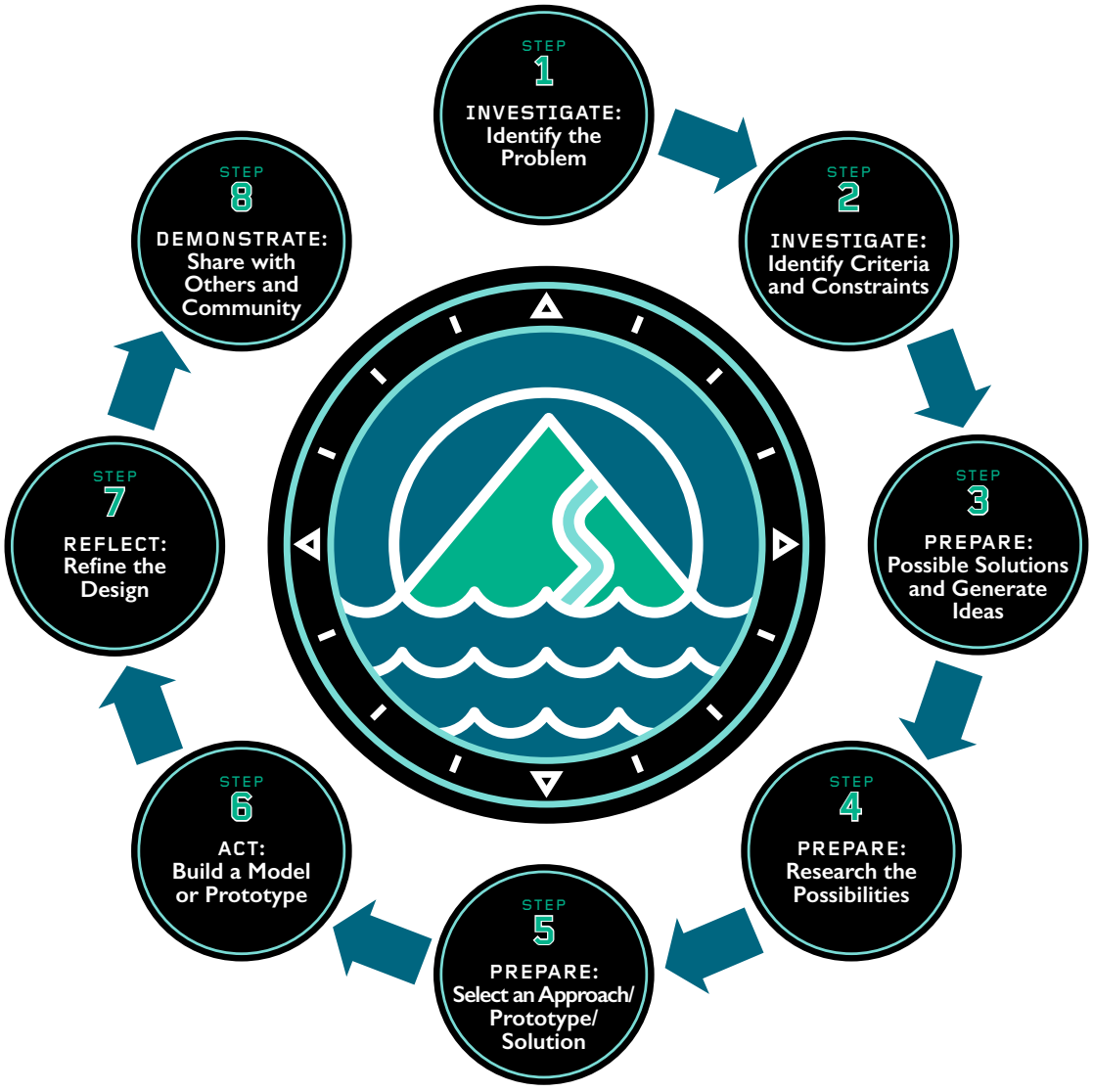
Whatever fish species you end up selecting for your aquaponic system, you will undoubtedly find yourself troubleshooting unexpected challenges at some point. Fortunately, most fish commonly used in aquaponics are fairly tolerant of the learning process you will go through, and by choosing a fish species that meets your needs and the tank conditions, you are more likely to be successful.

Some common fish used in aquaponics:

Fish species	Preferred water temperature (°F)	Edible or ornamental	Other considerations
Tilapia 	Warm 72-86	Edible	• Omnivore • Breeds easily • Mild-tasting meat • Time to plate: 6-9 months
Trout 	Cold 56-68	Edible	• Carnivore • Requires good water quality • Meat is in demand • Time to plate: 12-16 months
Catfish 	Warm 78-86	Edible	• Omnivore • Easy to maintain • Farmed extensively in the U.S. • Time to plate: 5-10 months
Perch 	Warm 70-82	Edible	• Carnivore • Adaptable to various conditions (good starter fish) • Slow-growing • Time to plate: 9-16 months
Goldfish 	Warm 68-75	Ornamental	• Omnivore • Cheap and easy to find • Tolerant of poor water quality • Requires plant cover to breed • Produces a lot of waste (good for crops that need lots of nutrients.)
Koi 	Warm 65-75	Ornamental	• Omnivore • More expensive than goldfish • Parasite-resistant • Long life-span • Hardy

EARTHECHO INTERNATIONAL

Engineering Design Process



Name _____ Date _____ Period _____

Aquaponics Design Challenge: Student Worksheet

Introduction:

Calling all Engineers!!! Greenville City, CA needs your help!

We are a mountain city, and are fairly isolated from agricultural centers. This means that all of the produce and seafood sold in our grocery stores has to be shipped in from outside locations. This becomes a problem for us during the long cold winters when the windy mountain roads are too icy or snowy for produce trucks to get into town. We are not a wealthy town and need to find low cost, sustainably sourced options to help us get the food we need. The local citizens here are interested in finding sustainable ways for us to get fresh fruits and vegetables year-round and are proposing that we set up aquaponics farms here. We are requesting that you design the initial blueprint and model, and if we're happy with it we will make a larger scale version of it for the town. You will find the criteria and conditions for our model request listed below. Thank you!

Before you begin: What is aquaponics?

It's a combination of ***Aqua***culture (raising aquatic organisms) and Hydro***ponics*** (growing plants without soil). In an aquaponics system, plants are grown in water that has had fish living in it. The fish create crucial nutrients (ammonia) that are subjected to bacterial colonies in the water which metabolize the ammonia, ultimately turning it into nitrate the plants can use. Then the plants absorb the nitrate and the clean water is returned to the fish. See our resources on the nitrogen cycle for additional information on this process.

Guiding Questions:

As we consider how to feed a growing population of humans with increasingly limited land and water resources available to us, we need to consider more sustainable alternative options for creating food while minimizing waste. Additionally, we need to find a way to produce food year-round for people with limited access to food or farmable land.

- How can we make the most food using the fewest resources (water, soil, etc.)?
- How can we grow produce (fruits and veggies) and protein (animals) at the same time?

Before You Build: Research & System Considerations

1. What criteria could we use to decide how successful and efficient the system is?
2. Where is your system going to be built at your school?
    a. What conditions will it require? (electricity? water source? Natural or artificial light? Etc.)
        i. If you are using grow lights, what will you use?
        ii. Does your system need special water?

3. Taking into account what you learned about fish from earlier lessons, what type of fish will you use in the system? Consider what you will do with the fish as they grow and which species produce appropriate amounts of ammonia, etc.
    a. Once you decide your fish type, what conditions (examples: pH, salinity, etc.) do they require?
    b. What do they eat?
    c. What temperature do they prefer the water?
    d. Do you need to add oxygen to your system?
4. What type of plants are you going to grow in your system? Are you going to have the plants be grown in a hydroponic setup or will they be in pots with drip irrigation of the "fish water"?
    a. If it's hydroponic: what will you be planting them in so they won't be fully submerged in water? Also will the fish have access to the roots? Is this something you want?
    b. If it's drip: What type of substrate will you plant your seeds in? Consider that you don't want to clog or contaminate your system.
5. What sort of bacteria do you want in your system? How will you get them?
6. Are there other nutrients that your plants will need? How will you provide them?
7. Based on the size of your system, what size/type of pump would work best?
8. How do you plan to control for pests?

Designing your System

System Design Criteria & Constraints:

Criteria (what your design needs to do):

- Must minimize risk of water damage to school property
- Must hold a minimum of (insert # here depending on size limitations) plants
- Aesthetically pleasing
- Must be able to deliver all resources necessary for fish and plant growth, including light, water, and water cycling functions.
- Work in teams of (insert # here)
- Must be well constructed
- Must have a materials list and budget provided
- Must have a detailed blueprint with key parts, materials, water pathways, and dimensions labeled.

Constraints (ways you or your design are limited):

- Must be compact (list size limitations if necessary) and take up as little horizontal space as possible.
- Insert time limit here

DESIGN RESEARCH:

Planning is an essential part of any successful engineering design challenge. Planning requires that you consider the structure and function of your product. Think about how your aquaponics system will work and what materials you will use to achieve the desired functionality. Now that you have thought about the key components and requirements of your system, it's time to design it. Click through the links below and take a look at a variety of design options.

http://www.backyardaquaponics.com/Travis/IBCofAquaponics1.pdf
http://www.aces.edu/dept/fisheries/education/documents/barrel-ponics.pdf
http://uponics.com/aquaponics-plans/
http://homeaquaponicssystem.com/basics/aquaponics-system-design-flood-and-drain/
http://www.ruaf.org/sites/default/files/Handbook%20for%20small-scale%20aquaponics%20%20in%20the%20West%20Bank%20.pdf
http://homesteadlaboratory.blogspot.com/2013/08/aquaponics-construction.html
(scroll to the bottom to get to the diagrams, ignore the sales pitch) http://aquaponichowto.com/aquaponics-diagram-employ-an-experienced-carpenter-intended-for-your-woodworking-projects/#.WiHhgVz83_R
https://experimentsinaquaponics.org/2015/02/22/how-to-build-a-simple-aquaponics-system/
http://aquaponicpeople.ripcloud.com/diy-aquaponics-system-design-build-2/

Take notes about how you will design your system, what materials you will use, and how you will power your system (pumps, lights, etc.). Notes may be in list (bullet) format and should include sketches AND the source URL where you got the ideas. Sketches can be of basic design options or specific aspects (just a part of a design) that you like.

Website URL

Notes:

Sketches:

Website URL

Notes:

Sketches:

Website URL

Notes:

Sketches:

Website URL

Notes:

Sketches:

Website URL

Notes:

Sketches:

Website URL

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Sketches:

BLUEPRINTS

Now that you have completed your research and have a vision of what you like and dislike about a system, it's time to design yours!

Blueprint components:

- Shows design from above (bird's eye view), below (to show piping), and long and short side view.
- Labels key parts of design
- Labels dimensions
- Shows pathway of water moving through system in one of the views.
- Materials list
- Names of engineers

BUILDING AN AQUAPONICS SYSTEM ASSESSMENT

Aquaponics Challenge PEER REVIEW

Name: _____

Directions: Write the name of the Aquaponics System in the space provided, then use the criteria listed below to rate each team's design.

3 = Above Average/Excellent **2 = Average/OK** **1 = Below Average/Poor**

Aquaponics System Name:	Circle score
CREATIVITY Aquaponics System has an interesting design with a variety of features that are creative and innovative. **Rationale:**	**3 2 1**
BLUEPRINT COMPONENTS Aquaponics System has a variety of features that would efficiently and effectively grow plants and fish. Expected design components are present. **Rationale:**	**3 2 1**
BLUEPRINT QUALITY Aquaponics System design looks well-constructed, organized, properly labeled. **Rationale:**	**3 2 1**
PRESENTATION If you were the Greenville City town council, would you choose this design? (**1** for yes, **0** for no) **Rationale:**	**1 0**
	/10

Aquaponics Challenge RUBRIC

Name(s) _____ Aquaponics System: _____

Aquaponics System Criteria	Point Value	Points Earned
Research segment • Answers to questions are thorough and well thought out • Drawings from research include sketch, bullet point notes, and URL of source (10 pts) • Correlates with final design	25	
Materials list Includes numbers (and sizes as applicable) of each material: • fish tank • fish • garden bed/irrigation/hydroponic system • plants • piping/connectors • pump(s) • fish food	15	

Blueprint components:
Clearly drawn image of system components:
• Drawn from 2 perspectives- side and birds eye view (2 pts)
• Lighting system (or natural light) shown (3 pts)
• Aquarium set up shown (with fish, oxygen pump, filter, etc.) (5 pts)
• Garden bed shown (5 pts)
  • with x amount of plants
  • substrate and irrigation shown (if not hydroponic)
  • OR hydroponic setup shown
• Pump shown (2 pts)
• Piping system shown (5 pts)
  • Directional water flow through pipes shown
• System is compact with minimal horizontal space used (2 pts)
• Shows how risk of water damage to school is minimized (1 pt)
	25	

Blueprint expectations: • Aesthetically pleasing design (2 pts) • Ruler used to draw lines for design AND labels. (2 pts) • System drawn to scale (2 pts) • Parts are clearly labeled (2 pts) • Measurements of parts labeled (2 pts) • Design should be able to be replicated without having to come ask designer for clarification. (2 pts) • Writing legible (2 pts) • Name of team members on blueprint (1 pt)	15	
Student participation (may vary by partner)	10	
Peer Review Average Score	10	
Final Score	100	

RESOURCES

Additional resources:

- EarthEcho Aquaponics: http://earthecho.org/expeditions/water-by-design
- Chef Adam STEM Career Close Up: http://earthecho.org/expeditions/water-by-design
- http://www.backyardaquaponics.com/Travis/IBCofAquaponics1.pdf - this is especially good for suggestions on where to locate systems, how to start systems, etc. It also has a bunch of system set-ups to meet a wide variety of needs.
- http://www.aces.edu/dept/fisheries/education/documents/barrel-ponics.pdf How to set up aquaponics systems in a barrel, with simple introductory info on system needs. Includes very specific materials lists and step-by-step procedures (with pictures) to build a few different options.
- https://see.systemsbiology.net/wp-content/uploads/2015/10/FS_Curriculum_Overview.pdf

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EDUCATIONAL STANDARDS

NGSS STANDARDS

Performance Expectations

MS-ESS3-2.

Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

SEP – Analyzing and Interpreting Data

DCI – Natural Hazards ESS3.B

CCC – Graphs, charts, and images can be used to identify patterns in data

Connections to Engineering, Technology, and Applications of Science

The influence of science, engineering, and technology in Society and the Natural World – The uses of technologies and any limitation on their use are driven by 1.) individual or societal needs, desires, and values; 2.) by the findings of scientific research; and 3.) by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies region to region over time.

Performance Expectations

MS-ESS3-3. - Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

SEP – Constructing explanations and designing solutions

DCI – ESS3.C: Human Impacts on Earth Systems

- Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.
- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.

CCC – Cause and Effect

- Relationships can be classified as causal or correlational, and correlational does not necessarily imply causation

Performance Expectations

MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

SEP - Engaging in Argument from Evidence

- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

DCI - ESS3.C Human Impacts on Earth Systems

- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth, unless the activities and technologies involved are engineered otherwise.

CCC - Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World:

Scientific knowledge can describe the consequences of actions, but does not necessarily prescribe the decisions that society takes.

NGSS Standards Addressed in Design Challenge:

ETS1: Engineering Design

ETS2: Links among engineering, tech, science, and society

LS1.C: From molecules to organisms: Structures and processes- Organization for matter and energy flow in organisms

LS2: Ecosystems: Interactions, energy, and dynamics

LS4.D: Biological Evolution: Unity and Diversity- Social interactions and group behavior

ESS3: Earth and human activity

PS1.B: Matter and Interactions: Chemical reactions

PS3.B: Energy- Conservation of energy and energy transfer

PS3.D Energy in chemical processes and everyday life

Lesson Plan

Who Grew My Soup? (Grades K-2)

Grade Levels

K - 2

Purpose

Students will identify the source of the food they eat and investigate the processes and people involved in getting food from the farm to their spoon.

Estimated Time

Materials Needed

Activity 1: Food/Farm Connection

- *Who Grew My Soup?* by Tom Darbyshire (book) or view a read aloud
- Fact Wheel (make sure that the "Shrink oversized pages to paper size" setting is not checked when printing)
- Metal brads, 1 per student
- Food samples
- Food/Farm Connection matching cards

Activity 2: Where Does Your Food Come From?

- Food item with product of origin label
- Where Does My Food Come From? activity sheets
- National Geographic's Mapmaker Interactive

Activity 3: Graphing Activity

- Examples of a fruit or vegetable in fresh, canned, frozen, and dried forms (enough for each student to sample)
- Sticky notes

Essential Files (maps, charts, pictures, or documents)

- Fact Wheel
- Food/Farm Connection Matching Cards
- Where Does My Food Come From? Activity Sheet

Vocabulary Words

edible: safe to be eaten as food

nutritious: having a large amount of vitamins, minerals, or other nutrients

preserve: to prepare (food) so that it can be kept for a long period of time

processing: to change a raw product, such as food, to make it into a different type of product

Did You Know? (Ag Facts)

The oldest known vegetable is the pea.

- Frozen foods were first introduced in the 1920s.[2]
- Consomme` soup was developed by a royal chef in the 1700s so that the French King could see his own reflection in the bowl.[3]
- The earliest evidence of our ancestors eating soup was 6000 B.C. It was hippopotamus soup![3]

Background Agricultural Connections

When asked where their food comes from, many students will say that it comes from a grocery store or restaurant. Young children don't always make the connection between agriculture and the food they consume every day.

One US farm produces enough food to feed 165 people worldwide, but farmers are not the only workers involved in making food available to the consumer.[4] Agriculture

Interest Approach - Engagement

1. Ask students to name their favorite kind of soup. Allow several children to answer. As each child answers, ask them what ingredients are used to make that soup. Make a list of the ingredients on the board.
2. Begin discussing the source of each ingredient by asking students, "Where do these ingredients come from?"
3. Transition to *Activity 1* by introducing the *Who Grew My Soup?* book. Explain to your students that they are going to read about a boy named Phin and the soup he eats.

Procedures

Activity 1: Food/Farm Connection

1. Read the book *Who Grew My Soup?* by Tom Darbyshire.
2. Ask the students to create a list recalling the ingredients in Phin's soup (carrots, tomatoes, green beans, celery, corn, barley, spinach, peas, onions, potatoes).
3. Cut out and assemble the Fact Wheel. Each student can make their own *Fact Wheel*, or it can be assembled prior to the lesson (one for each group).
   - Cut around the circle on page 1.
   - Cut around the circle on page 2 and

center on top of page 1.
- Cut around the circle on page 3. Cut on the dashed lines in between each ingredient, stopping at the circle in the center. Center page 3 on top of page 2.
- Using the sharp point of scissors, make a hole through the center dot of all three pages. Attach the pages together by placing a metal brad through the hole and securing.

4. Divide the class into 10 groups. Assign each group a food from the list. Give the groups enough time to match their food with the picture and information on the fact wheel. Provide a few samples of the ingredients for students to taste or observe while each group shares the facts about their food.
5. Ask the students if they think all of the ingredients in Phin's soup can be grown in our state? (Your response will depend on your location.) Ask the students if they think they can buy these ingredients locally grown all year long. Discuss what factors would affect the availability of locally grown food.
6. Pass one Food/Farm Connection card to each student. Allow the students to walk around the classroom and find the student who has their matching card. Students should match the food item with its farm source (ex. oatmeal—oats, French fries—potatoes, eggs—chicken, applesauce—apples). Discuss the connections as a class.

Activity 2: Where Does Your Food Come From?

1. Prior to the activity, ask the students to find a food item with a product of origin label at home. (Be prepared with extra food and a computer at school for students who are unable to complete this assignment at home.)
2. Have each student complete the Where Does My Food Come From? activity sheet by using National Geographic's Mapmaker Interactive to find the distance between their food's country of origin and the town in which they live. Instructions are found on the activity sheet. This can be

Bananas, a product of Equador.

Ginger root, a product of China.

Coconut, a product of Dominican Republic.

completed as a homework assignment or in school depending on computer access.

3. As a class, locate the origin of each child's food on a world map. Students can label each location on the activity sheet world map. Compare the distances and determine whose food traveled the farthest and shortest distances.
4. Discuss the different ways the food could have traveled to a local grocery store (truck, airplane, train, boat, etc.). What steps need to be taken to ensure that the food doesn't spoil before arriving at the market?
5. What are some possible reasons the food traveled so far? Discuss how the climate of a particular location affects what foods can be grown there.
6. Identify the different jobs involved in getting food from the farm to the table (e.g., grower, harvester, truck driver, packagers, processors, warehouse operators, grocers, etc.).

Activity 3: Graphing Activity

1. Bring examples of fruits and vegetables packaged in different ways (fresh, canned, frozen, dried).
2. Give the students a sticky note that they will write their name on. Have students sample the same fruit or vegetable fresh, canned, frozen, and dried.
3. Create a graph by writing fresh, canned, frozen, and dried on the bottom of the board. Explain that some foods may taste better cooked. Just because they don't like a fresh raw green bean or tomato, does not mean they won't like it cooked or prepared with other foods. The students will stack their sticky notes above their preference. Discuss the results.
4. Brainstorm reasons why foods are packaged in different ways. Reinforce that

foods are seasonal, and discuss how people's choices are influenced by price. For example, apples are in season in Utah in the fall and during this time they are very inexpensive, so it makes sense for processors to dry them or can them as applesauce to be eaten at other times of the year.

Concept Elaboration and Evaluation

After conducting these activities, review and summarize the following key concepts:

- Agriculture provides our food, such as ingredients for soup.
- Some foods can be grown or produced locally and others are produced far away and shipped to our local grocery stores.
- Some foods require a specific climate to be grown. This is one reason why some foods travel a long distance to get to our grocery stores.

We welcome your feedback! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Sources

1. http://www.did-you-knows.com/did-you-know-facts/food.php?page=2
2. http://www.frozenfoodfacts.org/about-frozen-foods/story-frozen-foods
3. http://ezinearticles.com/?Soup-Facts---Fun-Trivia!&id=582906
4. http://www.agfoundation.org/files/FFF_Graphic_US_Farm_Feeds.jpg
5. https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy/

Suggested Companion Resources

- Farm Pop-Ups
- Mapping Meals Activity
- All in Just One Cookie
- An Orange in January
- Farm
- Feast for 10
- Food
- Grow! Raise! Catch!
- How Did That Get in My Lunchbox?
- How to Make an Apple Pie and See the World
- On the Farm, at the Market

- PB&J Hooray!
- Plants Feed Me
- The Cow in Patrick O'Shanahan's Kitchen
- To Market, To Market
- Who Grew My Soup?
- Farming in a Glove
- Pizza Time Bulletin Board
- Eat Happy Project video series
- Planet Food Online Game
- Who Grew My Soup Song
- Who Grew My Soup? Movies
- Sprout 2 - Careers

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Organization Affiliation

Utah Agriculture in the Classroom

Agricultural Literacy | Education Content Standards | Common Core Connections

Agricultural Literacy Outcomes

Culture, Society, Economy & Geography

- Trace the sources of agricultural products (plant or animal) used daily (T5.K-2.f)
- Explain why farming is important to communities (T5.K-2.b)

Food, Health, and Lifestyle

- Recognize that agriculture provides our most basic necessities: food, fiber, energy and shelter (T3.K-2.b)

Plants and Animals for Food, Fiber & Energy

- Identify animals involved in agricultural production and their uses (i.e., work, meat, dairy, eggs) (T2.K-2.b)

Help Us Grow – Join Our Supporters

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Lesson Plan

Food Miles

Grade Levels

3 - 5

Purpose

Students will explore the economic and environmental benefits of buying locally grown food.

Estimated Time

Materials Needed

Interest Approach – Engagement:

- Computers or tablets
- Where Does Your Food Dollar Go? graphic
- Projector

Activity 1: Food Mile Cafe

- Food Miles Cafe Menu
- Food Miles activity sheet
- Computers or tablets

Activity 2: Eating Local Pros and Cons

- Pros and Cons graphic organizer

Essential Files (maps, charts, pictures, or documents)

- Food Miles Activity Sheet
- Food Miles Cafe Menu
- Pros and Cons
- Where Does Your Food Dollar Go? Graphic

Vocabulary Words

carbon footprint: a measure of the amount of carbon dioxide released into the atmosphere by a single endeavor or by a company, household, or individual through day-to-day activities over a given period

economy: a way to make a living; how people produce, sell, and buy whole goods and services

food miles: the distance food has traveled from where it is grown to where it is eaten

fossil fuel: a natural fuel such as coal or gas, formed in the geological past from the remains of living organisms

local food: the direct or intermediated marketing of food to consumers that is produced and distributed in a limited geographic area

locavore: a person whose diet consists only or principally of locally grown or produced food

Did You Know? (Ag Facts)

- If all the agricultural land in New York State were devoted to feeding New York City's population, there would be only enough food to feed half the city—with nothing left for the rest of the state.[2]
- Different areas of the world have their own local cuisine. The diets and food preferences of various cultures depend on social, religious, economic, and safety factors as well as the availability of different foods.
- An estimated 15% of the US food food supply is imported.[5]

Background Agricultural Connections

The United States Department of Agriculture (USDA) defines **local food** as the direct or intermediated marketing of food to consumers that is produced and distributed in a limited geographic area.[1] Local food is commonly considered to be food grown within 100 miles of its point of sale or consumption. A **locavore** is a person whose diet consists only or principally of locally grown or produced food. Buying food from local farmers and in-state businesses is be[See More]pod for communities, the

Interest Approach - Engagement

1. In preparation, set up a poll at polleverywhere.com.
2. Conduct the poll by asking students, "How much of every dollar you spend on food goes to the farmer?"
3. Display and discuss the results of the poll.
4. Project the Where Does Your Food Dollar Go? graphic[5] on a large screen. Ask the students the following questions:
   - Are you surprised by where your food dollar goes? Why or why not?
   - Are you surprised that the farmer receives so little of the dollar?
   - Do you think buying locally grown food would help the farmer by reducing some of the other costs associated with food production?

Procedures

Activity 1: Food Miles Cafe

1. Provide each student with a Food Miles Cafe Menu, and ask them to choose their favorite meal from the menu choices. Point out that the menu indicates where

each meal's ingredients come from.
2. Ask the students to predict how many miles their meal traveled.
3. Distribute the Food Miles activity sheet. Allow the students to use a website such as Google Maps or MapQuest to find the distance from their hometown to the farm where each of the main ingredients were grown or raised. Have them record the miles on the activity sheet. Then, have the students calculate the total miles the ingredients for their meal traveled.
4. Ask the students to compare the total miles with their predictions.

The locations listed on the Food Miles Cafe Menu represent actual farms in a high-production state for each commodity. In some cases, the food could be produced closer to your location.

Activity 2: Eating Local Pros and Cons

1. Distribute a Pros and Cons graphic organizer to each student. Throughout this activity, as the students are discussing the topic, they should make notes concerning the advantages and disadvantages of eating local on their graphic organizer.
2. Organize the students into small groups. Ask the groups to discuss the question, "Why does food travel long distances?"
3. Have the groups share the ideas they discussed with the class. Guide the students to consider the following points:
   - **Population Density:** Some areas do not have enough local farmland to support their local populations.
   - **Out-of-season Preferences:** In some areas, food production stops during the winter. Local food options are limited unless food is preserved. Transporting foods from other locations provide people with a year-round variety of food options and nutritional diversity.
   - **Climate and Soil Conditions:** Some climates are better suited than others for growing certain crops. It costs less for farmers to focus on products their climates are best suited to grow. Extra food can be exported to other areas.

4. Introduce the students to the term "locavore." Explain that a locavore is a person whose diet consists only or principally of locally grown or produced food. Ask the students to consider their meal choices from the *Food Miles Cafe Menu*. Ask, "Could any of the ingredients be grown or raised locally?"
5. Have the students return to their small groups, and ask them to discuss some of the reasons someone might be motivated to be a locavore.
6. Have the groups share the ideas they discussed with the class. Guide the students to consider the following points:
   - **Economic:** When you buy local products, more money stays in your community.
   - **Environmental:** The less miles a product travels, the less fossil fuels are needed to transport it. Reducing food miles cuts down on fuel consumption, air pollution, and greenhouse gas emissions.
   - **Fresher Food:** The farther food is transported, the amount of food lost to spoilage increases. Local food is typically fresher than food that has travelled long distances.
7. Ask the students, "How feasible would it be to eat only locally produced foods? If you decided to be a locavore, what foods would you have to give up?"

Concept Elaboration and Evaluation:

After conducting these activities, review and summarize the following key points:

- Food travels long distances due to population density, out-of-season preferences, and climate and soil conditions.
- Buying locally grown food is believed to be good for communities, the economy, and the environment.
- A locavore is a person whose diet consists only or principally of locally grown or produced food.

We welcome your feedback! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Read the book *On the Farm, At the Market* by G. Brian Karas. Generate a discussion about farmers' markets in your local community. Compare farmers' markets to trading posts and the bartering system. Indicate items that would be seasonal

and items that would not be.

- Play the My American Farm interactive game Harvest This or Farmer's Market Challenge.

Sources

1. https://www.nal.usda.gov/aglaw/local-foods#quicktabs-aglaw_pathfinder=1
2. http://www.foodsystemprimer.org/food-distribution/
3. https://www.amiba.net/resources/multiplier-effect/
4. Statistics used in the *Where Does Your Food Dollar Go?* graphic compiled by American Farm Bureau Foundation for Agriculture *Food and Farm Facts* 2017 (Sources: ERS, Farm Production Expenses and Food Dollar Series)
5. https://www.foodsafety.gov/news/fsma.html

Photo Credit Allen Sheffield

Suggested Companion Resources

- Mapping Meals Activity
- Two Truths and a Lie
- Grow! Raise! Catch!
- How Did That Get in My Lunchbox?
- How to Make an Apple Pie and See the World
- On the Farm, at the Market
- To Market, To Market
- Who Grew My Soup?
- Pizza Time Bulletin Board
- Eat Happy Project video series
- Planet Food Online Game
- My American Farm

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Agricultural Literacy | Education Content Standards | Common Core Connections

Agricultural Literacy Outcomes

Culture, Society, Economy & Geography

- Provide examples of agricultural products available, but not produced in their local area and state (T5.3-5.e)
- Explain the value of agriculture and how it is important in daily life. (T5.3-5.d)

Attachment C-5 Events

Events

Type: Program Development, Partner Coordination,

Implementation Time: 2-8 months

Goals: To unite community around food and local agriculture.
To improve awareness and understanding of local food systems as a means of community resilience.
To inspire communities to engage in locally grown food systems.
To increase accessibility to fresh locally grown produce and promote food security.
To generate community excitement around local food initiatives.
To encourage sustainable economic growth based on local agriculture.
To shape and share community culture and personal cultures.
To connect communities to their ecosystem.
To find groups interested in incorporating agricultural products into their operations.

Audience: General Community

Question: Are there other community agriculture initiatives underway? Who should be reached with events to enhance information around other initiatives?

Overview:

Any community event is an opportunity to highlight community agriculture initiatives taking place and the day-to-day intersection of community and their food. This can be accomplished by celebrating the producers and many steps that food goes through before arriving at their table. The community is united by sharing food and events may also include culinary skills with hands-on exhibits and workshops, community meals, activities for youth and adults, and/or local food vendors.

Participants would provide a range of activities for the community members of all ages to engage with. Educational workshops would be available for those looking to increase their culinary or growing skills. Local food products could be available for tasting and/or purchasing. Other participants could highlight community resources to increase accessibility to being successful in utilizing newfound culinary or gardening skills (tool libraries, community kitchen resources).

In addition to agriculture specific events, connections to local food can be made with virtually any event. Encouraging food at events to be sourced from local farms can support businesses and bolster the local economy. Providing signage around where the food was sourced can spark conversation amidst attendees and connect them to their local food system.

Implementation:

Phase I: Identify Community Leaders & Existing Events

Building relationships and weaving networks between community leaders can strengthen the inclusivity of events and utilize existing events to incorporate agriculture.

Question: What type of events currently exist?

Question: What partners, businesses, or resources exist to connect the community to food or agriculture resources?

Phase II: Identify Community Needs, Interest, and Focus Area

Question: Are there recent community agriculture demonstrations to centralize an event around?

Question: Does your community have a history or culture which they unite around? Can it be connected to community agriculture or ways to utilize local produce?

Question: Which areas in your community are best for holding events? Are they easily accessible to the entire community? Are there community members in certain areas that could benefit more from community events?

Phase III: Identify Potential Donations, Sponsors, and Participants

Question: Who are the producers? Regional relationships?

Question: What produce is in season during the event?

Question: How will the event be funded? Can funding be increased by adding community agriculture components?

Phase IV: Create & Distribute Marketing Content

Question: Who are you inviting? What materials will be best to reach them?

Question: How will the invitations be crafted and distributed to ensure genuine outreach to all community demographics?

Phase V: Implement

Partner with community groups and leaders to hold the event. If needed, distribute a survey to attendees to gain insight on how to improve the event for the future.

Cost:

Personnel time:

a) Partner coordination
b) Marketing & Outreach
c) Event Coordination tasks

Materials:

a) Outreach materials
b) Online marketing
c) Event specific needs (ie. equipment rental, tables, display materials, etc)

Partners to Support Implementation:

A. CCSWCD
B. Edgewood Nursery (Aaron Parker)
C. Cultivating Community
D. Resilience Hub
E. Wayside
F. Municipalities/ gov
G. Church Groups
H. Libraries
I. Master Gardeners
J. Downtown Business Orgs
K. Schools
L. Youth Groups
M. Communities

Funding Opportunities:

A. Fee for service
B. Sponsorship
C. Participant fees and/or attendee registrations
D. In-kind partner support

Attachment C-6 Community Gardens

Community Gardens

Type: Physical Installation, Program Development

Implementation Time: 1-3months, longer if site acquisition or permitting challenges exist

Goal: To inspire the public to engage in locally grown food systems.
To improve awareness and understanding of local food systems as a means of community resilience.
To increase accessibility to fresh locally grown produce and promote food security.
To demonstrate low maintenance gardening techniques that can be applied on a large or small scale.
To promote understanding of ecological relationships as a way to create habitat and food sources that are self-sustaining.
To increase community connections, including multigenerational relationships.
To connect with nature
To improve public health through benefits of working outside and increasing access to healthy food
To enhance school programming and access to garden space
To build economic and community development
To have a stronger community presence.

Audience: Gardeners, renters, low-income, food insecure, community groups, agriculture-based businesses.

Question: What local food systems exist in your municipality? Is most of the food consumed in your community locally sourced?

Question: What is your community's history with agriculture? Is there a long history of agriculture or is introducing local agriculture new?

Question: Is there work being done to tackle food insecurity & promote local food systems? What issues regarding food security does your community face? How can this project highlight these issues and promote local food?
Question: Are there common barriers (space, soil contamination, poor growing conditions, etc) to people gardening at home?

Overview:

Community gardens are a collaborative effort between gardeners, municipalities, or community partners to provide access to gardening space for those who may not have safe or productive access at their home. Providing a space for neighbors to gather and grow food builds community and positively contributes to food security.

Garden plots can be constructed with free or donated materials that are generally low-cost or considered to be waste products. Common materials include partially composted horse manure, leaves, newspaper, cardboard, wood chips and seaweed (Attachment i).

Community gardens can be structured several different ways (Attachment ii):

1. Gardeners rent their plots and are responsible for planting, harvesting, and maintaining their assigned plot. Produce is only available to the assigned gardener.
2. A designated group of gardeners are responsible for planting, harvesting, and maintaining a community share plot. Produce is distributed amongst the designated gardeners.
3. Community volunteers maintain the garden space. Produce is available for all visitors to harvest.

A community leader or organization should be selected to coordinate gardener's applications and align gardeners with plots. A garden leader will also maintain communication between gardeners to ensure that space is being utilized for the

full season and provide support to gardeners who may need extra guidance or help throughout the season. Participation from the immediate community also promotes long-term maintenance for the overall space.

Implementation:

Phase I: Define Target Area & Build Community Interest

Connect with the local community groups to determine how much interest there is from the community as well as on the neighborhood scale. Using community needs and goals for the installation, determine a target area within the municipality which best serves those goals.

> *Question: Is there a part of your municipality's history/food system/local agriculture that could be highlighted as part of the program? (e.g. connecting a town with its long history of local agriculture)*
>
> *Question: Are there unmet needs in specific areas of the community?*
>
> *Question: What are the goals of the municipality? Are they the same as the audience that will be engaged? Increase food security? Low maintenance garden demonstration? Community space enhancement?*
>
> *Question: Does a garden help to meet other community goals (Climate change, walkability, etc)?*
>
> *Question: Will other community agriculture initiatives be incorporated into the same space?*
>
> *Question: Where are there existing gardens? Is a new garden needed? Can an existing garden be expanded or improved?*

Phase II: Determine Organization Structure

Community gardens can have different structures which will help to meet different community needs and goals. Select a structure that will best serve your audience and their needs. For example, if your goals are to generate intergenerational connections around agriculture, a collaborative structure where many gardeners maintain plots together will help to meet this goal.

Partners should establish their roles and responsibilities for initiating a community garden as well as sustaining it in the long-term. A formal agreement should be drafted and signed by all parties. An agreement should also be drafted to clarify responsibilities of the group facilitating and gardeners who participate in the program (Attachment iii). This will prevent disputes from misunderstandings and achieve better resolutions when issues arise.

> *Question: Which organization structure will best meet the goals of your audience?*
>
> *Question: Are there dues for the gardeners to participate? Is funding available for reducing this barrier for low-income participants?*
>
> *Question: What are the roles and expectations between partners?*
>
> *Question: What are the expectations for participating gardeners?*
>
> *Question: What are the consequences for breaking the agreement? What is the mechanism for disputes between gardeners?*
>
> *Question: Are there liability concerns? Will a waiver be needed?*
>
> *Question: How will the garden be funded long-term?*

Phase III: Site Selection & Garden Design

Consult with a permaculture professional for community garden designs. Designs should account for community goals as well as the specific site conditions. The site should provide at least 1000sqft(?) of planting space as well as partial to full sun with well-draining soil, and a reliable water supply. A soil test will need to be completed to gain an understanding of the existing nutrient profile as well as the potential soil contaminants.

Garden sites should also be accessible – and ideally, walkable - to the targeted audience. Interaction with the space will be more successful if garden visits can be easily added to daily routines.

By layering materials in the plot spaces, the resulting foundation for each plot is nutrient dense and actively composting soil. Topping the garden plots with hay and newspaper creates a low maintenance mulch that can make gardeners with limited experience successful. Engaging those who will be actively gardening in the new plots promotes an understanding of the ecological benefits that are incorporated into the design. With this knowledge, gardeners are able to continue maintaining their plots with sustainable practices that promote the long-term success of each plot.

> *Question: What types of open/ green spaces are available in the target area? Are there existing community gardens? Does the site need to be municipally owned property? Are there community organizations with land to offer?*
>
> *Question: Is there a space where the targeted audience already gathers? (example: if targeting families with young children, is there space near a playground.)*
>
> *Question: How will the general community interact with this space? Is it a destination for participating gardeners or the community as a whole?*
>
> *Question: Does the community have tangential goals for the site? Does it need to be handicap accessible? Should it capture rainwater? High production plants? Species for preserving? Medicinal?*
>
> *Question: Are there ordinance or permit requirements that need to be fulfilled for this type of project? Will a presentation to the municipality be needed for site approval?*
>
> *Question: Will there be a need for a shed or fence? Are there ordinance or permit restrictions?*
>
> *Question: Is there access to water on the site? If not, how will water be made available on site?*
>
> *Question: Does the site need to be ADA accessible?*

Phase III: Installation

To enhance community investment and "buy in", it is suggested that organizers recruit community volunteers for garden installation. Volunteers should be from the immediate community to build their connection to the project and increase their interest in its success. The number of volunteers needed will depend on the size and existing conditions of the site. The site should be staged prior to volunteers being on site and any tasks requiring power equipment should be completed ahead of time. Create a list of all steps (Attachment iv) to completing the installation to help distribute volunteers to different tasks. Tasks will range in difficulty and should be assigned to make sure everyone is supporting a task that they are comfortable with and capable of completing.

> *Question: What preparation does the site need prior to volunteers being on site? Leveling? Is fill needed? Machinery?*
>
> *Question: What materials are needed for soil amending? Can they be donated or obtained for free?*
>
> *Question: How many volunteers will be needed to complete the installation tasks?*
>
> *Question: Are there any youth programs that can support installation?*
>
> *Question: Are liability forms needed for volunteers to participate?*

Phase IV: Long-term Maintenance & Sustainability

Identify volunteer or volunteer groups who are interested in taking a lead in organizing volunteers for long term maintenance. Creating positive interactions for all gardeners will help facilitate long-term volunteers who are able to support orienting new gardeners. Include their contact information on any signage as a point person. Develop a plan for seasonal maintenance needed (Attachment v).

Question: Are the community members who express interest able to support long-term volunteer efforts to help maintain the project?

Question: Are there community groups interested in leading maintenance efforts? Boy or Girl Scout Troop? Neighborhood Association?

Question: What efforts are needed to secure long-term funding? Are municipal funds available through related departments ie. public health funds?

Cost:

Personnel time

Materials:

a) Lumber if raised beds or signage is needed
b) Compost and/or other soil amendments
c) Woodchips (free)
d) Installation Tools: wheelbarrows, rakes, shovels, pitchforks
e) Daily Use Tools: trowels, etc.
f) Cardboard (free)
g) Partially composted manure (free)
h) Leaves (free)
i) Seaweed (free)
j) Newspaper (free)
k) Stakes/flags
l) Shed
m) Fencing

Partners to Support Implementation:

A. CCSWCD
B. Local businesses
C. Local farms/nurseries
D. Municipal Parks & Recreation Staff
E. Girl Scouts & Boys Scouts Troop
F. Neighborhood Associations
G. Master Gardeners
H. Youth Groups
I. Church Groups
J. Schools

Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachments:

i. Lasagna Layer Garden Bed
ii. Community Garden Structures and Governance
iii. Cultivating Community's Garden Agreement

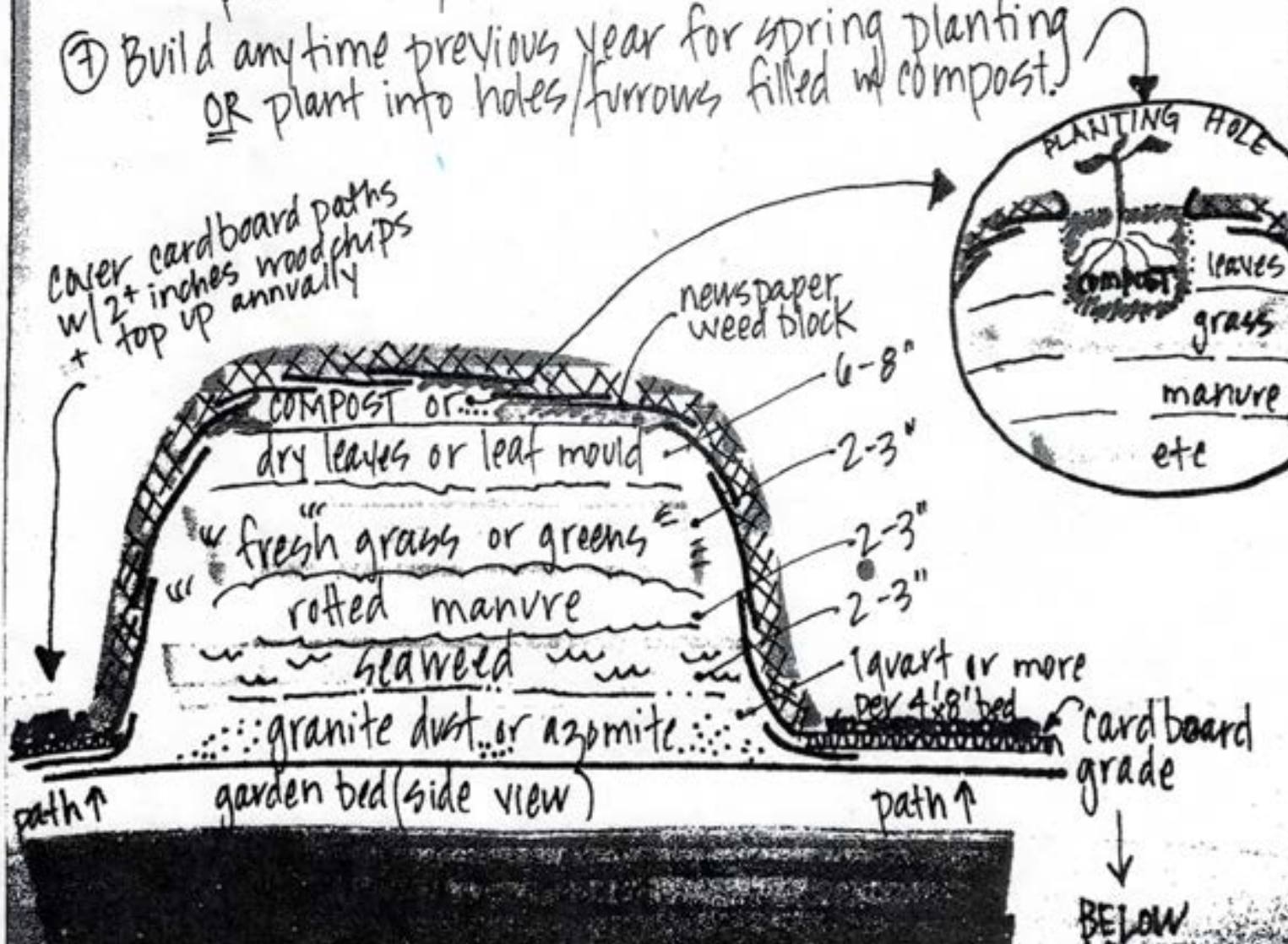
iv. Installation Tasks example list
v. Maintenance Plan example

Attachment i.

Lisa's Fantasy Sheetmulch Recipe

www.resiliencehub.org (2015)

1. Recipe can vary based on available materials.
2. For very compacted areas, loosen w/ fork first.
3. For very weedy areas, start w/ cardboard.
4. No need to remove sod.
5. Know your materials.
6. No need to do this every year! Just top-up or patch. Fully renovate after 4 or 5 years.
7. Build anytime previous year for spring planting OR plant into holes/furrows filled w/ compost.



Resources on Community Garden Governance Structures

- NC State Extension – "How to Organize a Community Garden"
  - **Plot Gardens:** Subdivide the garden into family-sized plots ranging in size from 100 to 500 square feet. Sometimes a section of the garden is reserved for the community to grow crops too large for individual plots (corn, pumpkins, watermelons, fruit trees, grapes, berries). Gardeners divide the bounty from these shared plots.
  - **Cooperative Gardens:** The entire space is managed as one large garden through the coordinated efforts of many community members. Produce from the garden is sometimes distributed equitably to all the member gardeners. Often these gardens are associated with communities of faith, civic groups, or service organizations that donate part or all of the produce to charitable organizations such as food banks and soup kitchens.
  - **Youth Gardens**: Youth actively participate in research and discovery. Typically, raised-bed gardens or sections of a larger garden are assigned to classes.
  - Suggestion to reduce theft if individual plot structure is used is to plant a plot at the entrance where people can "help themselves."

- Springfield (MA) Food Policy Council – Community Garden Management Toolkit
  - **Traditional**: These gardens are mostly comprised of separate garden plots that are cared for and harvested by individuals or families. Shared spaces like pathways, perennial herb and flower beds, sheds, and gathering spaces are cared for by all members of a community garden. Day-to-day operations, new garden sign ups, and events are handled by volunteer leaders or a steering committee.
  - **Communal**: Gardeners are not assigned individual plots, but, rather, the entire garden is planted, harvested, and maintained by the group. These gardens are often connected to a specific program or organization with a defined goal. The gardening group needs to establish a detailed maintenance assignment schedule (e.g., one family does the watering and weeding for one week, and another the next.) Depending on the size, there may be a paid coordinator.
  - **School**: Their primary purpose is to expose young people to gardening and nature, give them the opportunity to do some of their own gardening and/or educate them is a variety of subject areas. These gardens are typically associated with a formal or semi-formal program that incorporates classroom lessons with hand-on gardening activities. Schools have opportunities to infuse produce from the garden into the cafeteria and community at large. Can also provide neighbors a space for gardening, especially when school is not in session during the summer.
  - **Specialty**: Designed for specific populations. For example, horticultural therapy, demonstration gardens, location-based (senior gardens, church gardens, prison gardens).

- Food Security Network of Newfoundland and Labrador – Community Garden Best Practices Toolkit
  - **Collective**: "Growing communally requires a significant degree of cooperation and works best with a small number of participants. This style is well suited for groups that already have a strong membership that meet regularly and may be able to garden at the same place where they currently gather, such as at a school, church, or club space. Beginner gardeners may excel in this environment as they are supported by a close-knit group from which they can learn new skills."
  - **Allotment/Individual**: "This model can provide garden space to individuals and community organizations that may not have access to it at home, or at their facilities. This style works well for groups with varying schedules and a variety of aspirations for what they want from their gardening experience. More seasoned

gardeners may appreciate this environment as it provides the freedom to experiment and opportunity to share ideas with other gardeners."
    - Sample site map of mixed allotment/collective garden structure on page 26.

- NCCGP – Governance Strategy Development Guidelines
    - Recommends steering committee of 3-5 people. Decision method should be determined, suggestions include by consensus, by vote, or autocratic. Consistency is key.
    - Explicit goal statement should be developed based on input from all potential garden members
    - Set up clear, simple, and practical rules.
    - This article also includes a sample Meeting Schedule for initial garden implementation

Garden Agreements

Attachment iii.

PORTLAND COMMUNITY GARDEN NETWORK

Boyd St, Brentwood Farms, Casco Bay, Clark St, Common Share, Libbytown, North St, Payson Park, Peaks Island, Riverton,Valley St

[illegible]

Every gardener is responsible for keeping the gardens positive, productive, and inclusive spaces for everyone by following the agreements listed below. These agreements are revisited each year and continually evolve based on feedback and learnings.

I agree to:

❑ [illegible]

- Early March: Return my Spring Application and plot fee by the due date, or my plot will be reassigned
- By May 25th: Begin gardening
- May - October:Keep my plot planted, weeded, and harvested
- May - October: Make sure there is no empty space in my plot
- by November 1st.: Complete all fall clean up tasks and return a completed Fall Checkout Form

❑ [illegible]

- Communicate any garden concerns, feedback or questions directly to Cultivating Community
- Respond within 3 days if I am notified of a garden issue by Cultivating Community during the active garden season (March 1- November 1). I understand that if I do not reply within this time, Cultivating Community may take direct actions to resolve the garden issue.
- Inform Cultivating Community and the Volunteer Garden Coordinator (in advance if possible) if I will not be able to respond within 3 days due to illness, short term travel, or other circumstances.
- Confirm dimensions, materials, and placement with Cultivating Community before installing or replacing a wood garden frame.
- Notify Cultivating Community with any change to my contact information or ability to garden.

❑ [illegible]

- Complete a minimum of **SIX HOURS of community work** per season. At least half of my hours will take place at my garden location while the other half may go to supporting coordinated volunteer opportunities at other City of Portland community gardens.
- Treat fellow gardeners, garden visitors, and garden program staff with respect.
- Be responsible for the impact of my behavior on others, whether it is intended or unintended
- Accept that theft of produce is part of gardening in a public space
- Remove all trash or recycling I bring to the garden (rather than leaving it in or behind the shed).
- Use headphones when listening to recorded music and respect the gardens as a quiet space for others.

❑ [illegible]

- Remove weeds before they develop seeds that can spread to pathways and other garden plots.
- Keep pathways around my plot free of weeds and covered with wood chips.
- Place all structures and plants that are 2 feet or taller at least **2 feet away** from the edge of the plot and clear any plants hanging over or crowding pathways.
- Only grow annuals and perennials that die back to the ground every fall (No bushes, roses, or trees)
- Avoid planting any difficult to remove plants (e.g. bishop’s weed or horseradish) or plants that are irritants (e.g. stinging nettle) in my plot.

- ❑ ĊŖǪǪŖŰ ŖŦÕĶŔŌŇÕĶŦŇŅŔ ŤŦĶŇŰŌŅŲÉ
  - Use organic compost, seaweed, leaves, or grass clippings from untreated lawns to fertilize the soil
  - Avoid any products or materials that will leach chemicals into soil, including: synthetic chemicals (such as pesticides, insecticides, herbicides, weed killers, and fertilizers), plastic weed barrier, plastic (PVC) pipe, pressure treated or painted wood, dyed or treated wood chips, and glossy newspaper pages
  - Avoid any products or materials that will cause a safety hazard, including: glass and wire that rusts easily (including chicken wire).
  - Avoid using motorized machines inside the gardens
- ❑ I ÚKV ŌŔÔŖŦR ŅŇ KŔŇ NŖR TǪŲŰ ŌÖ ÕKŦŇŅŔ TŖǪŌŅŲĄŌŔNǪŇŌŔÕÉ
  - Pets are not allowed in the gardens
  - Smoking is not allowed in the gardens.
  - Cannabis is not allowed at the gardens.
  - Any physical or verbal harassment or aggression based on race, gender, sexual orientation, country of origin, age, or any other legally protected statuses is strictly prohibited. Any evidence of a disrespectful, harmful, or disruptive action towards another individual (gardener, program staff, or public citizen) may warrant the immediate termination of your access to a plot.
  - Conflicts and violations of the Garden Agreements will be resolved through a hearing process. The community garden Program Manager will arrange to meet with all parties involved within two weeks of notification of a conflict or violation. Any party may request to have a neutral third party present. Resolutions will be handled with an equity lens and will be based on the hearings, the Garden program Agreements, mission, and policies as well as the severity of circumstances in which these agreements are breached. Outcomes will be communicated back to all parties involved within two weeks of the final hearing.
  - Any personal tools left in the garden shed may be used by others. The City is not liable for any lost or damaged tools.
  - The City of Portland cannot guarantee protection against vandalism or theft.
  - Water is turned on in May and off at the beginning of October as part of the Portland Parks and Rec. winterization process. We cannot guarantee advance notice of the specific dates.
  - A "City Release Form" must be signed each year
  - Payson Park gardeners may not park in the Seaside Nursing Home parking lot.

REGISTRATION & WAITING LIST:

- For plots that become available after July 1, the charge will be prorated.
- Garden plots are limited to Portland residents.
- Only one plot per household is permitted.
- The primary gardener may register an additional gardener at the time of registration. The Additional Gardener may not be changed during the season and must be actively involved in the plot. In order to keep access open and equitable, plots are not transferable to anyone other than a registered Additional Gardener.
- Formally organized groups may apply for one plot.
- The garden plot waiting list is maintained in the order that requests are received. Any Portland resident may request to be added to the waiting list by contacting Cultivating Community.
- Gardeners who qualify as low income under the City's Community Development Block Grant program guidelines, as well as organizations serving low income Portland residents, receive priority for garden access. Residents seeking this priority may be asked to verify their income eligibility to the City.

I understand that failure to comply with these agreements may result in loss of my plot and/or disqualification from future participation in the Community Garden Program.

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The Community Gardens are a City of Portland Parks and Recreation program. Cultivating Community provides program management. Volunteer Garden Leaders support each garden site. For more information about the roles and responsibilities please contact. garden@cultivatingcommunity.org (207) 761- 4769 Ext. 855

Attachment iv.

Community Garden Installation Prep

Task	Who Responsible	Organization	Source	Timeframe	Quantity	Notes
Both Sites (June 2nd & 8th)						
Cardboard	Bryce Neal	CCSWCD	CCSWCD	Transport day of	lots…	If we need more can check: Maine Shipping & Packaging, LP Appliance, and Mount Joy Orchard may have excess from their maintenance day.
Wood Chips	Josh Haiss	Landscape Revolution	Colonial Tree	Delivered beforehand	7 yards	Can stage materials at Little Falls. Some space on back parking spaces can be used. Will be able to stage materials at Robie Gym on tarp
Compost	Jenna Martyn-Fisher	CCSWCD	Bensons?	Ordered 5/22/19 Delivered beforehand	15 yards to Little Falls, 5 yards to Phinney.	Add a layer 3-4'' thick for "lasagna layer"
Plants	Aaron Parker	Edgewood				
Straw	Josh Haiss	Landscape Revolution	Find View Farm		10 bales	Can invoice CCSWCD or be reimbursed
Tools	Bryce Neal & Aaron	CCSWCD	CCSWCD		4+ Wheel Barrows 10+ round shovels 2 Box cutters 6 metal rakes	CCSWCD has 2 wheel barrows. Aaron has 2 wheel barrows and can bring 2 more metal rakes if needed. Will want flat shovels and mulch forks. Need to inventroy what tools CCSWCD has available. Add the volunteers may want to bring their own tools.
Signage	CCSWCD / Town			Do not need before planting days		Might be able to reuse some language on recent signs for Portland Food Forests Plant species signs could be a project with the youth in the rec program
Food	Ali/ Kathy?	CCSWCD	CCSWCD		Food	
Scatter Granite dust						
Leaves						Add a layer 3-4'' thick for "lasagna layer"
Seaweed						Add a layer ~2'' thick for "lasagna layer"
Add partially composted manure						Add a layer ~2'' thick for "lasagna layer"

Community Garden Maintenance Plan (Example)

Spring

- Sheet mulch (cardboard topped with wood chips)
  - Areas already showing weeds
  - Edges
  - Pathways
- Remove dead flower stems
  - All dead material should be left in the beds and mulched over to return nutrients and continue building up organic soil

Summer

- Sheet mulch
  - Areas with weeds
  - Pathways
- Water if needed
  - Most plants should be well established and only need water if there is an extended dry spell
- Spread wanted seeds (borage, chamomile, etc)

Fall

- Sheet mulch
  - Areas showing weeds
  - Around plants that might have dropped unwanted seeds (ie. Tansy)
  - Optional: add a thick layer of leaves instead of cardboard. Top with a thin layer of woodchips. Leaves will compress throughout winter and provide nutrients and organic matter for spring growth
- Optional: remove dead flower stems from echinacea and other flowers
  - Leaving them in place helps serve as insect homes and bird food through the winter
  - All dead material should be left in the beds and mulched over to return nutrients and continue building up organic soil
- Collect seeds to propagate in following season

Attachment C-7 Connecting Growers to Land

Connecting Growers to Land

Type: Program Development, Partner Coordination

Implementation Time: 2-8 months

Goal: To assist people with overcoming economic barriers to accessing land for food production
To inspire the public to engage in locally grown food systems.
To improve awareness and understanding of local food systems as a means of community resilience.
To increase accessibility to fresh locally grown produce and promote food security.
To utilize low maintenance gardening techniques that can be applied on a large or small scale.
To promote understanding of ecological relationships as a way to create habitat and food sources that are self-sustaining.
To increase community connections including multigenerational relationships.
To increase multigenerational connections

Audience: Gardeners (renters or others with no direct access to land), home/landowners with underutilized land resources

Question: Who in your community has land available? Is it located in a specific geographical area (ie. low density neighborhoods)?

Question: Who in your community needs access to land for growing produce?

Overview:

Connecting gardeners to gardens seeks to achieve similar goals as community gardens by matching those who wish to grow their own food to available land. Community gardens focus on making a garden space available to many people and are typically located on vacant or public access land. In contrast, this type of program seeks to connect homeowners with underutilized garden or yard space with gardeners who can tend to the space and do not have their own access to garden space (Attachment i). This program increases access to fresh local food for both the grower and the homeowner.

The usage of privately owned space is negotiated between the parties. It is critical that clear expectations are agreed to by all parties. Typical terms are for free access to the land in exchange for a share of produce. It is recommended to establish a third party to provide active facilitation between each group to ensure that if conflicts arise, there is a protocol to navigate conflict resolution.

Implementation:

Phase I: Establish Structure for Administering Program

Programs that connect growers to land can be administered either through a public agency or organization or a private nonprofit. The group administering the program should establish the initial agreements between landowner and gardeners with a process for conflict resolution. The agreement should include clarifying details such as the following:

- Level of garden maintenance required (natural vs landscaped appearance)
- Seasonal commitment from each group
- Harvest guidelines
- Fertilizer/pesticide use

Question: What elements need to be included in an agreement in addition to these? Are there any aspects that may be unique to your community?

Question: How will conflicts between participants be resolved?

Question: Are any tax incentives available for landowners?

Phase II: Identify Participants

Compile a database of interested homeowners with available garden space. Include characteristics about their property including the following:

- Neighborhood/ general location
- Size of garden space available
- Growing conditions (sun and soil availability)
- Existing garden structures
- Soil test results of garden space
- Any access restrictions throughout the growing season. What is the expectation for off-season access?
- Water supply
- Expectation of fertilizer/pesticide use

Compile a database of gardeners interested in being paired with garden space. Include information including:

- Low-income status
- Garden experience
- Neighborhood/ general location
- Ability to provide materials for amending/building gardens
- Anticipated garden schedule (?)
- Distance able to travel

Question: Are there any additional land characteristics or gardener information that need to be included for your community?

Phase III: Match Gardeners to Garden Space

Using the criteria provided by gardeners and homeowners, match suitable combinations. When possible, priority should be given to low-income gardeners. Begin by grouping participants by location. In urban areas, effort should be made to decrease the size of any food deserts.

Phase IV: Installation

If amendments and construction of gardens are needed on a property, determine who will be responsible for completing this.

Question: Are materials that contribute to permanent structures provided by the property owner or gardeners?

Question: Are there funds available to support garden building?

Phase IV: Long-term Maintenance & Sustainability

The long-term viability of programs such as this one requires some administrative support. This could either be provided with public / private organization general funds, or a dedicated funding stream can be provided by collecting a fee from participants.

Question: Is there a time requirement for participating? One growing season? More?

Question: What long-term funding is available for program facilitation?

Cost:

Personnel time:

- Establishing guidelines & agreements
- Compiling participant info and matching them
- Seasonal facilitation

Materials:

- Lumber if raised beds or signage is needed
- Compost and/or other soil amendments
- Woodchips (free)
- Tools: wheelbarrows, rakes, shovels, pitchforks
- Cardboard (free)
- Partially composted manure (free)
- Leaves (free)
- Seaweed (free)
- Newspaper (free)
- Stakes/flags

Partners to Support Implementation:

A. CCSWCD
B. Local businesses
C. Local farms/nurseries
D. Municipal Parks & Recreation Staff
E. Girl Scouts & Boys Scouts Troop
F. Neighborhood Associations
G. Master Gardeners
H. Senior groups
I. Condo associations

Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachments:

i. Program Examples
   a. Maine Land Share – program started during the beginning of the COVID-19 pandemic to connect landowners and growers. Prioritizes members of communities affected by racism, colonialism, xenophobia, and class inequality.
   b. Maine FarmLink – linking service intending to connect people seeking farmland with farm owners (or representatives). Range of working arrangements used in connecting.
   c. Leasing and Alternative Tenure – University of Vermont resource providing information on types of leases/arrangements for new farmers who can't afford land, as well as resources about crafting a lease agreement and determining a fair rental rate.

Attachment i.

Maine Land Share: What it Is & How it Works

Overview

The Maine Land Share Project is a statewide mutual aid effort to connect people who want to grow food with people who have land to share. The project mobilizes resources to support gardeners and farmers with their growing and distribution efforts. We hope this work will increase food security during the pandemic, build solidarity through resource-sharing, and create opportunities for joy and outdoor connection in a time of heightened isolation.

Current collaborating organizations are **Land in Common**, **Presente! Maine**, and **The Resilience Hub**.

We are collecting land offers, land needs, and resource-sharing ideas. With this information, we will work to find matches that meet everyone's needs and requests. We may not always be able to find a match in each location, but we will do our best.

Roots of the Land Share Project

A year ago, as the reality of COVID-19 was growing, many of the systems that we had relied upon were shutting down or limiting their operations. People who experienced stability and safety before the crisis were tilted into vulnerability, and people who had long been surviving in the face of difficulty experienced even greater challenges. This was a time to come together to build-life sustaining community, grow solidarity, and share resources.

The Maine Land Share Project was born out of this crisis, in a spontaneous collaboration between Land in Common, the Resilience Hub, and Presente! Maine. Through this all-volunteer effort, the Maine Land Share Project connected gardeners with land and garden-support resources at 15 sites across Maine, 80% of which supported BIPOC, trans, and low-income gardeners. Presente! Maine's land share site has produced hundreds of pounds of fresh food for free community distribution in Portland and Lewiston/Auburn via the Food Brigade.

Why Land Sharing Still Matters Now

As infection rates are falling, and more and more people get their vaccines, the end of the pandemic feels like it may be in sight. Yet many of the inequities that the pandemic made widely visible continue to stay with us, and many cut deeper than before. It is more important than ever for us to maintain the solidarity we built during the pandemic, and continue to meet our needs locally and cooperatively. Growing food for ourselves and our communities is one powerful way to meet one of our most basic needs.

What better way to increase access to healthy food, build new relationships, and work together in ways that maintain a safe distance outdoors than to *share land for community food production*?

How Land Sharing Works

The Land Share team works together to do the following:

- **Outreach**. We created this online portal for land offers and requests, and we are working with partners to get the word out as widely as possible via email and social media. We work with organizers from various communities to connect with people who don't have access to electronic media.

- **Intake**. We use a series of Google Forms to collect basic information about land offers, land requests, and resource-sharing possibilities. These forms ask questions that help us identify potential matches. All information that we collect is confidential and will be seen only by project staff and volunteers working on land-matching.

- **Matching**. As we collect information, we will identify potential matches between those offering and those seeking land. We then reach out to both parties individually to have a more detailed conversation, to ensure that the potential match is truly a good one. If it's a match, we will "virtually" introduce everyone using whatever means a most comfortable and accessible (phone, video, etc).

- **Values & Safety**. As part of this connection process, we ask all parties to agree to a set of Guiding Commitments as well as a set of COVID-19 Safety Protocols to ensure that everyone is on the same page about core values and safety.

- **Land-sharing Agreement**. We then work with both parties to create a custom land-sharing agreement that includes logistics, personal boundaries, resource-sharing arrangements (if any), and other specific needs of land share participants. These, along with a waiver of liability, are then signed by both parties.

- **Connect & Support.** As the season unfolds, the Land Share team will maintain regular contact with both the land-owner

and the land users to make sure that everyone has what they need, and to provide support along the way. We will do our best to connect growers with other organizations and individuals who are able to provide needed resources: seeds, seedlings, soil, compost, tools, technical gardening assistance, etc.

- **Assessment.** We will be in ongoing conversation with partners and participants, seeking and responding to feedback, and making changes as needed along the way.

Criteria for Offered Land

To make the project as manageable as possible, we have identified basic criteria for the kind of land we're encouraging people to share. These include:

- Land is clearly owned or secured by stable, long-term lease by the person offering it, and this person is empowered to make decisions about its use by others.

- Land gets direct sunlight for at least 6-8 hours during the growing season (i.e., it is not significantly shaded)

- Land does not need to be cleared of significant trees, shrubs, or invasives (i.e., it could be tilled or worked without a great deal of prep work).

- Soil and drainage are adequate for growing vegetables (i.e., no low-lying wet land with saturated soils, no known toxins such as heavy metals).

- Reliable (all-season) water source to which a gardener can have regular access.

Priorities for Matching Land Seekers with Land

In keeping with our core values (Land in Common; Resilience Hub) we will do our land-matching work in ways that prioritize communities that are most affected by racism, colonialism, xenophobia, and class inequality. These communities have also experienced long histories of land dispossession and unequal access to land, and are often faced with the hardest effects of the COVID-19 crisis (See also here).

While we *prioritize* matches for people from communities whose lives and needs have *not* been widely prioritized in our society, we will work to make sure that everyone whose land needs can be met through this project are connected to land for growing food this season.

How You Can Get Involved

- **Do you have land that you would like to share?** Fill out our Land Offers form here.
- **Are you seeking land upon which to grow?** Fill out our Land Seekers form here.
- **Do you have access to resources and/or experience that you would be interested in offering our project, or do you have ideas about where else we might find these things?** Fill out our our Resource Sharing form here.
- Are you able to make a financial donation to the project? **Donations we collect will support organizers and gardeners/farmers from most-impacted communities.** This includes purchase of seeds, soil, tools, and other necessary resources, assistance with childcare and transportation as needed, and support for front-line organizers helping to facilitate work on the land. A small amount of donations will support staff time to lead this role, but this is almost entirely a volunteer effort. You can donate here.

- **Do you have any other ideas for how we could strengthen our work?** Please let us know by emailing landshare@landincommon.org.

A Note on Urgent, Imperfect, Action

This is a young project created in a moment of crisis. We recognize from the outset that this project will have some rough edges and that we will make mistakes as we go. At the same time, we know that even a rough version of this work will literally “bear fruit” that can make real, nourishing impacts in our communities. We commit to doing our best, to seeking and welcoming feedback at every turn, and learning from our experiences.

LAND SHARE COLLABORATORS

Land in Common

Presente! Maine

The Resilience Hub

LAND SHARE MATERIALS

Gardening Resources

Land Share COVID-19 Safety Protocols

ACKNOWLEDGEMENT & COMMITMENT

Land in Common does its work on land that has been marked by a long history of injustice, resistance, and resilience. We recognize the original Wabanaki caretakers of this land that is now called “Maine,” and we honor their elders, past, present, and future. We acknowledge the many histories of racism, colonialism, and exploitation that have excluded so many people and communities from land-based livelihood. We honor the strength and resilience of all those who have resisted and persisted, and who have passed on the dream of a more just and equitable world. We commit ourselves to the work of reckoning, reparation, and healing, and to learning

from the wisdom of those most impacted by injustice. We recognize that we are at the beginning of our journey of putting our values into practice, and we welcome all input about how best to proceed.

MAINE FARMLINK

Maine FarmLink, a program of **MAINE FARMLAND TRUST**, is a linking service that helps connect people who are seeking farmland, with farmland owners (or their representatives) who are looking to sell, lease or work out non-traditional tenure arrangements, based on their respective interests, needs and goals. **Learn more**

FEATURED PROPERTIES

Cheviot Farmland • Caribou, ME

This farm has fields fronting Langley Road, as well as access to Caribou Stream. It could be used for rural retreat, hunting camp, small farm/forest operation.

Read more

Sander Lou Farm • Leeds, ME

This is a typical Maine farmhouse, and was built in 1916. It is heated with baseboard hot water/oil (relatively new furnace), in reasonable condition, is well maintained, though many updates are needed. It has 4 bedrooms and one bath. It has ~1900 s.f. of living space. The house is connected by a shed to the barns.

Read more

FEATURED TOPIC

OTHER PROGRAMS

Farmland Protection

Farm Viability

CONTACT

For more information:

(207) 338-6575

Fax: 207-338-6024

info@mainefarmlink.org

Gallery

Maine Farmland Trust
97 Main Street
Belfast, Maine 04915

Leasing and Alternative Tenure

There are numerous tenure options available to new farmers. Farmers do not necessarily need to own or hold title to farmland into order to farm it.

Contents:

Lease Arrangements

Leasing land is the most common option for non-ownership tenure, allowing farmers to gain legal access to land for a time period agreeable to both land owner and farmer. Leasing allows beginning farmers without credit histories or financing to get onto the land with very little start-up capital. Depending on the situation, the land owner might not even charge money for the land rental. The farmer's services alone, such as keeping fields hayed and manageable are sometimes benefit enough for the land owner. In some cases the farmer and land owner create a bartering arrangement. For instance, the farmer provides food in return for use of the land owner's land. Lease agreements where the farmer pays cash for rent are common. In these cases, the rent amount can be a tax-deductable business expense for

the farmer.

If certain criteria are met, leasing land can also allow the land owner to obtain considerable tax benefits by enrolling land in Vermont's Use Value and Appraisal (Current Use) Program. As of 2007, about 23% of farmland in Vermont was leased. An annual "hand-shake" or oral lease is common, although these arrangements can leave both the farmer and the landowner vulnerable if disputes arise. Written leases are also often necessary for either the farmer or land owner for certain services or state programs.

Questions to Ask Before Crafting a Lease Agreement (PDF)

This two-page bulletin offers helpful questions and ideas for beginning farmers to consider before crafting a lease. It will help you think through what you need and want in the agreement to make sure it works for your farm operation.

Short Term Lease

Leases from a one to five-year duration are by far the most common alternative tenure arrangements found in Vermont. Most of these agreements are purely verbal, and often don't last for more than a growing season. The short duration allows both the farmer and the land owner to frequently modify the terms of their agreement if changes are needed. Short term leases allow land owners to take on minimal risk and avoid some of the more far-reaching changes that might accompany a long term stay. Some farmers favor short term leases because they allow for the most experimentation with the least level of commitment. On the other hand, short term tenure does not give the farmer the assurance that they will see an economic return on investments in farm infrastructure or soil fertility. In cases where the land owner is also looking for long term stewardship of the land, short term arrangements might not live up to expectations.

Long Term Lease

Lease agreements with durations of longer than five years are considered long term. Organic farmers or farmers whose operations depend on gradually building soil fertility, pasture quality, infrastructure, perennial

plantings, or local markets benefit most from long term leases. Long term leases can offer the farmer significant flexibility in planning and modifying their enterprises. They are far more complex than short term leases. Both land owner and farmer need to spend time to determine their needs and acceptable terms. It is in the best interest of all parties to seek legal counseling from a lawyer familiar with long-term lease requirements.

Determining the Right Farm Rental Rate (PDF)

This 2014 guide is designed to help farmers and landowners determine a fair cash rental rate for farmland, equipment and infrastructure.

Other Forms of Alternative Tenure

Community Land Trusts or Ground Leases

Community Land Trusts (CLTs) have traditionally operated in urban and suburban areas to increase access to affordable housing. The Trust typically owns the land, while the housing and improvements such as barns and greenhouses are owned by its occupants. In some cases in the Northeast, CLTs own farmland and lease it to farmers for renewable 99-year terms. This mimics land ownership in the sense that the farmers can take advantage of long term improvements and the ability to pass tenure down to future generations when the lease provides for family succession. Farmers can build equity in the housing and infrastructure they own. CLT arrangements often have formulas that determine the resale value of the housing and improvements in a way that will allow for the farming opportunities to be kept affordable to future generations. The CLT model has the potential to be an excellent strategy for ensuring long term affordability and accessibility of farmland for Vermont's beginning farmers.

Cooperative Ownership

Cooperative ownership of farmland is where members own shares in the property.. Forming a legal Cooperative might represent a feasible strategy for beginning farmers to pool resources and purchase farmland. Vermont law regulates how cooperatives can be established, and details related to land tenure and stewardship can be specified when creating the cooperative's by-laws that are submitted to the state. In some cases, another

cooperative, such as a food co-op might own the land and lease the land to farmers.

Incubator Farms

Incubator farm programs are typically run by non-profits, universities, or other organizations supporting farm start-ups. Beginning farmers can secure short-term tenure by leasing land owned or managed by the incubator program. The lease terms range depending on the specific program. Incubator programs enable beginning farmers to "jump start" their enterprise with access to land; but also often offer shared access to processing infrastructure, equipment, water, marketing channels, and other technical assistance related to production and marketing. Once operations mature, farmers are expected to move out of the incubator program and re-establish elsewhere. The Intervale Center'sFarms Program in Burlington, VT is a nationally known incubator program. It currently serves as a successful model for many other programs currently being developed in Vermont and around the country.

Attachment C-8 Perennial Agriculture

Perennial Agriculture

Type: Physical Installation, Program Development

Implementation Time: 1-3months

Goal: To inspire the public to engage in locally grown food systems.
To improve awareness and understanding of local food systems as a means of community resilience.
To increase accessibility to fresh locally grown produce and promote food security.
To demonstrate low maintenance gardening techniques that can be applied on a large or small scale.
To promote understanding of ecological relationships as a way to create habitat and food sources that are self-sustaining.
To improve the quality of public spaces and encourage community interaction.
To build economic and community development.
To increase habitat resilience and species diversity with the addition of perennial crops.
To mitigate soil health concerns and build capacity for stormwater infiltration.
To utilize space which may not be appropriate for traditional food production or have lower capacity for maintenance.

Audience: The community: home gardeners, community gardeners, low-income, and food insecure.

Question: What local food systems exist in your municipality? Is most of the food consumed in your community locally sourced?

Question: What is your town's history with agriculture? Is there a long history of agriculture or is introducing local agriculture new?

Question: Is there work being done to tackle food insecurity & promote local food systems? What issues regarding food security does your community face? How can this project highlight these issues and promote local food?

Overview:

Perennial agriculture brings together a variety of useful and low maintenance perennial plants as well as practices that promote a healthy ecosystem. This can include woody crops which can be harvested for trellising support, companion plants that can help to achieve rich organic soil, pollinator habitat to promote productive edible plants, or pest deterrent species.

Food forests are a method of perennial agriculture that mimic the ecological relationships of natural forests where plants are selected for their edible properties, medicinal properties, or general usefulness towards agriculture uses. Natural forests are comprised of layers (canopy, sub-canopy, shrub, herbaceous, root, vine) that fulfill different roles and support various habitat niches. Food forest designs account for layers that are suitable to the site and promoting biological activity.

Establishing any perennial agriculture or food forest is done from the ground up. As with any type of gardening, healthy soil with rich organic matter and biological activity is key for the success of healthy plants. This can be accomplished initially though soil amendments like compost and over time with the addition and accumulation of organic materials like cardboard, leaves, and wood chips. As plants become more established, they will contribute their own organic material to the soil and require less amendments.

In the first year of a perennial agriculture planting or food forest, regular watering and maintenance is required. In subsequent years, the plants are well established and minimal maintenance is needed to produce healthy products. It is beneficial, however, to establish a core group of volunteers early in the process to ensure the success of a public food

forest. Depending on the size of the installation, volunteer roles are generally not time intensive and many tasks can be completed by people with varying physical abilities.

Ongoing maintenance needs are an excellent opportunity for incorporating educational opportunities into perennial agriculture as well as intergenerational relationships. Many gardening practices can be demonstrated with this type of installation to increase the community's overall understanding of gardening practices. Educational opportunities can be facilitated peer to peer or include support from agriculture professionals. Holding regular events for the public to engage can also help to increase the knowledge of what uses different plants offer. With more understanding of how to use less common plants, the agricultural products will gain more community value.

Similar to maintenance needs, financial burdens of the food forest will also primarily occur in the first year of the project to purchase plants and any materials needed for trellising or signage. Many materials needed for maintenance, like cardboard and wood chips, can be acquired for free making this installation both ecologically self-sustaining as well as financially.

It is recommended to work with a landscape professional to determine the initial forest structure and select the core plants. Additions can be made at later times as gaps in plantings become apparent or new species become available. Many common food forest plants are easy to propagate to spread either through the food forest, to other locations, or sold to raise funds for maintenance.

Implementation:

Phase I: Define Target Area & Build Community Interest

Connect with the local community groups to determine how much interest there is from the community as a whole, as well as on the neighborhood scale. Using community needs and goals for the installation, determine a target area within the municipality which best serves those goals.

> *Question: Is there a part of your municipality's history/food system/local agriculture that could be highlighted as part of the program? (e.g. connecting a town with its long history of local agriculture)*
>
> *Question: What are the goals of the installation? Increase food security? Low maintenance garden demonstration? Community space enhancement?*
>
> *Question: How will harvesting occur? Is produce widely open to the entire community? Will any of the produce be sold to recoup project costs?*

Phase II: Site Selection & Food Forest Design

Consult with a permaculture professional for food forest designs (Attachments i and ii). Designs should account for community goals as well as the specific site conditions. The site should provide planting space for several varieties of plants as well as partial to full sun with well-draining soil. A soil test will need to be completed to gain an understanding of the existing nutrient profile as well as the potential soil contaminants. Community input should help determine the primary plant species initially selected and the layout based on their goals for the site.

> *Question: What types of open/ green spaces are available in the target area? Are there existing community gardens? Does the site need to be municipal owned property? Are there community organizations with land to offer? Are there underutilized open spaces?*
>
> *Question: How will the community interact with this space? Is it a destination or a place that people walk through?*
>
> *Question: Does the community have tangential goals for the site? Does it need to be handicap accessible? Should it capture rainwater? High production plants? Species for preserving? Medicinal?*
>
> *Question: Are there ordinance or permit requirements that need to be fulfilled or prohibit this type of project? Will a presentation to the municipality be needed for site approval?*

Question: Will any special tools or methods be needed to harvest or process agricultural products? Are those tools or methods readily available in the community? How can this be connected to other modules to meet community needs and goals?

Phase III: Installation

Installations can be completed by paid staff (for example municipal staff), volunteers, or a combination. In most cases it is desirable to include volunteers in installation of perennial agriculture plantings. If this method is used, the first step is to recruit the community volunteers for installation. Volunteers should be from the immediate community to build their connection to the project and increase their interest in its success. The number of staff or volunteers needed will depend on the size and existing conditions of the site. The site should be staged prior to volunteers being on site and any tasks requiring power equipment should be completed ahead of time. Create a list of all steps (example in Attachment iii) to completing the installation to help distribute volunteers to different tasks. Tasks will range in difficulty and should be assigned to make sure everyone is supporting a task that they are comfortable with and capable of completing.

Question: Who will provide the labor for the installation: Paid staff, volunteers, or a combination?

Question: What preparation does the site need prior to volunteers being on site? Leveling? Is fill needed? Machinery?

Question: What materials are needed for soil amending? Can they be donated or obtained for free?

Question: How many volunteers will be needed to complete the installation tasks?

Phase IV: Long-term Maintenance, Sustainability, and Education

Create a maintenance plan. Typically, this involves utilizing community volunteers for maintenance. If this approach is used, identify volunteer or volunteer groups who are interested in taking a lead in organizing volunteers for long term maintenance. Include their contact information on any signage. Develop a plan for seasonal maintenance needed (Attachment iv). It should include general food forest tasks as well as specific needs of different species (pruning, dividing, etc). Offering educational opportunities for the community to engage with the plantings can familiarize more people with lesser-known plantings that may have been incorporated and ensure intended goals are met.

Question: Are the community members who express interest able to support long-term volunteer efforts to help maintain the project?

Question: Are tools available to community volunteers to provide maintenance?

Question: Are there community groups interested in leading maintenance efforts? Community garden? Boy or Girl Scout Troop? Neighborhood Association?

Question: Are there Master Gardeners in the community who would be interested in providing educational workshops?

Question: Are there gleaning needs? (view Gleaning & Foraging module)

Cost:

Personnel time:

a) Planning
b) Installation
c) Maintenance coordination
d) Education and Outreach

Materials:

a) Lumber if trellising or signage is needed

b) Compost and/or other soil amendments
c) Woodchips (free)
d) Tools: wheelbarrows, rakes, shovels, pitchforks
e) Cardboard (free)
f) Plants
g) Stakes/flags
h) Clean fill (if needed)

Partners to Support Implementation:

A. CCSWCD
B. Town's Downtown Network (local town business alliance/association)
C. Local businesses
D. Local farms/nurseries
E. Municipal Parks & Recreation Staff
F. Girl Scouts & Boys Scouts Troop
G. Neighborhood Associations
H. Master Gardeners

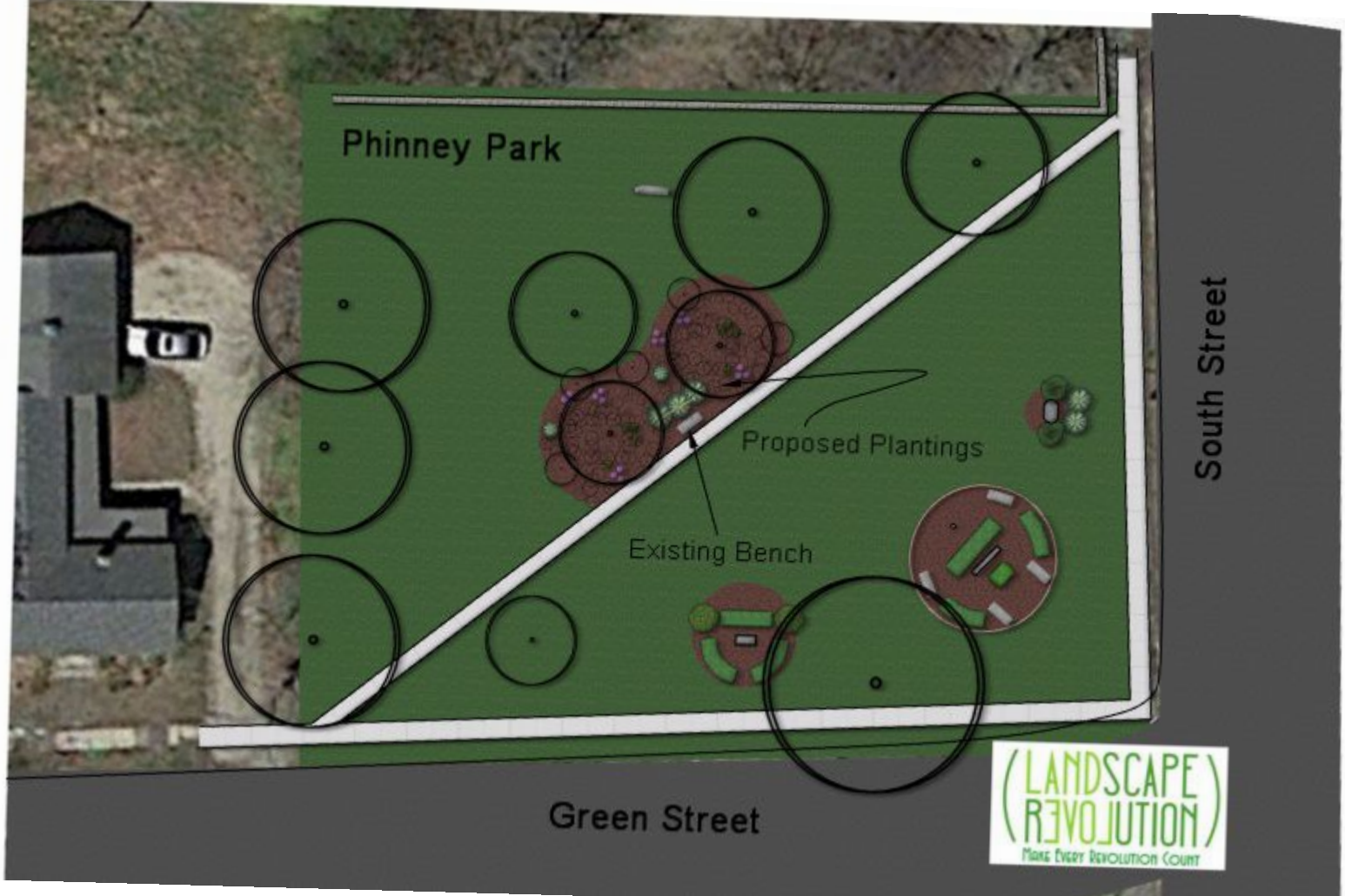
Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachments:

i. Food Forest Design example (Phinney-original walking path one)
ii. Food Forest Design example (Little Falls- destination type)
iii. Installation Tasks example list
iv. Maintenance Plan example

Attachment i.


Phinney Park
Proposed Plantings
Existing Bench
South Street
Green Street
LANDSCAPE REVOLUTION
Make Every Revolution Count


Acorn St

Attachment iii.

Food Forest Installation Prep						
Task	**Who Responsible**	**Organization**	**Source**	**Timeframe**	**Quantity**	**Notes**
Both Sites (June 2nd & 8th)						
Cardboard	Bryce Neal	CCSWCD	CCSWCD	Transport day of	lots...	If we need more can check: Maine Shipping & Packaging, LP Appliance, and Mount Joy Orchard may have excess from their maintenance day.
Wood Chips	Josh Haiss	Landscape Revolution	Colonial Tree	Delivered beforehand	7 yards	Can stage materials at Little Falls. Some space on back parking spaces can be used. Will be able to stage materials at Robie Gym on tarp
Compost	Jenna Martyn-Fisher	CCSWCD	Bensons?	Ordered 5/22/19 Delivered beforehand	15 yards to Little Falls, 5 yards to Phinney.	
Plants	Aaron Parker	Edgewood	Edgewood + other food forest + donations			
Straw	Josh Haiss	Landscape Revolution	Find View Farm		10 bales	Can invoice CCSWCD or be reimbursed
Tools	Bryce Neal & Aaron	CCSWCD	CCSWCD		4+ Wheel Barrows 10+ round shovels 2 Box cutters 6 metal rakes	CCSWCD has 2 wheel barrows. Aaron has 2 wheel barrows and can bring 2 more metal rakes if needed. Will want flat shovels and mulch forks. Need to inventroy what tools CCSWCD has available. Add the volunteers may want to bring their own tools.
Signage	CCSWCD / Town			Do not need before planting days		Might be able to reuse some language on recent signs for Portland Food Forests Plant species signs could be a project with the youth in the rec program
Food	Ali/ Kathy?	CCSWCD	CCSWCD		Food	
Planter Construction						
Aquire construction materials	Daniel Bachner	Boy Scout		Before June 8		Fundraising is done. $850 raised will cover costs of planters and be donated to help with other material costs. Phinney lumber gave a discount of 10% Prototype looks great! Will make 6 boxes at 3 boards tall, 12 at 4 boards tall, 6 at 5 boards tall
Assemble 24 planters	Daniel Bachner	Boy Scout		Before June 8		Assembling weekend of June 1 & 2
Identify host locations	Ben Demers + Kathy Gerrard	Boy Scout		Before June 8		Reach out to Rob Sanford for USM locations
Aquire Hay for planters	Josh Haiss		Find View Farm	Before June 8	12 bales	Note - compost for this task purchaced in bulk for all activities
Signage	Jenna			Can be after installation		CCSWCD will coordinate permanent plaques for the boxes and temporary signs for plant species
Plants				Week before June 8th		Check with local businesses to get plant donations. Closer to the date will be more likely to donate. Old Well farm said they were interested in donating.
Phinney Planting / Planter Day (June 8th)						
Transport assembled planters to Phinney Park						
Distribute planters to hosts						
Peat	Jenna Martyn Fisher	CCSWCD	Garden Store	Before June 8	TBD	
Fill planters with hay and soil on site						
Add plants						
Little Falls Raised Beds						
Compost	Jenna / Josh		Garbage to Garden Donation	TBD	2 yard donation	Need to pick up

Food Forest Maintenance Plan

Phinney Food Forest

Spring

- Sheet mulch (cardboard topped with wood chips)
    - Areas already showing weeds
    - Edges
- Remove dead flower stems

Summer

- Chop and drop Comfrey
    - Drop leaves around trees, mulch over to maintain aesthetic
- Sheet mulch areas looking weedy
- Water if needed
    - Most plants should be well established and only need water if there is an extended dry spell
- Dead head Tansy

Fall

- Sheet mulch
    - Areas showing weeds
    - Around plants that might have dropped unwanted seeds (ie. Tansy)
    - Optional: add a thick layer of leaves instead of cardboard. Top with a thin layer of woodchips. Leaves will compress throughout winter and provide nutrients and organic matter for spring growth
- Optional: remove dead flower stems from echinacea and other flowers
    - Leaving them in place helps serve as insect homes and bird food through the winter

Winter

- Add rodent guards to Peach and Cornelian Cherry trees

Little Falls Food Forest

Spring

- Sheet mulch (cardboard topped with wood chips)
    - Areas already showing weeds
    - Edges
- Remove dead flower stems
    - All dead material should be left in the beds and mulched over to return nutrients and continue building up organic soil
- Train grape vines, kiwi vines, and black raspberry to trellis (trellis not currently in place)
- Divide plants as needed, use to fill in any gaps around the garden
    - Annise Hyssop, Bee Balm, Comfrey, Coneflower, Rhubarb, Chives, Mouse Garlic

Summer

- Chop and drop Comfrey
    - Drop leaves around trees, mulch over to maintain aesthetic
    - Chop after flowers have gone by. Can be done several times during the summer
- Sheet mulch
    - Areas with weeds
- Water if needed
    - Most plants should be well established and only need water if there is an extended dry spell
- Dead head Tansy
- Mow clover pathway after flowers start to fade
- Spread wanted seeds (borage, chamomile, etc)
- Remove bulbs from the top of Egyptian Walking Onions and plant them
    - Top bulbs can also be harvested to eat, but some should be planted to continue them through the next year
- Remove flower stems from garlic
    - Garlic scapes can be eaten. Removing them helps the plant put energy into their bulbs.

Fall

- Sheet mulch
    - Areas showing weeds
    - Around plants that might have dropped unwanted seeds (ie. Tansy)
    - Optional: add a thick layer of leaves instead of cardboard. Top with a thin layer of woodchips. Leaves will compress throughout winter and provide nutrients and organic matter for spring growth
- Optional: remove dead flower stems from echinacea and other flowers
    - Leaving them in place helps serve as insect homes and bird food through the winter
    - All dead material should be left in the beds and mulched over to return nutrients and continue building up organic soil
- Prune Elderberry bushes
    - Look where stems come out of the ground, thicker bumpier stalks are older and can be removed. Stray stems in unwanted places can also be removed. Thin out about a third of each clump.
        - Consider propagating cuttings or stray stalks into new locations. Cut stems should be planted with two nodes below the ground to start roots. Stray stalks can be dug out with some roots attached.
- Sow garlic cloves around the beds.
- Collect seeds to propagate in following season

Winter

- Add rodent guards to Peach and Cornelian Cherry trees
- Prune Black Raspberry
    - Remove stems that produced fruit in the past season. Remove stems in unwanted places

Attachment C-9 Edible Main Street

Edible Main Street

Type: Physical Installation, Program Development

Implementation Time: 2-8 months

Goal: To inspire the public to engage in locally grown food systems and local businesses to stimulate local economic activity.
To improve awareness and understanding of local food systems as a means of community resilience.
To facilitate foot traffic in town and bolster the community's economy by creating a highlighting local businesses.
To contribute visual cohesion & aesthetic appeal to the town center, perpetuating a sense of community and reinforcing the town center as a valued space.
To establish social care of town plantings and distribute workload associated with public landscaping.
To increase accessibility to fresh produce by bringing edible plants to the forefront.
To increase community awareness of municipal community agriculture initiatives.
To create synergies with community members, volunteers, and municipal properties.

Audience: The general community, town business alliance/association/downtown district, local businesses, town planners, local nurseries, local farmers, tourists (regional and out of state).

Question: What local food systems exist in your municipality? Is most of the food consumed in your community l locally sourced?
Question: How will harvesting be done? Passersby? Full harvest donated? Business owners?
Question: Are there any education/ youth groups who would interact with this installation.
Question: What is your municipalities history with agriculture? Is there a long history of agriculture or is introducing local agriculture new?
Question: Is there work being done to tackle food insecurity & promote local food systems? What issues regarding food security does your community face? How can this project highlight these issues and promote local food?

Overview:

An "Edible Main St." consists of a set of edible plantings (annual & perennial) in a public space intentionally designed to engage the public with local food concepts. The installation may be small scale, perhaps just on one block, or consist of a comprehensive city-wide program. Typically, programs are a collaboration between local businesses (or "hosts") and the municipality, with non-profit organizations such as Downtown Districts often serving as coordinators.

Food produced through these installations can be harvested in different ways to achieve different goals. The following are several examples of ways that produce can support the community in different ways:

1. Produce is open to the general public to pick from. This method engages the public in locally grown food and demonstrates productive small space gardening methods in population dense areas.
2. Produce is harvested by the host. The host can choose to utilize the produce in their business or donate it to a local food pantry. This method supports local businesses integrating local produce into their daily business.
3. Produce is harvested by the coordinators and donated to a local food pantry. This method demonstrates productive small space gardening to the public while also addressing food insecurity with fresh local food.

Implementation:

Phase I: Creation

Collaborate with stakeholders to design an edible planter box that meets the needs of the community (Attachment i.). Create a framework for expectations with host sites and planter maintenance. Determine how the edible installations will

be distributed throughout the community and what the procedure will be for harvesting produce. Connecting with local businesses or business associations can determine areas of the community that will be open to hosting installations and the number of locations that are interested in hosting.

> *Question: Is there a part of your municipality's history/food system/local agriculture that could be highlighted as part of the program? (e.g. connecting a town with its long history of local agriculture)*
>
> *Question: Do you have a local business alliance/organization of local businesses? (Maine Downtown Business Alliance)*
>
> *Question: How will plantings be maintained through the winter? Do they need to be removable?*
>
> *Question: How will harvesting be done?*
>
> *Question: What are the expectations for hosts and maintenance responsibilities? Who is responsible for watering? Are there restrictions on soil amendments and pesticide use?*

Phase II: Installation & Community Outreach

If needed, establish a volunteer base to support building planters, installing the plants and planters, and maintaining them throughout the season. Coordinate with the host sites to determine what contents each planter will contain. Plants selected for each box can align with a theme or recipe (Attachment ii.) to enhance interaction or connect to the community's agricultural history. Plants should be considered for the entire season incorporating a mixture of early and late season produce. Coordinate with local nurseries and farms for possible plant and soil media donations.

Create signage for planter boxes and outreach materials to add to the boxes or provide host sites with outreach materials like a program pamphlet (see Attachments iii.). Signage may include instructions for harvest or a map of all planter locations to encourage travel between all the planters. Hosting events centered around installing the planters can help to generate community interest in the project.

> *Question: Whom in your community can volunteer to build planter boxes? What community organizations can you partner with to provide long-term volunteers to help maintain the project?*
>
> *Question: Do planter locations have any growing conditions (water access, sun/shade) that need to be considered with plant selection?*
>
> *Question: How will information about this program be shared with the community? What types of media does your audience consume? Do you need a social media plan to reach the community?*
>
> *Question: What types of events exist in your community to help draw attention to these installations? How can you encourage people to participate and interact with the planter installations?*
>
> *Question: What type of signage is needed for the planters? Does it need to be translated into multiple languages?*

Phase III: Expansion & Sustainability

Determine how this program will continue in the long term. Encouraging businesses to store the boxes themselves can sow the seed of project sustainability.

Connect with volunteer groups that are willing to commit to the project's sustainability for years to come (such as a local Scouts troop, gardening group, etc.). Encourage returning planter box hosts to prepare their own boxes with compost and plants. Find volunteer groups willing to build new planter boxes, organize materials donations, design planter box themes, create signage and outreach materials, and prepare the boxes. Once a business has their boxes, encourage them to care for the box themselves. Help businesses and volunteers connect with organizations able to provide materials and provide support as tasks present themselves. When local business/village alliance/downtown district and businesses invest in the project, their engagement reflects as a commitment to the community.

Expanding the project includes building more planter boxes thus involving more businesses. With the success of the initial installation, it is likely there will be additional interest in participating as the program builds community interest and support.

Question: Is there funding to support host sites long term with set-up materials? What organization can help to facilitate host site needs or recruitment for new host sites?

Question: How can these installations be incorporated with long term community landscape plans?

Cost:

Personnel time:

a) Planning
b) Outreach materials
c) Installation

Materials:

a) Lumber
b) Hay
c) Peat moss
d) Compost
e) Plant (annually)
f) Printed Brochures
g) Printed & laminated planter box signs
h) Tools

Partners to Support Implementation:

A. CCSWCD
B. Town's Downtown Network (local town business alliance/association)
C. Local businesses
D. Local farms/nurseries
E. Municipal Parks & Recreation Staff
F. Girl Scouts & Boys Scouts Troop

Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Regional Government funding
C. Municipal Funding
D. Other funding sources (grants)

Attachments:

i. Case Study: Gorham
ii. Planter Box Themes 2019 & 2020
iii. Outreach Materials
    a. Edible Mainstreet Brochure 2019 & 2020
    b. Planter Box Signage 2019
    c. Planter Box Signage 2020
    d. Project Signage
    e. COVID-19 Health & Safety Signage
iv. Planter Box Designs

Attachment i.

Gorham Grown

A Case Study

Program Elements:

- 48 planter boxes
- Over 19 businesses providing planter locations
- 2 public food forests
- 50 Planter location maps distributed to Village businesses
- Countless happy visitors

Summary

Gorham's Edible Main Street program began in 2019 with funding from the Quimby Family Foundation in partnership with the Town of Gorham and the Cumberland County Soil and Water Conservation District.

Additional community involvement included fundraising and construction efforts from local boy scouts (2019) and girl scouts (2020). Volunteers from Fort Hill Community Church assisted with filling planter boxes and installing the food forest at Phinney Park.

Outreach

Outreach was conducted through print and online news media to help recruit volunteers and raise awareness of the program throughout the Town. A Facebook page was created to share information about where the planters are located and alert the community when different produce is ready to harvest.

Signage is posted at both food forests and identifies plant species, how to use them, and when they are ready.

Pamphlets were created in both 2019 and 2020 to identify participating Edible Main Street locations.

CUMBERLAND COUNTY SOIL & WATER CONSERVATION DISTRICT

www.cumberlandswcd.org

Phase 1: Creation & Implementation (2019)

The Edible Main Street was created by connecting with the Gorham Village Alliance to determine which local businesses were interested in participating. Once interest in Edible Main Street was determined, a call for volunteers was issued in early spring to build the needed planter boxes. Boy Scouts fundraised for materials and constructed all planters.

A volunteer "Planting Day" in late May/early June was held to prepare the boxes with hay, soil media (peat moss & compost), and plants. Volunteers also helped install the Phinney Park Food Forest and to distribute the boxes throughout the town. Plants were donated by local nurseries.

Planter boxes were filled based on themes (salsa garden, tea garden, etc) using the available plants. Signage and outreach materials were added to the boxes to show the contents, location of other planters, and recipes. At the end of the season, many businesses were able to store their planter boxes on site. Those who could not were able to store them under cover at a Town property.

Pogo Realty Planter (June 2019)

Pogo Realty Planter (July 2019)

Phase II: Expansion & Sustainability (2020)

Expanding the project included building more planter boxes thus involving more businesses. Project expansion in the second year mirrors the work done in the first year: engaging with volunteers to build boxes; working with the Gorham Village Alliance and business owners to host boxes.

Returning planter box hosts were encouraged to prepare their own boxes with compost and plants. Two girl scouts pursuing their silver badge volunteered to build new planter boxes, organize materials donations, design planter box themes, create signage and outreach materials, and prepare the boxes. Once a business had their boxes delivered, they cared for the boxes for the remainder of the growing season. By the end of the second year, community partners including the Gorham Village Alliance and Gorham Parks & Rec Department were able to take on the responsibility of coordinating end of season logistics. These groups will continue to support businesses in participating in future years.

Pogo Realty Planter (August 2019)

2019 Businesses & Planter Boxes

Business	Number of Planter Boxes	Planter Box Theme & Plants
8 Elm Street Businesses	3	**Salsa Garden** Box1- Chive, Nasturtium, Cilantro, Lettuce Box 2- Tomato, Lettuce x2 Box 3- Ace Pepper, Green Pepper
Atlantic Dance Arts	1	**Tomato Sauce Garden** New Girl Tomato, Basil x2, Calendula
Baxter Library	3	**Salsa Garden** Box 1- Thai Basil, Husk Cherry Box 2- Juliet Tomato, Nasturtium Box 3- Ace Red Pepper, Green Pepper
Carter's Green Market	1	**Tomato Sauce Garden** Heirloom Tomato, Basil, Calendula
Chiropractic Clinic of Gorham	3	**Roasting** Box 1- Fennel x3, Parsley Box 2- Eggplant, Calendula Box 3- Cabbage
Great Falls Construction	1	**Salsa Garden** Tomatillo x2, Nasturtium, Cilantro
Norway Savings Bank	3	**Roasting** Box 1- Fennel x3, Mint Box 2- Eggplant x2, Nasturtium Box 3- Red Cabbage
Po-Go realty	3	**Salad Garden** Box 1- Cucumber x4, Calendula Box 2- Heirloom Tomato Box 3- Lettuce, Kale
Robie Gym	3	**Salsa Garden** Box 1- Cilantro, Lavender, Nasturtium Box 2- Roma Tomato, Calendula x2 Box 3- Tomatillo x2, Nasturtium
The Bookworm	1	**Tea Garden** Chamomile x2, Mint, Lavender
The Vintage Heart (not participating in 2020)	1	Ace Pepper x2, Basil
Back in Motion (not participating in 2020)	1	Ace Pepper x2, Basil

2020 Boxes Created & Planted by Girl Scouts

Business	Number of Planter Boxes	Planter Box Theme & Plants
On Purpose WellBeing Center	3	3 new boxes
Party Time Rental	1	1 new box
Galilee Baptist Church	3	3 new boxes
Gorham Arts Alliance	3	3 new boxes
Village Builders	3	3 new boxes
Pine Crest Inn	3	3 new boxes
Harrison House & Home	3	3 new box
First Parish Congressional Church	3	3 new box

2020 Boxes Arranged by CCSWCD/Businesses

Business	Number of Planter Boxes	Planter Box Theme & Plants
Atlantic Dance Arts	1	*CCSWCD Stored* **Tomato Sauce Garden** New Girl Tomato, Basil x2, Calendula
Baxter Library	3	*CCSWCD Stored* Theme TBD by Laura Box 1- Box 2- Box 3-
Chiropractic Clinic of Gorham	3	*Stored independently* **Roasting** Box 1- Fennel x3, Parsley Box 2- Eggplant, Calendula Box 3- Cabbage
Great Falls Construction	1	*Stored independently* **Salsa Garden** Tomatillo x2, Nasturtium, Cilantro
Norway Savings Bank	3	*Stored independently* **Roasting** Box 1- Fennel x3, Mint Box 2- Eggplant x2, Nasturtium Box 3- Red Cabbage
Po-Go realty	3	*Stored independently* **Salad Garden** Box 1- Cucumber x4, Calendula Box 2- Heirloom Tomato Box 3- Lettuce, Kale
Robie Gym	3	*CCSWCD Stored* **Salsa Garden** Box 1- Cilantro, Lavender, Nasturtium

		Box 2- Roma Tomato, Calendula x2 Box 3- Tomatillo x2, Nasturtium
The Bookworm	3	*Stored Independently* **Tea Garden (2019 Theme)** Box 1 - Chamomile x2, Mint, Lavender
SYNC Gorham	1	1 new box
Edward Jones - Financial Advisor: Jessica Szafranski	1	1 new box
Carter's Auto Service	1	1 new box
Michael Smith Financial	3	**Salsa Garden** Box1- Chive, Nasturtium, Cilantro, Lettuce Box 2- Tomato, Lettuce x2 Box 3- Ace Pepper, Green Pepper

Attachment iii.

Gorham Food Forests

Food forests are designed to mimic the layers of a natural forest that include canopy trees, understory shrubs, and small groundcover plants. All plants are chosen for their edible (fruits, herbs) or useful (teas) properties. Below is a list of a few examples found in Gorham's food forests. Visit these locations for full details:

Little Falls Activity Center | 40 Acorn St

Phinney Park | South St & Green St

Plant Type	Typical Use
Arctic Kiwi	Fresh Eating
Asparagus	Cooked Vegetable
Bee Balm	Tea, Infused Vinegar
Black Raspberry	Fresh Eating, Jam
Blueberry	Fresh Eating, Jam
Borage	Salads, Garnish
Chives	Salads, Garnish, Spice
Cornelian Cherry	Fresh Eating, Jam
Cut-Leaf Coneflower	Cooked or Raw Greens
Elderberry	Syrups, Jams, Wine
Fennel, Bronze	Salads, Stir Fry, Soups
Garden Sorrel	Salads, Soup
Grape	Fresh Eating, Juice
Haskap	Fresh Eating, Jam
Lovage	Spice
Mouse Garlic	Salads, Garnish, Spice
Paw Paw	Fresh Eating
Peach "Red Haven"	Fresh Eating
Rhubarb	Fresh Eating, Pies
Sage	Spice
Schisandra	Fresh Eating, Juice
Sea Kale	Salads, Cooked Greens
Seaberry	Fresh Eating, Jam
Strawberry	Fresh Eating, Jam
Thyme	Spice
Walking Onion	Green Onion

Gorham's agricultural history dates back to the 18th century, when early settlers discovered its rich soil and abundant water. After a decline in farming, the Town is enjoying a recent resurgence in agriculture.

Gorham Grown aims to teach residents and visitors the ease of small-scale gardening and the joy of growing food for home consumption. Several installations can be found throughout the Town to show these low-maintenance food gardens. We hope you're inspired to eat *Gorham Grown!*

Gorham Grown is a project of the Cumberland County Soil and Water Conservation District. It is supported by the Town of Gorham, many community partners and grant funds from the Quimby Family Foundation.

Partners

Planter boxes were constructed as an Eagle Scout Project by Daniel Bachner of Gorham.

For more information

Edible Main Facebook
www.facebook.com/GorhamFoodForest

Gorham Parks & Rec
www.gorhamrec.com | 207.839.7752

Cumberland County SWCD
www.cumberlandswcd.org | 207.892.4700

Exploring our Roots

Gorham Grown

Take an edible tour through the Gorham Village

Look What We're Growing

Gorham's "Edible Main St" wooden planters are located throughout the Village. Downtown businesses adopted planters for the season that are open for everyone to harvest from. Each planter has a theme to help complete a dish with one stop. Here's what Gorham is growing:

1. Back in Motion

Sauce Garden

Ace Pepper, Basil

2. Norway Savings Bank

Roasting Pan

Box 1- Fennel, Mint
Box 2- Eggplant, Nasturtium
Box 3- Red Cabbage

3. The Bookworm

Tea Time

Chamomile, Mint, Lavender

4. Po-Go Realty

Salad Garden

Box 1- Cucumber, Calendula,
Box 2- Heirloom Tomato
Box 3- Lettuce, Kale

5. Atlantic Dance Arts

Sauce Garden

New Girl Tomato, Basil, Calendula

6. Chiropractic Clinic of Gorham

Roasting Pan

Box 1- Fennel, Mint
Box 2- Eggplant, Nasturtium
Box 3- Red Cabbage

7. Great Falls Construction

Salsa Garden

Tomatillo, Nasturtium, Cilantro

8. Carter's Green Market

Sauce Garden

Heirloom Tomato, Basil, Calendula

9. 8 Elm St Businesses

Salsa Garden

Box 1- Chive, Nasturtium, Cilantro, Lettuce
Box 2- Tomato, Lettuce
Box 3- Ace Pepper, Green Pepper

10. Robie Gym

Salsa Garden

Box 1- Cilantro, Lavender, Nasturtium
Box 2- Roma Tomato, Calendula
Box 3- Tomatillo, Nasturtium

11. The Vintage Heart

Sauce Garden

Ace Pepper, Basil

12. Baxter Library

Salsa Garden

Box 1- Thai Basil, Husk Cherry
Box 2- Juliet Tomato, Nasturtium
Box 3- Ace Red Pepper, Green Pepper

13. Phinney Park Food Forest

The food forest at Phinney Park contains many types of edible perennial plants including Peach, Borage, Asparagus, and Sage. Signs available at the site give full details on all the plant types you can find.

8. Po-Go Realty
Roasting Pan
Box 1–Zuccini
Box 2–Summer Squash
Box 3–Eggplant

9. Atlantic Dance Arts
Tomato Sauce Garden
Oregano, Parsley, Basil, Bell Peppers,
New Girl Tomato, Calendula

10. First Parish congretional Church
Coleslaw
Box 1–Green Cabbage
Box 2–Purple Cabbage
Box 3–Onions, Decorative Flowers*

11. Gorham Arts Alliance
Roasted Eggplant
Box 1–Eggplant
Box 2–Hot Peppers
Box 3–Oregano

12. Robie Gym
Cucumber, Tomato, Dill Salad
Box 1- Picking Cucumbers
Box 2- Dill, Onions
Box 3- Cherry Tomatoes

13. SYNC Gorham
Cabbage Pico de Gallo
Box 1–Tomatillo, Curled Parsley, Marigold
Box 2–Cherry Tomato, Basil
Box 3–Cabbage, Marigold

Thank you
Meghan & Brinn Irish
from Girl Scouts Troop 2300!

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Gorham Food Forests

Little Falls Activity Center | **40 Acorn Street**

Phinney Park | **South Street & Green Street**

Partners

Gorham

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

girl scouts of maine

Planter boxes were contstructed and compiled by **Meghan & Brinn Irish** from Gorham Girl Scouts Troop 2300.

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Cumberland County SWCD
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Exploring our Roots

Gorham Grown

Take an edible tour through the Gorham Village

Look at What Gorham's Growing
Gorham's "Edible Main Street" boxes are are hosted by local businesses throughout the village. Feel free to harvest as you please!

1. Village Builders
Pepper Garden
Box 1–Hot Peppers, Decorative Flowers*
Box 2–Cherry Tomatoes
Box 3–Onion, Green Peppers

2. Great Falls Constructions
Roasted Tomatillo
Box 1–Tomatillo
Box 2–Sage, Marigolds

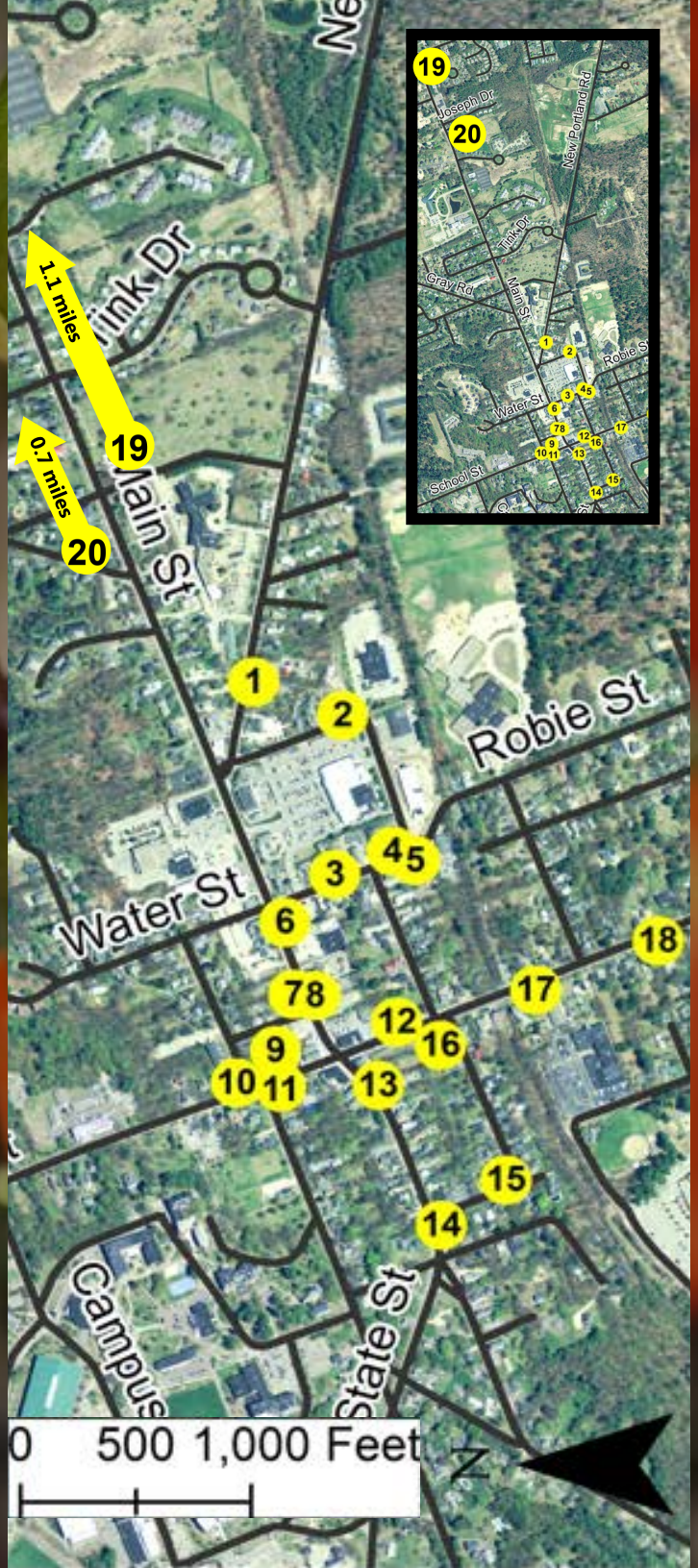
3. Edward Jones Financial
Beans & Greens
Pole Beans, Lettuce

4. Carter's Auto Service
Roasting Pan
Cherry Tomatoes, Green Peppers, Basil

5. Party Time Rental
Chocolate & Lavender Tea Garden
Chocolate Mint, Lavender, Marigold

6. Norway Savings
Salsa Garden
Box 1–Tomato, Cilantro, Marigold
Box 2–Tomato, Cilantro, Marigold
Box 3–Yellow Peppers, Basil, Marigold

7. The Bookworm
Herb Salad Garden
Box 1–Butter lettuce, Gormet Red Lettuce
Box 2–Tomatoes
Box 3–Sage, Rosemary, Marjoram, Thyme



14. Chiropractic Clinic of Gorham
Pepper Pandemonium
Box 1–Cubanelle Peppers
Box 2–Poblano Peppers
Box 3 - Bell Peppers

15. Harrison House & Home
Chili Essentials
Box 1–Hot Peppers, Decorative Flowers*
Box 2–Cherry Tomatoes
Box 3–Hot Pepper, Onion

16. Phinney Park Food Forest

17. Baxter Library
Tomato Sauce Garden
Box 1–Large Tomatoes
Box 2–Basil
Box 3–French Herbs

18. PineCrest Inn
Fresh Salad Garden
Box 1- Green Beans
Box 2–Butter Lettuce, Arugula
Box 3- Onion, Sun Gold Tomatoes

19. OnPurpose Well Being
Roasting Herb Garden
Box 1–Oregano, Rosemary
Box 2–Nastertium
Box 3- Santo Cilantro, Cherry Tomatoes

20. Galilee Baptist Church
Salad Garden
Box 1–Buttercrunch Lettuce
Box 2–Cucumbers
Box 3- Cherry Tomatoes

**decorative flowers are not edible*

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #1

Gorham Grown **is a project of the Cumberland County Soil and Water Conservation District. It is supported by the Town of Gorham, many community partners, and grant funds from the Quimby Family Foundation.**

Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Back in Motion** is growing:

Sauce Garden

Ace Red Pepper

Basil

Nasturtiums

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

Planter boxes were constructed as an Eagle Scout Project by Daniel Bachner of Gorham.

For more info:

Edible Main Facebook

www.facebook.com/GorhamFoodForest

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #2

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Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Norway Savings Bank** is growing:

Roasting Pan

Box 1

Fennel

Mint

Box 2

Eggplants

Nasturtiums

Box 3

Red Cabbage

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

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Exploring our Roots

Gorham Grown

Edible Main Street — Stop #3

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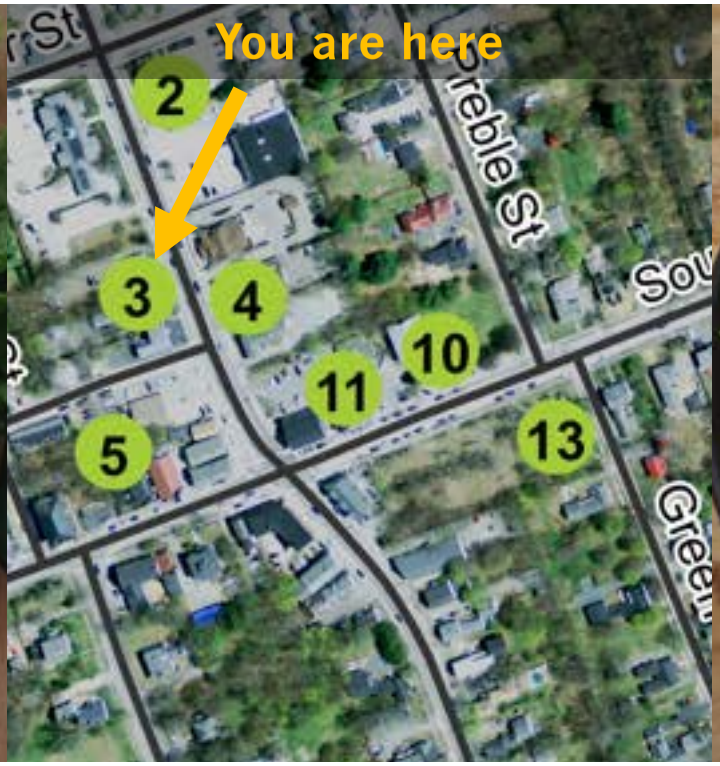
Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **The Bookworm** is growing:



Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

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Edible Main Facebook

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Exploring our Roots

Gorham Grown

Edible Main Street — Stop #4

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Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Po-Go Realty** is growing:

Salad Garden

Box 1

Cucumber

Calendula

Box 2

Heirloom Tomato

Box 3

Lettuce

Kale

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

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Edible Main Facebook

www.facebook.com/GorhamFoodForest

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #5

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Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Atlantic Dance Arts** is growing:

Sauce Garden

New Girl Tomato

Basil

Nasturtiums

Calendula

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

Planter boxes were constructed as an Eagle Scout Project by Daniel Bachner of Gorham.

For more info:

Edible Main Facebook

www.facebook.com/GorhamFoodForest

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #6

Gorham Grown **is a project of the Cumberland County Soil and Water Conservation District. It is supported by the Town of Gorham, many community partners, and grant funds from the Quimby Family Foundation.**

Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Chiropractic Clinic of Gorham** is growing:

Roasting Pan

Box 1

Fennel

Mint

Box 2

Eggplants

Nasturtiums

Box 3

Red Cabbage

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

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For more info:

Edible Main Facebook

www.facebook.com/GorhamFoodForest

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #7

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Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Great Falls Construction** is growing:

Salsa Garden

Tomatillo

Nasturtium

Cilantro

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

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Edible Main Facebook

www.facebook.com/GorhamFoodForest

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #8

Gorham Grown **is a project of the Cumberland County Soil and Water Conservation District. It is supported by the Town of Gorham, many community partners, and grant funds from the Quimby Family Foundation.**

Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Carter's Green Market** is growing:

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

Planter boxes were constructed as an Eagle Scout Project by Daniel Bachner of Gorham.

For more info:

Edible Main Facebook

www.facebook.com/GorhamFoodForest

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #9

Gorham Grown **is a project of the Cumberland County Soil and Water Conservation District. It is supported by the Town of Gorham, many community partners, and grant funds from the Quimby Family Foundation.**

Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **8 Elm Street** is growing:

Salsa Garden

Box 1

Chive

Cilantro

Lettuce

Box 2

Tomato

Box 3

Red & Green Peppers

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

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Edible Main Facebook

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Exploring our Roots

Gorham Grown

Edible Main Street — Stop #10

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Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Robie Gym** is growing:

Salsa Garden

Box 1

Lavender

Cilantro

Box 2

Roma Tomato

Calendula

Box 3

Tomatillo

Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

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Edible Main Facebook

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Exploring our Roots

Gorham Grown

Edible Main Street — Stop #11

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Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **The Vintage Heart** is growing:

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #12

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Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Baxter Library** is growing:

Salsa Garden

Box 1

Thai Basil

Husk Cherry

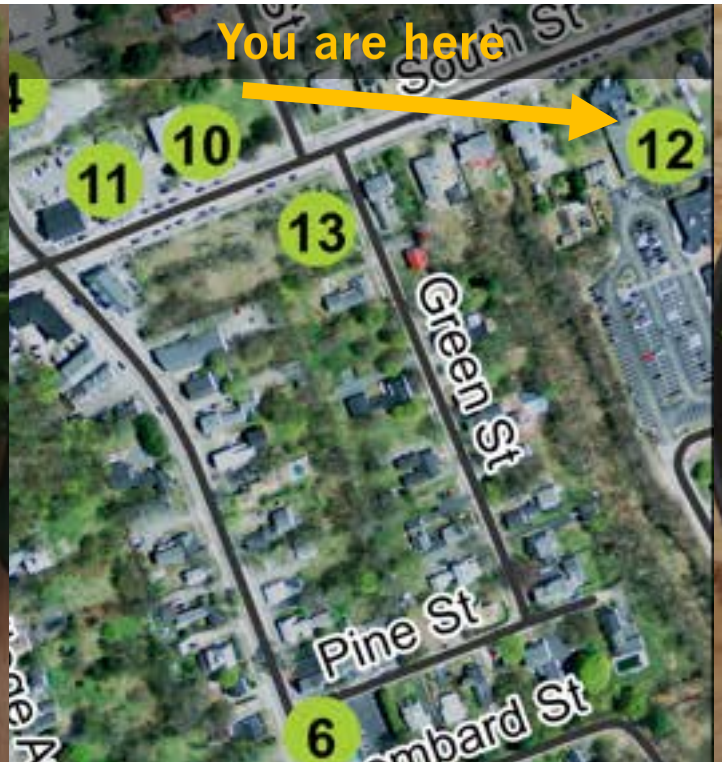
Box 2

Juliet Tomato

Nasturtium

Box 3

Red & Green Peppers



Partners

Gorham Parks & Recreation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Village Alliance

Quimby Family Foundation

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Edible Main Facebook

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Exploring our Roots

Gorham Grown

Edible Main Street — Stop #1

Gorham Grown **is a project of the Cumberland County Soil and Water Conservation District. It is supported by the Town of Gorham, many community partners, and grant funds from the Quimby Family Foundation.**

These 3 boxes were built and distributed by **Meghan Irish**. The plants were raised and recipes compiled by **Brinn Irish** from Gorham Girl Scouts Troop 2300 for their Silver Awards.

Thank you Meghan & Brinn Irish!

Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Village Builders** is growing:

Pepper Garden

Box 1—Hot peppers, Decorative flowers*

Box 2—Cherry tomatoes

Box 3—Onion, Green Pepper

**decorative flowers are not edible*

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Stuffed Green Pepper Recipe

6 medium tomatoes
1 medium onion
3 celery ribs, diced
8 oz can of tomato sauce
1 cup water
4 medium green peppers
1 lb lean ground beef
1 cup instant rice, cooked
1 teaspoon dried basil
1/2 teaspoon pepper

1. In a large saucepan, add tomatoes, onion, celery, tomato sauce, water, 1 tsp salt, and 1/4 tps pepper. Bring to a boil. Reduce heat & simmer for 10-15 minutes. Meanwhile, cut off tops of green peppers and remove seeds. Set peppers aside.
2. Combine ground beef, rice, basil, 1 tsp salt, and 1/4 tsp pepper. Fill peppers with beef mixture.. Carefully place peppers in tomato sauce. Spoon some sauce over tops of peppers.
3. Cover and simmer for 40-45 minutres of until beef is cooked and peppers are tender.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #2

Thank you Meghan & Brinn Irish!

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Great Falls Construction** is growing:

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #3

Thank you Meghan & Brinn Irish!

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Edward Jones Financial Advisor** is growing:

Bean & Greens

Pole Beans, Lettuce

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Gorham
Cumberland County Soil & Water Conservation District
Edgewood Nursery
Landscape Revolution
Gorham Village Alliance
Quimby Family Foundation
girl scouts of maine

This box was built by
Daniel Bachner
in 2019 for his Eagle Scout Project. This year's project was coordinated by
Meghan & Brinn Irish
from Girl Scout Troop 2300 for their Silver Awards.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #4

Thank you Meghan & Brinn Irish!

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Carter's Auto Service** is growing:

Roasting Pan

Cherry tomatoes, Green Peppers, Basil

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Gorham
Cumberland County Soil & Water Conservation District
Edgewood Nursery
Landscape Revolution
Gorham Village Alliance
Quimby Family Foundation
girl scouts of maine

This box was built by
Daniel Bachner
in 2019 for his Eagle Scout Project. This year's project was coordinated by
Meghan & Brinn Irish
from Girl Scout Troop 2300 for their Silver Awards.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #5

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This box was built and distributed by **Meghan Irish**. The plants were raised by and recipe compiled by **Brinn Irish** from Gorham Girl Scouts Troop 2300 for their Silver Awards.

Thank you Meghan & Brinn Irish!

Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Party Time Rental** is growing:

Chocolate & Lavender Tea

Recipe from "Irish Family Garden"

(Makes 2 cups)
10 to 15 fresh or dried lavender flowers
4 to 5 freshly harvested mint stems with leaves
2 cup boiling water

After harvesting your mint and lavender check for bugs. Give them a gentle wash in cool water. You can place the herbs in a teapot or gently pick off all the lavender flowers and mint leaves and place them in a mason jar. Pour boiling water over the herbs and let steap for 15 minutes. Strain and enjoy!

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #6

Thank you Meghan & Brinn Irish!

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Look What We're Growing

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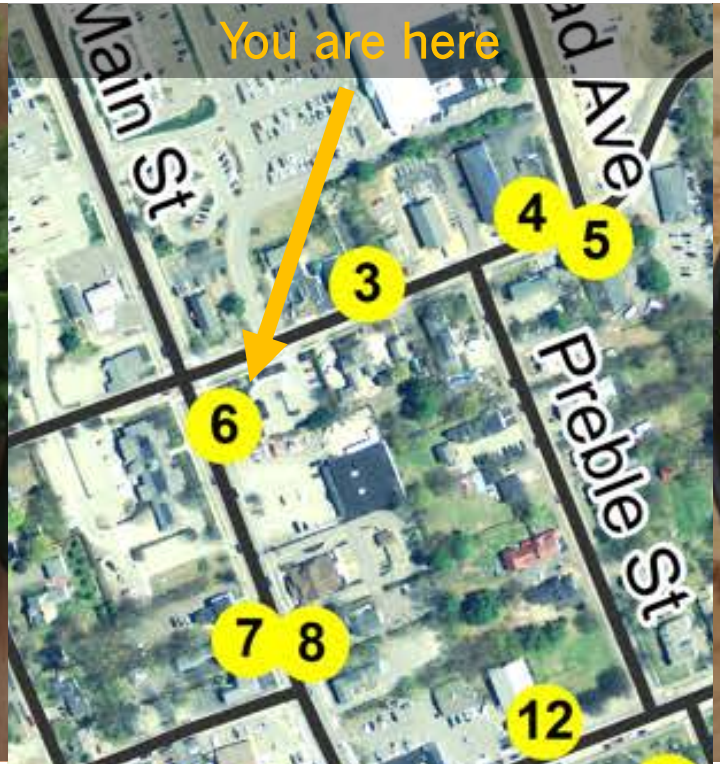
Salsa Garden

Box 1 & 2—Tomato, Cilantro, Marigold

Box 3—Yellow Pepper, Basil, Marigold

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest



Gorham
Cumberland County Soil & Water Conservation District
Edgewood Nursery
Landscape Revolution
Gorham Village Alliance
Quimby Family Foundation
girl scouts of maine

These boxes were built by *Daniel Bachner* in 2019 for his Eagle Scout Project. This year's project was coordinated by *Meghan & Brinn Irish* from Girl Scout Troop 2300 for their Silver Awards.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #7

Thank you Meghan & Brinn Irish!

Gorham Grown **is a project of the Cumberland County Soil and Water Conservation District. It is supported by the Town of Gorham, many community partners, and grant funds from the Quimby Family Foundation.**

Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **The Bookworm** is growing:

Herb Salad Garden

Box 1—Butter Lettuce, Gourmet Red Lettuce

Box 2—Tomato

Box 3—Sage, Rosemary, Marjoram, Thyme

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Gorham
CUMBERLAND COUNTY SOIL & WATER CONSERVATION DISTRICT
EDGEWOOD NURSERY
LANDSCAPE REVOLUTION
GORHAM VILLAGE ALLIANCE
QUIMBY FAMILY FOUNDATION
girl scouts of maine

These boxes were built by
Meghan Irish
and the plants were raised by
Brinn Irish
from Girl Scout Troop 2300 for their Silver Awards.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #8

Thank you Meghan & Brinn Irish!

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Po-Go Realty** is growing:

Roasting Pan

Box 1—Zuccini

Box 2—Summer Squash

Box 3—Eggplant

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Gorham
CUMBERLAND COUNTY SOIL & WATER CONSERVATION DISTRICT
EDGEWOOD NURSERY
(LANDSCAPE REVOLUTION)
GORHAM VILLAGE ALLIANCE
QUIMBY FAMILY FOUNDATION
girl scouts of maine

These boxes were built by
Daniel Bachner
in 2019 for his Eagle Scout Project. This year's project was coordinated by
Meghan & Brinn Irish
from Girl Scout Troop 2300 for their Silver Awards.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #9

Thank you Meghan & Brinn Irish!

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Look What We're Growing

Gorham's "Edible Main St" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Atlantic Dance Arts** is growing:

Tomato Sauce Garden

Oregano, Parsley, Basil,
Bell Pepper,
New Girl Tomato,
Calendula

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Gorham
CUMBERLAND COUNTY SOIL & WATER CONSERVATION DISTRICT
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Exploring our Roots

Gorham Grown

Edible Main Street — Stop #10

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Look What We're Growing

"Edible Main Street" spans throughout the Gorham Village. Businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **First Parish Congretional Churh** is growing:

These 3 boxes were built and distributed by **Meghan Irish**. The plants were raised by and recipe compiled by **Brinn Irish** from Gorham Girl Scouts Troop 2300 for their Silver Awards.

Thank you Meghan & Brinn Irish!

Coleslaw

Box 1—Green Cabbage

Box 2—Purple Cabbage

Box 3—Onions & decorative flowers*

*decorative flowers are not edible

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Coleslaw Recipe

Red cabbage
Green cabbage
Carrots
1 cup mayonnaise
1/2 cup Apple Cider Vinegar
2 tbs sugar
A pinch of salt
A pinch of celery seeds

1. Place the finely chopped closeslaw veggie mix in a large bowl.
2. Combine the granulated sugar, mayonnaise, apple cider vinegar, salt, and celery seeds.
3. Stir to fully combine and coat the shredded cabbage.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #11

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Gorham Art Alliance** is growing:

These 3 boxes were built and distributed by **Meghan Irish**. The plants were raised by and recipe compiled by **Brinn Irish** from Gorham Girl Scouts Troop 2300 for their Silver Awards.

Thank you Meghan & Brinn Irish!

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #12

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Thank you Meghan & Brinn Irish!

Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Robie Gym** is growing:

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #13

Thank you Meghan & Brinn Irish!

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **SYNC Gorham** is growing:

Eggplant & Company

Box 1—Eggplant, Curled Parsley, Marigold

Box 2—Cherry Tomato, Basil

Box 3—Cabbage, Marigold

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

These boxes were built by *Daniel Bachner* in 2019 for his Eagle Scout Project. This year's project was coordinated by *Meghan & Brinn Irish* from Girl Scout Troop 2300 for their Silver Awards.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #14

Thank you Meghan & Brinn Irish!

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Chiropractic Clinic of Gorham** is growing:

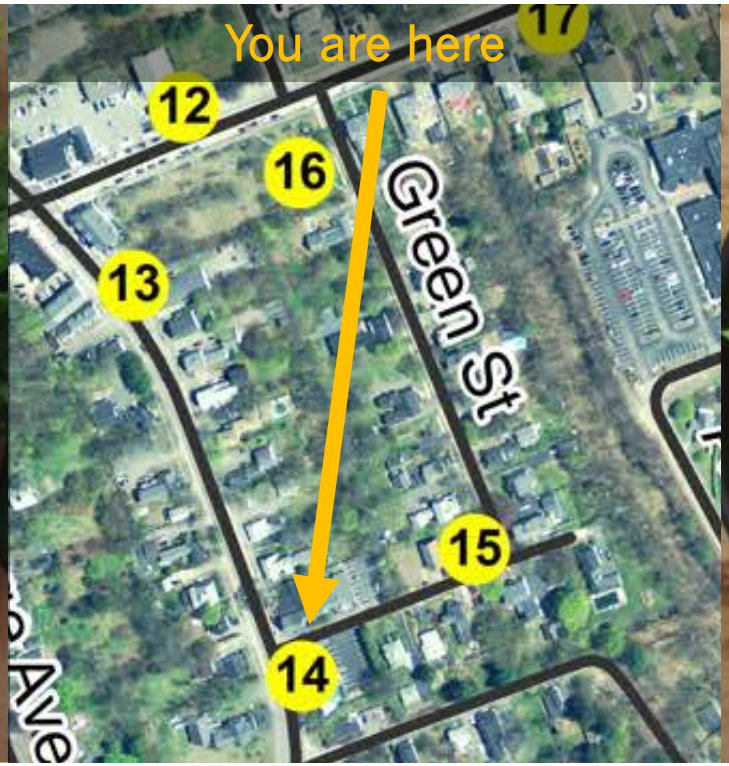
Pepper Pandemonium

Box 1—Cubanelle Peppers

Box 2—Poblano Peppers

Box 3—Bell Peppers

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest



These boxes were built by *Daniel Bachner* in 2019 for his Eagle Scout Project. This year's project was coordinated by *Meghan & Brinn Irish* from Girl Scout Troop 2300 for their Silver Awards.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #15

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Thank you Meghan & Brinn Irish!

Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Harison House & Home** is growing:

Chili Essentials

Box 1—Hot peppers, decorative flowers

Box 2—Cherry tomatoes

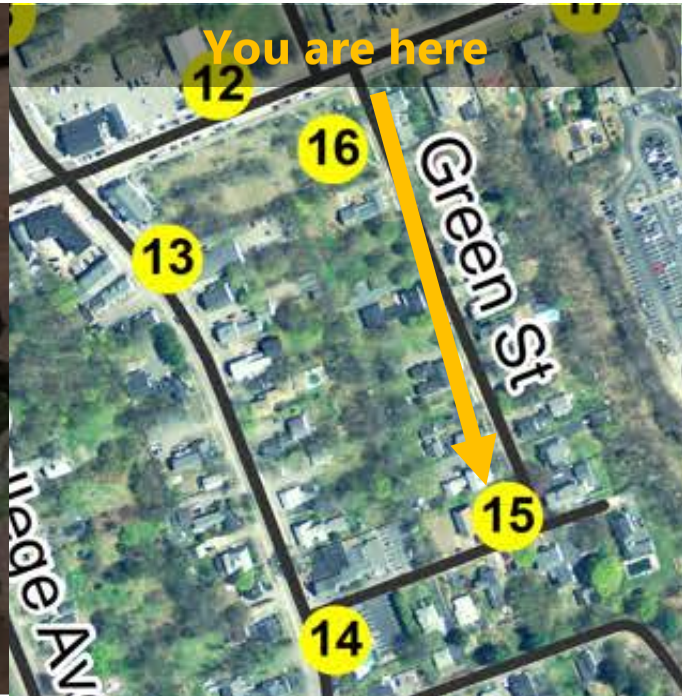
Box 3—Hot Pepper, Onion

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Chili Recipe

1.5 lb ground beef
2 Tbsp butter
8 cups diced tomatoes
1 hot pepper
1/2 green pepper
2 large onions, diced
6 cloves minced garlic
1 tsp salt
1/2 tsp black pepper
2 tsp italian seasoning
2 cans chili beans
1 tsp paprika
2.5 tsp cumin
2 tbsp chili powder

1. Melt butter in a large Dutch oven or stockpot over medium-high heat.
2. Add the onions and saute until they begin to soften.
3. Add ground beef & garlic. Cook until beef is browned.
4. Add remaining ingredients & put the lid on. Reduce heat to slow simmer.
5. Simmer for at least an hour.



Exploring our Roots

Gorham Grown

Edible Main Street — Stop #16

Gorham Grown **is a project of the Cumberland County Soil and Water Conservation District. It is supported by the Town of Gorham, many community partners, and grant funds from the Quimby Family Foundation.**

Welcome to Phinney Park Food Forest!

A *food forest* is "a way of laying out a garden that incorporates many types plants in a way that structurally and ecologically mimics natural forest systems." All produce is free for YOU to pick!

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Gorham

CUMBERLAND COUNTY SOIL & WATER CONSERVATION DISTRICT

EDGEWOOD NURSERY

(LANDSCAPE REVOLUTION)

GORHAM VILLAGE ALLIANCE

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Thank you Meghan & Brinn Irish!

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #17

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Thank you Meghan & Brinn Irish!

Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Baxter Library** is growing:

Tomato Sauce Garden

Box 1—Large Tomatoes

Box 2—Basil

Box 3—French Herbs

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Tomato Sauce Recipe

2 tbsp olive oil
1/2 cup white onion, chopped
3 cloves garilc, minced
2 cups tomatoes, chopped
Several basil leaves, torn or chopped
2 tbs French herbs, torn ofrchopped
Few dashed of salt & sugar

In a medium saucepan, heat up the olive oil. When hot, saute the onions for a few minutes or until starting to brown. Add the garlic and saute for 30 second. Carefully add in the tomatoes and stir together. Turn the heat down to low and throw in the basil and French herb. Cook for 15 minutes (it should still be slightly bubbling when cooking). Add salt and sugar to taste. Serve with pasta.

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #18

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **PineCrest Inn** is growing:

These 3 boxes were built and distributed by **Meghan Irish**. The plants were raised by and recipes compiled by **Brinn Irish** from Gorham Girl Scouts Troop 2300 for their Silver Awards.

Thank you Meghan & Brinn Irish!

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #19

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **OnPurpose Well Being** is growing:

Roasting Herb Garden

Box 1—Oregano, Rosemary

Box 2—Nastertium

Box 3—Santo Cilantro, Cherry Tomatoes

For more info:
Edible Main Facebook
www.facebook.com/GorhamFoodForest

Roasting Herb Garden Tips

- **If you want to give depth to pasta, stews, and gravy, use a combinatin of oregano and sage**
- **Cilantro, if you like it, lends strong and citrusy notes to spreads and salads**
- **Fresh basil is a great starting point for adding brightness**
- **Parsley, which has been a staple of herb blends since the Roman Empire, is lovely with Rosemary**
- **Parsley, sage, rosemary, and thyme are classic rub for roasted chicken or potatoes. (For a dried verions, start wth a teaspoon of each and work from there.)**

Quimby Family Foundation

Cumberland County Soil & Water Conservation District

Edgewood Nursery

Landscape Revolution

Gorham Parks & Recreation

Gorham Village Alliance

girl scouts of maine

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Thank you Meghan & Brinn Irish!

Exploring our Roots

Gorham Grown

Edible Main Street — Stop #20

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Look What We're Growing

Gorham's "Edible Main Street" spans throughout the Village. Village businesses have adopted their planters for the season but are open for everyone to harvest from. Each location has a theme to help complete a dish with one stop. Here's what **Galilee Baptist Church** is growing:

These 3 boxes were built and distributed by **Meghan Irish**. The plants were raised by and recipes compiled by **Brinn Irish** from Gorham Girl Scouts Troop 2300 for their Silver Awards.

Thank you Meghan & Brinn Irish!

Help keep Gorham safe!

Before you harvest:

1. Please only touch plants when harvesting produce.
2. Sanitize your hands prior to touching plants.
3. If you feel sick, please do not touch any plants or the planter boxes.
4. Keep 6ft distance while harvesting.
5. Wash all produce before eating.

Thank you & stay healthy!

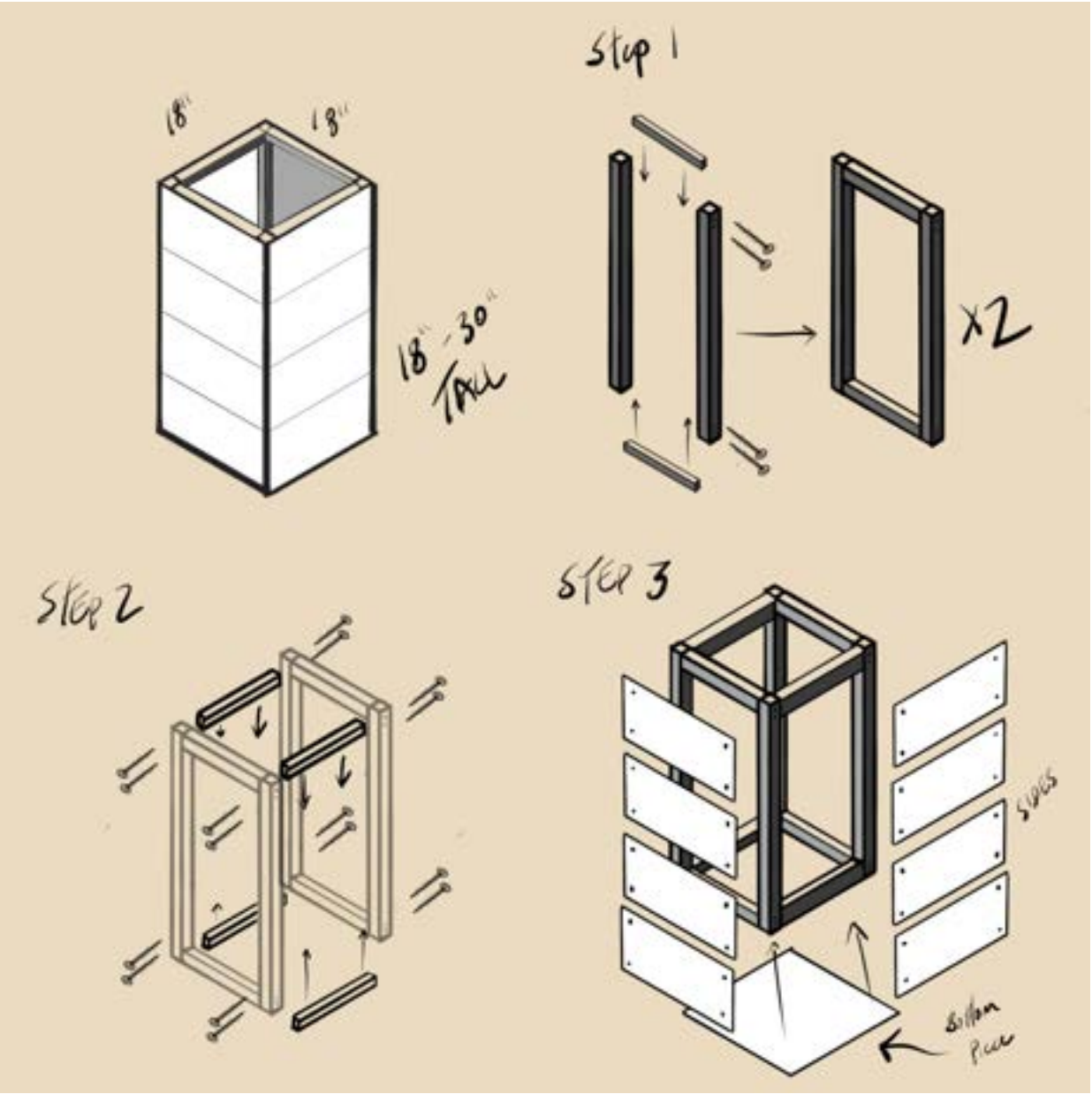
Help keep Gorham safe!

Before you harvest:

1. Please only touch plants when harvesting produce.
2. Sanitize your hands prior to touching plants.
3. If you feel sick, please do not touch any plants or the planter boxes.
4. Keep 6ft distance while harvesting.
5. Wash all produce before eating.

Thank you & stay healthy!

Planter Box - 2020



Dimensions: 18''x18''x(18, 24, or 30)'' tall

*Not pictured is design update by Girl Scouts to allow for more airflow by raising bottom off of ground.

Three-Level Planter Box – 2019

Attachment C-10 Community Resources

Community Resources

Type: Program Development, Partner Coordination

Implementation Time: 3-6 months

Goal: To inspire the public to engage in locally grown food systems.
To provide the public with access to resources that may otherwise hinder their ability to complete garden or food preservation techniques.
To increase accessibility to fresh locally grown produce and promote food security.
To assist people with overcoming economic barriers to accessing land for food production
To create economic efficiency by pooling resources for specialized equipment.
To enable small scale agriculture to increase capacity through shared costs and risk mitigation in investments.

Audience: Community, gardeners, small-scale agricultural producers

Overview:

Community resources may include facilities and equipment for food preservation, tool sharing program, garden installation meet-ups, and many more options. These initiatives focus on connecting the community to resources, facilities, and tools which make community agriculture projects more easily achievable, but may not be available to everyone. For example, installing gardens can be made much easier with access to certain tools or with many volunteers. Often times, these highly specialized tools or equipment are expensive to purchase and not accessible for the limited amount of use they would incur. Additionally, bulk purchasing can also help to reduce overall costs.

Having these resources available in the community can also enhance access to pursuing agricultural businesses. When specialized tools/equipment or microgrants are more accessible to the public, small-scale producers may take more risks to establish their business without needing to invest in pricey equipment.

Incorporating educational programming around community resources can increase the interest and skills within the community. This can create a community with a more resilient food system and decrease dependance on long supply chains.

Implementation:

Identify priority resources as well as any partners which may have similar resources available or the capacity to expand to new efforts. For example, a public library may have capacity to host a seed library. Determine whether these resources will be aimed at the general public or for small business incubation as different scales of resources are needed to meet these separate needs.

Question: Which resources have the highest need in your community?

Question: What partners will be involved? Who will actually be implementing these resources?

Question: What are existing resources?

Question: Are there any regulatory barriers? Are special trainings needed to operate some equipment (ie. food safety training to use commercial kitchen space)?

Question: Who is the intended audience? General homeowner or business incubation?

Tool Library: Tool libraries function to provide a central storage area for a collection of stores available for use by the community. Tools can be donated or purchased. Participation can be membership based or available to the community for one-time rental fees.

Resources:

- Portland Tool Library – A Southern Maine tool library
- Local Tools – A global inventory of tool libraries

Questions:

- *How will tools be acquired? Where will they be stored?*
- *Who will track lending?*
- *What will the fee structure be?*

Food Processing and Preservation: Adequately preserving food to be shelf stable can require equipment and space that may not be widely available. Some food products also require special tools to be able to access the edible component of the plant.

Resources:

- University of Maine Cooperative Extension – Provides localized food processing guidance and workshops, as well as some services, such as canning pressure gauge testing

Questions:

- *Are there specific processing or preservation needs in your community (harvesting tools, nut cracking, canning equipment etc.)?*
- *Where will this equipment be stored? Will it be used on site?*
- *What will the fee structure be?*
- *Is this equipment already available in your community?*

Commercial Kitchen: Commercial scale kitchens may have specialized kitchen equipment including pressure canner, cold storage, root cellar, and industrial sized ovens. These industrial scale tools may increase efficiency in creating agriculture products for individuals as well as small-scale businesses.

Resources:

- Fork Food Lab – a nonprofit commercial kitchen space for start-up and existing small-scale businesses. Also offers a place to sell products, networking opportunities, and consultation services.
- "A Legal Guide for Community Kitchens" – resource based on laws in MA, but still a useful resource touching on legal considerations for starting a shared kitchen in the community

Questions:

- *Where do these resources already exist in your community? If they are currently used privately, is there capacity to expand for community use?*

Meat/animal processing: Processing meat requires special equipment and training. This can be a barrier for small-scale producers to raise animals for market. Community members raising meat for their own consumption may not have the training or access to a sanitary facility for processing.

Resources:

- State of Maine Meat Processing Regulations

Questions:

- *What regulations does your community have around meat processing?*
- *Are there existing facilities in your community?*

Community Volunteer Network: Many hands make light work. Establishing a reliable network of volunteers with a range of experience and interest in agriculture methods can efficiently install community agriculture projects. It provides an

additional opportunity for peer-to-peer education and training when volunteers with different levels of knowledge are brought together.

Resources:

- Resilience Hub Meet-up Group – Portland volunteer group for agriculture projects. Also see model from California: Our Story | NorCal Resilience Network
- Volunteer Maine – statewide group connecting volunteers with projects. Large-scale (such as AmeriCorps members), as well as smaller scale opportunities listed
- Cultivating Community – non-profit whose mission is to expand access to healthy, local food. Volunteer opportunities available in many sectors of community agriculture.

Questions:

- *What partners in your community have volunteer networks?*
- *What types of projects and skills are volunteers needed for?*

Micro-Grants: Small grants available to community members can help to alleviate the costs of agriculture needs. They can be applied to individual projects like building raised beds to safely garden over contaminated soil to small scale producers needing to purchase equipment for increasing efficiency.

Resources:

- Local Food Promotion Program – USDA Grant.
- Small Farm Funding Resources – USDA guide with resources regarding initial funding sources
- Farm to School Program – state grant supporting students in agricultural programs, including gardening, greenhouse development, production technology, and marketing.

Questions:

- *What funding sources are available?*
- *What types of projects are most important to be completed in your community?*

Bulk purchasing: Bulk purchasing can help to reduce overall costs for some purchases. Sharing the purchase between multiple people can prevent food from going to waste and make products more affordable.

Resources:

- Allen Avenue Unitarian Universalist Church Co-op – Places monthly orders with several local vendors to provide members with affordable quality products.
- Crown O' Maine – Wholesaler sourcing food from over 100 local farms and distributing it to small and large-scale groups and businesses.

Questions:

- *What types of products are needed for bulk purchasing in your community?*
- *Who will be responsible for distribution?*
- *Which partners in the community can support this effort?*

Cold storage: Some produce can be stored longer in cold temperatures. Many homes are not equipped with sufficient cold storage space to make this a practical storage option. Community cold storage offers space for rent which can allow for garden produce or bulk meat purchases to be stored at the correct temperatures.

Resources:

- Vermont Refrigerated Storage – A New England cold storage facility.
- Explore grant funding opportunities.

Seed Bank/Lending Library: Whether seeds are purchased or saved from produce at the end of the year, people often end up with more than they need. Seed libraries help to facilitate seed trading. Having more access to seeds can increase the diversity of everyone's gardens.

Resources:

- Portland Grows @ PPL – Seed library program at Portland Public Library. Started a few years ago.
- Wild Seed Project – Local nonprofit which provides seeds for native plants, as well as provides education promoting native plant populations and biodiversity.
- UMA Seed Library – seed library program currently at UMaine Augusta and UMA-Bangor.
- Seed Library Network – resources on starting a seed library, as well as list of current ones nationwide

Questions:

- *Is there a community partner that would be able to host this initiative? Does an existing library have the capacity to include this?*

Soil testing equipment: Equipment like an XRF can increase efficiency and decrease the cost of individual soil tests. This equipment can help to ensure the community is gardening safely on soils that are free of contamination (see Soil Contaminants module).

Resources:

- UMaine Soil Testing Service – affordable soil test option for Maine Residents
- Multilingual Factsheets- Factsheets on soil lead are available in 5 languages.

Questions:

- *Is soil contamination common in your community? Is more data needed?*
- *What funds are available for purchase? Is there a community partner who can help share costs?*
- *Where would the equipment be housed? What training is needed to use the equipment?*
- *How would soil analysis be done? Mobile collection? Drop-off only?*

Institutional Purchasing of Local Agricultural Products: Connecting local institutions with produce from local farms provides a fresh local option for large scale meals and decreases the need for produce to be shipped from long distances. It also provides support for local farms and agricultural producers.

Resources:

- Food Fuels Learning- A program which seeks to provide nutritious food to local schools. This includes the use of locally grown and processed foods.

Questions:

- *Can regulations be put in place to require that a percentage of institutional food include locally sourced produce? What are the barriers to this? Are any institutions currently utilizing local food?*
- *Are there any gleaning efforts that can support including locally sourced food in institutions at lower costs?*
- *Can municipal facilities and events include a percentage of locally sourced food?*

Cost:

Personnel time: Specific to community resources

Materials: Specific to community resources.

Partners to Support Implementation:

A. CCSWCD
B. Local businesses

C. Local farms/nurseries
D. Municipal Parks & Recreation Staff
E. Girl Scouts & Boys Scouts Troop
F. Neighborhood Associations
G. Master Gardeners
H. Libraries
I. Processing facilities
J. Food hubs

Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachment C-11 Community Composting

Community Composting

Type: Program

Implementation Time: 3-8 months

Goal: To reduce food waste in landfills
To inspire the public to engage in locally grown food systems.
To provide the public with an accessible option for composting.
To increase accessibility to fresh locally grown produce and promote food security.
To increase availability of valuable organic materials for local agriculture needs
To reduce material costs for community ag projects.

Audience: Community, Businesses, Institutions, Municipal Staff

Overview:

Composting is a beneficial practice for building healthy soil and returning nutrients to the soil. When food and plant waste is sent to a landfill rather than composted, it undergoes decomposition processes which produces methane, a potent greenhouse gas. When properly composted, food waste and plant materials will instead mainly produce carbon dioxide instead of methane, and generate a valuable soil amendment.

An effective compost pile requires a high amount of organic input from food waste and plant material. The larger the pile, the greater the biological activity will be which is responsible for breaking down the organic matter into available nutrients. If little matter is collected, it will take longer for the material to fully compost. Large quantities of material with active biological activity also generate more heat which can help to accelerate the composting process as well as compost the materials more fully. Composting material in heat over 140°F ensures that any seeds are destroyed and unable to germinate. Higher temperatures also aid in killing pathogens which allows for meat products to be contributed.

Temperatures above 140°F can be difficult to obtain with home garden compost systems, especially in population dense areas with limited yard and garden space. Industrial-scale composters are able to obtain higher temperatures and can support the diversion of a wider range of organic matter to their compost pile. While 140°F can prevent the spread of many unwanted bacteria or seeds, compost intended for community use should not be combined with any municipal bio sludge or invasive species.

Industrial-scale composting requires regular maintenance and monitoring. To create a valuable end product, there needs to be a balanced mix of carbon and nitrogen incorporated. Many residential inputs from high density areas will include higher amounts of carbon from the abundance of food scraps. This should be balanced with nitrogen inputs from woodchips or leaves. When possible, avoid yard waste which has been treated with chemical fertilizers or pesticides which may have negative effects on the biological life of the compost pile. The compost will also require regular aeration and watering to achieve ideal circumstances for quickly breaking down the organic matter.

In situations where the compost pile may not be as regularly monitored, it may be better to allow only garden waste rather than collective kitchen waste. Garden waste will provide more easily balanced compost and prevent odors which can attract pests.

Implementation:

Phase I: Identify Community Interest & Outreach

Community composting may be more appealing to more population dense areas which have less space for composting in their yard. Consider how composting can be done more efficiently. Neighboring towns may be able to share costs and increase the amount of organic material collected for composting.

Education and outreach to community members will be needed to secure community participation. Additional educational resources for participating members will educate on what types of materials can be composted through the program (Attachment i).

Question: Which areas of the community interested? Is it primarily urban or distributed evenly?

Question: Are neighboring communities interested in participating?

Question: What types of organic materials will be collected for composting? Garden waste only? Kitchen waste? Meat or plant-based kitchen waste?

Question: What types of outreach materials are best for reaching your community?

Phase II: Determine How Compost Will Be Collected

Curbside composting is available in some regions by private companies, however, in some areas the interest in participation is so great that municipalities provide this service or contract with a company to provide this service for the whole community.

Analysis of options will help determine a public, private, or hybrid approach is warranted. This will include a determination of consumers' willingness to pay fees, or appropriate public funds, to cover operations. The analysis should consider the use for compost generated, and to what degree this can offset the cost or be provided as a benefit to participants.

The quality of the compost produced can be important to deliver the compost as a product. It is not recommended to mix yard waste containing invasive plant species into compost piles which will be distributed throughout the community.

Question: Is there an existing service in the region?

Question: Are there local farms with industrial composting operations or capacity?

Question: Will compost be picked up from homes or will residents be instructed to bring their compost to a drop-off site?

Phase III: Compost Distribution

Finished compost can be made available to the community to enhance their soil's fertility and grow more productive plants. It can be utilized in the municipality's property maintenance methods to provide chemical free fertilizer to public properties where needed.

Question: Are their municipal needs for compost?

Question: Are their community needs for compost?

Question: Will it be available for free or reduced cost to those who participate in contributing compost? Is it an incentive to participate in the composting program?

Question: What is the cost for purchase for those who do not participate in the program?

Cost:

Personnel time:

a) Planning
b) Community Outreach
c) Ongoing management

Materials:

a) Collection trucks
b) Compost buckets
c) Drop off bins
d) Educational materials

Partners to Support Implementation:

A. CCSWCD
B. Local businesses
C. Local farms/nurseries
D. Municipal Parks & Recreation Staff
E. Girl Scouts & Boys Scouts Troop
F. Neighborhood Associations
G. Master Gardeners
H. Public Works
I. Garbage to Garden
J. We Compost It

Funding Opportunities:

A. Fee for service
B. Regional Government funding
C. Municipal Funding
D. Other funding sources (grants)

Attachments:

i. Outreach materials

Community Composting Outreach Materials

- Garbage to Garden Composting Info – Local program which performs curbside compost pickup in the Greater Portland Area. Has material towards the bottom of what can and can't be composted.
- EcoMaine Composting Tips Pamphlet – Includes backyard composting tips, as well as information about drop-off and curbside alternatives.
- Maine DEP Composting Information – Resources on composting for both backyard composting and school composting projects.

Attachment C-12 CSA

Community Supported Agriculture (CSA)

Type: Program Development, Partner Coordination

Implementation Time: 3-8 months

Goal: To promote subscription-based "Community Supported Agriculture" initiatives in order to:

- Strengthen local food production and distribution systems
- Stabilize revenue for producers over the growing season
- Introduce subscribers to unusual or uncommon items that can be produced locally, and in the optimum season
- Build resilient community relationships, farmers to consumers
- Strengthens the local commercial agriculture sector
- Creates a "gateway" effect to build public support and participation in other community agriculture programing
- Promote intergenerational community building
- Can be incorporated into existing organizations or programs to support food insecure people
- Promotes regional sustainability goals

Audience: Consumers, producers, site managers/ facilitators

Overview:

Community Supported Agriculture is a subscription-based approach for consumers to purchase goods directly from local producers. Because there are lower infrastructure needs compared to other models for food distribution, more profits flow to producers. In a typical arrangement, consumers may pay up front at the start of the growing season, and then receive regular deliveries of a variety of produce over the rest of the season. There are considerable advantages for this approach for producers, where revenue is available at the time most expenses are due to be paid. There are considerable advantages for consumers as well, in that a diverse assortment of foods are delivered to one easy pick-up location or directly to homes, saving time while ensuring in-season products are selected. The flexible models for CSAs allow for better match of supply and demand within markets. Models can include a "get what you get" system based on what crops have performed well, use a credit-based system, or some kind of hybrid. (Attachment i)

Implementation:

While most CSAs are agreements directly between local producers and consumers, many variations on the model exist. For example, shares can be picked up on-farm, include "pick your own", be delivered to residences, or be picked up by consumers at 3rd party locations. Food-based non-profit organizations, and even local governments, can play a role to facilitate and promote the CSA model.

Measures to promote CSAs can include:

- Providing publicly accessible locations for distribution of CSA shares that:
  - Should be easily accessible via a variety of transportation modes
  - Are monitored for security purposes to deter theft
  - Be protected from extreme temperature or precipitation
- Providing incentives or targeting of existing organizations people are already involved with, for example large employers, to reach many potential consumers.
- Incorporating CSA into institutional buying power, for example snacktime at schools
- Through education and outreach programs, increase public awareness of CSA options in their community and the benefits of the CSA model
- Hosting a "CSA Fair" in the spring as an event to connect famers to customers. Farms allow customers to purchase shares directly at the event, and provide additional information and samples to prospective customers. Can also involve other ways to entice potential customers to show up, such as live music.

- Governments can provide financial incentives for underserved populations to buy CSA subscription:
  - Through the supplemental nutrition assistance program (SNAP)
  - Incorporating sliding scales for payment
- Provide options like "online marketplaces" that may facilitate a hybrid CSA type of model.
  - While most producers do not have this capacity, local organizations or governments may.
  - Could be connected to local educational institutions, for example web design classes.
  - Through this approach orders can be packed that are sourced from multiple farms.
  - This emphasizes individual convivence, and new popularity of online ordering post COVID-19.
  - It is a potential microgrant opportunity

Question: What promotion of CSAs already exists in your community? What capacity does your municipality have to expand this?

CSAs may include distribution of:

- In-season summer vegetables
- Vegetables in winter storage
- Specific crops, for example an apple CSA
- Meat, dairy, or other goods may be available

Question: What types of agricultural producers are local to your community?

Potential barriers to implementation may include:

- Hurdles to qualify for financial assistance
- Regulatory requirements limiting use of locations for sales / distribution
- Setup of online marketplaces can be technically challenging and require personnel time.

Question: What barriers does your community have?

Cost:

Personnel time:

a) Monitoring of distribution sites
b) Education and outreach

Materials:

a) Signage
b) posters
c) Marketing materials and advertisements

Partners to Support Implementation:

A. CCSWCD
B. Local farms/nurseries
C. Local government / facilities staff
D. Food security organizations
E. Business owners
F. Health care providers / public health
G. Schools Public prek-12, higher education
H. Cooperative extension

Funding Opportunities:

A. Private nonprofit organizations/foundations

B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachments:

i. CSA Model Examples

CSA Model Examples

Traditional CSA Models

- Cultivating Community – CSA connecting members of Cultivating Community's Farmer Training Program (New American farmers) to consumers. Provides shareholders with what is weekly ready to harvest. Numerous pickup locations available, as well as weekly Farmers' Markets.
- Bumbleroot Farm (Windham) – offers pickup on farm and at pickup sites around Portland. Also offers 6 and 12 week flower CSA shares.
- Hancock Family Farm (Casco) – offers traditional full season and summer memberships for pickup only at farm. Offers free bouquet of flowers each week to members.

Credit-Based Systems

- Goranson Farm (Dresden) – "Free Choice CSA" – Allows consumers the ability to purchase a full/half/quarter/winter share, entitling them to the cost of the share (plus 5-10%) in produce and farm merchandise at their Farmers' Market stand.
- Green Spark Farm (Cape Elizabeth) – Dollar-for-dollar exchange. Members can use their credit to order produce online each week. Pickup is at farm stand only.

Other References

- Comprehensive Guide to CSA Distribution Models – overview of most of the types of CSAs

Attachment C-13 Farmer's Markets

Farmer's Market

Type: Program Development

Implementation Time: 1-6 months, longer if permitting challenges exist

Goal: To inspire the public to engage in locally grown food systems.
To improve awareness and understanding of local food systems as a means of community resilience.
To increase accessibility to fresh locally grown produce and promote food security.
To provide local farms with a profitable market opportunity
To activate underutilized community spaces
To provide a cultural amenity that unites community around food and local agriculture.

Audience: The community, Municipal staff, Commercial & Market Growers, Vendors, Farm to table businesses

Question: What local food systems exist in your municipality? Is most of the food consumed in your community locally sourced?

Question: What is your town's history with agriculture? Is there a long history of agriculture or is introducing local agriculture new?

Question: Is there work being done to tackle food insecurity & promote local food systems? What issues regarding food security does your community face? How can this project highlight these issues and promote local food?

Overview:

Farmer's markets bring fresh produce and products directly into the hands of the community. They can provide economic benefits as well as community health and food security benefits. When food passes through fewer hands, more income stays directly with the farmer. Many farms are located in rural areas and their stands may not be widely accessible or their limited range of produce may not draw people who are not in the immediate area. Farmer's markets increase the appeal of local produce by bringing together farmers with many types of produce and food products.

Strategically selecting a location for the market can help to bridge gaps in areas defined as food deserts. Opportunities for SNAP access can enhance accessibility to fresh locally grown food.

The location may will also determine how many vendors can participate. Guidelines may be needed to ensure participating vendors are the best for meeting the community's needs. Participants can present a wide range of produce and goods for sale. Some may choose to focus strictly on local farms or producers using materials from local farms. Others may include more local crafters and may not be as strict as to the origin of materials. (Attachment i).

The number and type of participants will also help to determine the cost for participation. Memberships can be managed on an annual basis or seasonal to accommodate for participants whose produce may not extend through the entire season.

Implementation:

Phase I: Define Target Area & Build Community Interest

The selected location should be accessible to many people in the community. If it is not an area that is easily walkable, it should offer adequate parking or public transportation options.

Question: How does your community value local produce?

Question: Does your community have any areas that are classified as a food desert?

Question: Are there local organizations combatting food insecurity in your community? How can the market support food insecure members of the community?

Question: Which farms are interested in participating?

Question: Are there permit requirements or ordinance restrictions on market locations or sizes?

Phase II: Determine Organization Structure & Market Schedule

Municipal ordinances may have guidelines or restrictions that will determine market locations or sizes. If no ordinance around farmer's markets exists (Attachment ii), see Land use Regulation Module.

Question: Who will run the market? Participating farmers? Land trusts? What partners are available to support coordinating market space, participating farmers, marketing, etc?

Question: Do your community's ordinances support a farmer's market as written? Are revisions needed? Are there restrictions on type of products that can be sold?

Question: Do any neighboring communities hold farmer's markets? How can your community's market be scheduled to complement and not conflict with theirs?

Question: Are there licensing fees to hold a market?

Phase III: Compile Participants & Promote Market Information

Promote materials about the market to attract farmers and vendors to participate. Share statistics around community interest to demonstrate that this will be a profitable venture.

When participants are determined, promote market information to the community with an emphasis on the audience previously selected to have the most need.

Question: What groups and organizations exist to recruit participants?

Question: What types of media does you audience consume? How will the community become aware of the new market?

Cost:

Personnel time:

a) Community Outreach
b) Partner Organization
c) Permit Acquisition
d) Planning

Materials:

a) Outreach Materials
b) Tables

Partners to Support Implementation:

A. CCSWCD
B. Town's Downtown Network (local town business alliance/association)
C. Local businesses
D. Local farms/nurseries
E. Municipal Parks & Recreation Staff
F. Neighborhood Associations

G. Master Gardeners
H. Land trusts
I. Farmers Associations

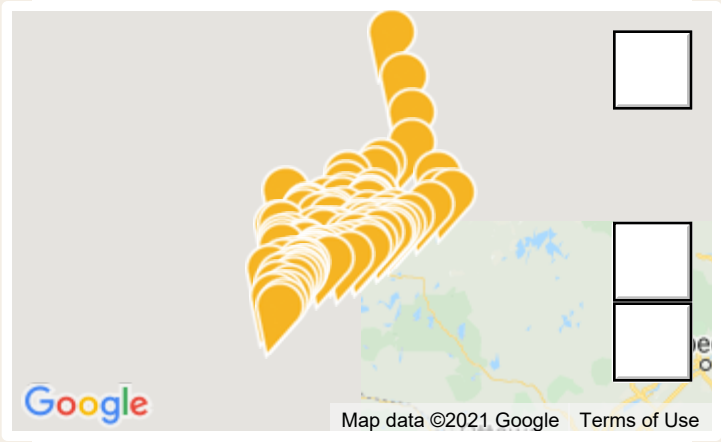
Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachments:

i. Portland Farmer's Market Guidelines for participants
ii. Example Ordinances
    a. Gray Farmer's Market Ordinance
    b. South Portland Farmer's Market Ordinance

Attachment i.



Featured Markets

Union Farmers' Market

Union Farmers' Market is located on the grass of the historical Union Common at 280 Common Rd. on Fridays from 3:00pm-6:00pm from May through early October. Each Friday in season, this market offers an opportunity for people to come together, under the trees in the heart of Union, to have fun, learn, & find hand-made […]

more…

Freeport Makers' Market

The Cumberland & Falmouth Farmers Market Association is excited to announce our first totally indoor weekly "Maker's Market" starting Saturday, December 5th. We will be inside the historic Bartol library building located at 55 Main

Portland Farmers' Market Association (PFMA) Market Rules

Portland Farmers' Market Association Rules amended 2016

Portland Farmers' Market Association (PFMA)

1. Membership

a. Applications are filed with the Membership Coordinator of the Farmers' Market Association

b. Membership applications are due prior to the Portland Farmers' Market Association's annual meeting.

c. Application Packets (including annual dues, appropriate licensing, and proof of insurance) should be returned to the address on the application or submitted at annual meeting. Returning member Application Packets that are not submitted by the Annual Meeting are subject to a **$60 late fee**, if not submitted by the Membership Meeting these members forfeit their membership.

d. If Space is available in either the Wednesday, Saturday, or Winter Farmers' Markets the market Chairperson will address new membership at the annual meeting. If space is available the Chairperson will call a membership meeting. The membership meeting will be attended by all officers, the steering committee any other market members that wish to attend. The Membership Coordinator will send to the new applicants and to all current members a list of

Street, right in the heart of downtown Freeport. The market will run Saturdays from 10:00AM – 2:00PM. The main entrance […]

more…

Saco Farmers' Market

One of Maine's oldest Farmers Markets ~ Since 1975 "Local flavors directly from the producers" Seasonal Vegetables and Fruits* Glass Bottled Milk* Lobsters and Clams* Locally Raised Grass Fed Beef, Pork, and Chicken* Eggs* Seedlings, Perennials, Herbs* Cut Flowers* Honey* Maple Syrup* Jams and Pickles* Baked Goods* Homemade Butter Learn more on the market's website! […]

more…

new applicants along with the date, time and place of the membership meeting at which the selections will be made. A two thirds vote of those present is necessary for acceptance. After the decisions, the membership coordinator will notify the prospective applicants of their status.

e. New members will be provisional for their first year without voting rights, and are subject to a vote on their acceptance into the market at a future Annual Meeting. Each Annual Meeting will consider all outstanding provisional members for reentry into the market.

2. Locations and times.

a. The Saturday Farmers' Market in Deering Oaks Park will be open from 7:00 am until 1:00 pm. Farmers may arrive two hours early for set-up and may remain two hours after for break-down.

b. The Wednesday Farmers' Market on Monument Square will be open 7:00 am until 1:00 pm. Farmers may arrive two hours early for set-up and may remain two hours after for break-down.

c. The Farmers' Market shall be the primary use of Monument Square on the designated days of the week, during the designated times from April 15th until the Wednesday before Thanksgiving. From Thanksgiving through April 15th, the Farmer's Market location may be relocated in the square to accommodate other activities. d. The Winter Farmers' Market dates and times will be determined each year.

3. Fees.

A. Fees are as follows:

i. New Application Fee $30

ii. Permit Fee $100

iii. An additional fee of $50 per market location

B. All fees to be paid to Membership Co-ordinator

checks made out to PFMA

4. Processed Food, Scales, Insurance, Licensing.

a. All producers of home-processed items such as honey, maple syrup, jams, jellies, relishes and home canned goods are required by law to obtain the proper licenses from the Department of Agriculture. These licenses must be obtained and submitted prior to being at market.

b. A state scale inspector may visit the market during the season to check the accuracy of vendor scales.

c. Vendor has in effect a policy of general liability insurance in the minimum amount of One Million Dollars ($1,000,000) combined single limit covering bodily injury, death or property damage naming the City and PFMA as additional insureds thereon, in this way: certificate must say either: A) “the policy has actually been endorsed to name the City of Portland and the Portland Farmers Market Association as Additional Insureds” and a copy of the endorsement must come to the City of Portland with the certificate, or B) “the policy already includes an endorsement, such as a Blanket Additional Insured Endorsement, by which the City of Portland and the Portland Farmers Market Association are , in fact, automatically made additional insureds.” A Certificate which merely has a box checked under “Addl Insr,” or which merely states The City of Portland is named as an Additional Insured, will not be acceptable. In addition the Portland Farmers’ Market Association carries a liability policy.

5. Buy-In Rule

a. All members shall certify that any product offered for sale shall be of their own raising. In addition, members may also sell identified voids (products that the current market vendors do not supply enough of) by popular vote at a meeting after the Membership Meeting each year referred to as the Buy In Meeting. The identified voids can then be bought in by any member of PFMA, those bought in items equaling no more than 25% of their total potential gross sales on

any given day. All bought in items must be grown/ processed in Maine and purchased only from Maine Farms. Single ingredient products such as honey must be grown in Maine and the main ingredients in multi ingredient products must be sourced from Maine. Additionally all vendors who buy in must label their products as such with the orange buy in tags that they are responsible for providing from the preset image and dimensions.

b. Market members must list on their application all items they expect to be buying in. These items will be reviewed at the annual Buy in Meeting.

c. Bought in items offered for sale must be fresh and of the highest quality.

d. Processors must also label with orange buy in tags in situations when main ingredients are not sourced from their farm.

e. Farm visits by two market member volunteers will be made as needed to ensure a member's adherence to the rules. Every new member will have a farm visit. Also, one fifth of the membership will be visited each year to build neighborliness and to keep up to date with members changing and expanding products. The Association will accept inspections done by other Farmers' Markets.

6. Products.

a. Notification to the Steering Committee of new products is required. As long as the product in question is produced on your farm you will be permitted to bring it to market.

b. Members may not use the word "Organic" to describe their products unless they have been certified as organic by a recognized agency.

c. Local fruit, vegetables, flowers, seedlings and plants grown under the farmers' care for at least 6 weeks, may be sold at the Farmers' Markets.

d. Farm fresh eggs, raw milk, pasteurized milk,

honey, raw fiber, fresh meat, frozen meat, seafood, pesto, and maple syrup may be sold, provided they are stored or processed in compliance with state law during transport and display. Animals must be under farmers' care for at least 8 weeks.

e. The following value-added items may also be sold at the Farmers' Markets, provided the product is produced, processed, or manufactured in an establishment licensed by the Department of Agriculture to produce the item and that the seller had produced, or processed, or manufactured the item: Licensees must provide proof of their current license with the Department of Agriculture. The main ingredients in multi ingredient products must be sourced from Maine. Additionally all vendors who buy in their main ingredients must label their products as such with the orange buy in tags that they are responsible for providing from the preset image and dimensions.

1. Jams, jellies, pickles, tomato sauce,relishes, apple cider, provided they are processed, transported, stored, and displayed in compliance with state law

2. Meat products provided they are processed, transported, stored, and displayed in compliance with state law

3. Frozen meat products provided they are processed, transported, stored, and displayed in compliance with state law

4. Milk products stored in compliance with Maine State Law.

5. Cheese, provided in compliance with state law 6. Fiber products

7. Hard cider, as defined in 28-A M.R.S.A. § 2 and any amendments thereto, provided however that the producer has a farm winery license; malt liquor and wine, produced subject to the provisions of 7 M.R.S.A Sec. 415, and any amendments the reto.

8. Ferments, in compliance with state law during

production, storage, transport and display.

f. The following items may be sold, provided that the total amount of sales from all such items does not exceed 49% of the total amount of sales made by the licensee at the Farmer's Markets:

1. Any other edible produce that is a derivative of local plants or produce grown by the licensee, provided that the licensee holds the necessary license from the Department of Agriculture to produce such item(s). It is the intention that the licensee would be allowed to produce and sell such items such as fruit pies,breads, squares and fruit filled cookies derived in whole or in part from the products grown on their farm. It does not allow for the sale of such items as rice crispy squares, chocolate chip cookies, chocolate fudge, or brownies, to name a few.

2. Any baked goods eligible to be sold at the farmers' market must be individually or collectively wrapped while displayed and sold.

3. The sale of any potentially hazardous foods, which includes any perishable food or food products which consists, in whole or in part, of milk or any other ingredient capable of supporting rapid and progressive growth of infectious and toxigenic microorganisms, including but not limited to, cream fillings in pies, cakes or pastries, custard products, meringue topped bakery products, or butter cream type fillings in bakery products, will not be allowed.

g. Non-Farmer vendors may sell products at the Saturday Farmers' Market in Deering Oaks provided all proceeds from those sales go to exclusively support Deering Oaks Park.

7. Signs.

a. All members must display signs that display their name and town in a prominent manner every day they are at market.

b. All bought in items must be labeled as such and

must state the farm where the products were purchased.

8. Setting up at Market.

a. All displays should be neat and tasteful.

b. Only one vehicle is allowed to be set up at a time.

c. Maintenance by market members of a clear walkway for customers and wheelchairs to move from one vendor to another without obstruction is important and will be enforced by the Market Manager. In addition market members are subject to city laws regarding wheelchair access and sidewalk space.

d. Members must park their vehicles in a safe and space-efficient manner. Generally, it works best to leave enough space between your setup and the next member's so the customers do not become confused as to whose goods are whose.

e. Food must be displayed at least 8 inches off the ground.

9. Attendance.

a. All members must state the dates they plan to attend the market, on their applications. This will help fill physical gaps in the market with seasonal products.

b. All members are encouraged to attend all markets rain or shine.

c. Poor weather aside, all members must not miss more than two markets within the time frame they plan to attend. If more than two markets are missed a reason must be provided for continued absence.

d. It is asked that you inform your Market Neighbors when you plan to skip market so people may adjust their setup.

10. Presentations.

a. Members must present themselves in an appropriate manner, dress, and state of cleanliness.

b. Shirts and shoes must be worn.

c. Members should behave in a cooperative manner with other members and the public. d. Members must keep tents fastened to weights to prevent personal injury.

11. Picking up.

a. It is a condition of our use of these sites that the market will leave the lot exactly as we find it each day. All trash generated by the market must be cleaned up by the members.

12. Violation of the rules.

Any PFMA member can bring a complaint that a fellow vendor has violated the PFMA rules to any member of the steering committee.

1. It is the Steering Committee's responsibility to conduct an investigation, the Steering Committee may request assistance from the Inspection Committee if deemed appropriate by the the majority of the Steering Committee.

2. If there is cause to continue investigation the accused PFMA member will have an opportunity to answer to such charges at a Steering Committee meeting that will be announced to full membership and open to any PFMA member.

3. If found by a 2/3rds majority of the Steering Committee that the member did indeed violate one or more rules the Steering Committee will issue written (email acceptable where applicable) warning and must become in compliance with PFMA rules.

4. If the same member is found a second time to be in noncompliance with the same market rules such action will cancel the membership of the accused member. A 2/3rds majority of the Steering Committee is required to cancel the PFMA member's membership. A full steering committee vote is

required for such action. Email votes will be accepted in extreme cases only, which will be determined by the Chairman of the PFMA.

C. Nothing in this Section shall be construed to prohibit any lawful use, possession or conduct pursuant to the Maine Medical Use of Marijuana Act (22 M.R.S.A. 2421 – 2430-B, as may be amended from time to time).

402.7.21 FARMERS' MARKET

A. The purpose of this ordinance is to regulate the temporary use of land for the establishment of farmers' markets as defined by 7 M.R.S. §415, where the primary purpose of the market is to make local farm and food products available to the public.

B. Administration and Enforcement: This ordinance shall be administered by the Community Development Department and enforced by the Code Enforcement Officer.

C. Farmers' Market on Town Property: The Town Council may authorize the Town Manager to enter into a lease or license agreement for the use of Town property for the purpose of operating a Farmers' Market. No license for the sale at a Farmers' Market of any items shall be issued by the Town Clerk until the applicant has filed with the Town Clerk a certificate evidencing liability coverage at the minimum amount recommended by Maine Municipal Association at the time of the event and naming the Town as an additional insured. The licensee shall maintain such insurance at all times while engaged in sales at a farmers' market, and the licensee shall provide the Town Clerk with not less than ten (10) days' advance written notice of the cancellation, expiration or non-renewal of said insurance.

D. Farmers' Market on Private Property: Farmers' Markets may take place on private property, where allowed as a permitted or conditional use under Chapter 402 with written consent of the property owner.

E. Prohibitions

1. A person may not use the terms "Farm and Food Products", "Farmer", or "Farmers' Market" to describe a market or other sales that does not meet the terms of the definitions set forth in 402.2.2.
2. A person may not sell farm and food products at a market labeled "farmers' market" unless at least 50% of the farm products offered by that person were grown, processed, or prepared by that person or under that person's direction.
3. A product not grown, processed, or prepared by the farmer or under that farmer's direction must have been grown, processed, or prepared by and purchased directly from another farmer and the name and location of the farm must be identified on the product or on a sign in close proximity to the displayed product.
4. Invasive terrestrial plants, weapons, fireworks, tobacco or tobacco products, and marijuana, marijuana products or tobacco/marijuana paraphernalia are prohibited. Hemp-based Cannabidiol (CBD) products are allowed if locally sourced and prepared by the farmer.
5. Live animals offered for sale are prohibited.

F. Additional Conditions for Farmers' Markets

1. Sufficient off-street parking, not within a public way, must be provided for both the Farmers' Market vendors and their patrons. One space per 400 sf of stalls/tables is required.

2. The items to be sold at the Farmers' Market are intended to be local farm products. Craft items made by the farmers/vendors are allowed but limited to 25% of the products offered for sale by the market.
3. Mobile, temporary, and non-permanent stationary food vending units, and mobile ice cream vendors, are prohibited from participating in duly approved Farmers' Market locations without a Mobile Vendor or Food Truck license issued by the Town of Gray.
4. The term of a license shall not extend beyond a 12-month period. Annual renewals may be permitted in the same manner as an initial license agreement.
5. Farmers' Markets that exceed 20 farmers and/or tables/stalls require Staff Review Committee or Planning Board approval as applicable.
6. Farmers' Markets are limited to two days a week between the hours of 8:00 am and 6:00 pm.
7. All Farmers' Markets must adhere to State standards including Title 7, Part 2, Chapter 101, Subchapter 1-A, subsection 415 which specifies produce and products eligible to be sold.
8. All Farmers' Markets must adhere to applicable Town standards, specifically including the Local Food Ordinance and Zoning Ordinance provisions.
9. This section does not prohibit a market from imposing more stringent requirements on its sellers than those imposed by the Town.
10. This section does not prohibit individual Farmers' Markets to charge their own table/stall fees in addition to the fees the Town charges pursuant to the Town Council approved Fee Schedule.
11. Signage for Farmers' Markets must comply to Chapter 406 Town of Gray Sign Ordinance.

G. Permitting Procedure

1. Application Submittal: Applicants shall submit an application packet in a manner specified by the Town and shall include such fees as established by the Town Council.
2. Staff Review: The Community Development Department shall circulate the application to Gray Fire Rescue and Public Works Department within 3 business days of receipt of a complete application. The Community Development Department shall submit any written comments within 5 business days to the Town Manager.
3. Farmers' Market with =/< 20 farmers and/or tables/stalls: Subsequent to the receipt by the Town Manager of the staff recommendation and prior to the issuance of a license agreement, the Town Council shall hold a Public Hearing at the first available Town Council Meeting. In addition to general notice, notice of the public hearing shall be mailed to immediate abutters no later than 7 days prior to the hearing.
4. Farmers' Markets with > 20 farmers and/or tables/stalls: Subsequent to receipt of staff recommendations and all applicable materials for Site Plan Review are received by the Town Planner, the application shall be placed on the next available Staff Review Committee or Planning Board agenda as applicable for Site Plan Review and a Public Hearing. In addition to general notice, notice of the public hearing shall be mailed to abutters withing 250' of the parcel on which the Farmers' Market is to be located no later than 7 days prior to the hearing.

(a) Farmers' Markets Generally.

(i) No person may sell items at a farmers' market without either a farmers' market license or a vendor associated with a farmers' market license issued by the City Clerk's office. There must be at least two farmers holding valid farmers' market licenses present at a designated location and day/time of a farmers' market in order for any licensee to sell good or services at the farmers' market for that day/time.

(ii) A farmer, craft producer or services vendor seeking to participate in or be associated with a farmers' market shall pay an annual application processing fee as specified in the Schedule of License, Permit and Application Fees established by City Council order. In addition, for each farmers' market location that an applicant seeks to sell goods or services at, the applicant shall pay the applicable per market location fee as specified in the Schedule of License, Permit and Application Fees established by City Council order. All other licensing fees shall be waived.

(iii) Any vendor who seeks to apply for a vendor associated with a farmers' market license must first demonstrate to the City Clerk that the applicant has been approved by whomever is responsible for the general oversight of the designated location and day/time of the farmers' market, be it the property owner, market manager or otherwise.

(iv) To ensure that a farmers' market retains its essential character as such, the total number of licenses issued for vendors associated with a farmers' market shall not exceed 25% of the total number of farmers' market licenses issued, as calculated on a per farmers' market location basis each license year and in whole numbers. For purposes of calculating compliance with this subsection, the number of licenses issued for vendors associated with a farmers' market shall be rounded up to the nearest whole number.

(v) All farmers' markets must comply with all applicable requirements of Chapter 27 of the Code of Ordinances.

(vi) Mobile, temporary and non-permanent stationary food vending units, including push carts and mobile ice cream vendors, are prohibited from participating in duly approved farmers' market locations.

(vii) Any items sold at the farmers' market that are not the products of the farmer selling them must be so labeled.

(viii) In addition to the general provisions regarding suspension or revocation of a license, the City Clerk shall revoke the license of any person who fraudulently uses weights or measures, combines with any other licensee in the fixing or maintaining of a price, or who intentionally and knowingly deprives another licensee of the use of the latter's designated stall in the market. In addition, the City Clerk may suspend or revoke the license of any person who violates any other section of this Chapter.

(b) Farmers' Markets located on City Property.

(i) Farmers' markets may be permitted on City property at such times and locations as established by City Council order.

(ii) The City Clerk may assign to a particular farmer or to a farmers' market association duly organized and existing under the laws of Maine the administrative duty to assign stalls to participating farmers.

(iii) No license for the sale at a farmers' market of any items shall be issued by the City Clerk until the applicant has filed with the City Clerk a certificate, in a form satisfactory to the Corporation Counsel, evidencing general liability coverage in an amount not less than $400,000 combined single limit for personal injury and property damage, or such other amount as may be required by the Maine Tort Claims Act (14 M.R.S.A.

§ 8001 et seq.) as amended from time to time, whichever amount shall be greater, and naming the City as an additional insured. The licensee shall maintain such insurance at all times while engaged in sales at a farmers' market, and the licensee shall provide the City Clerk with not less than ten (10) days' advance written notice of the cancellation, expiration or non-renewal of said insurance.

Sec. 14-106. Enforcement and penalties.

(a) Enforcement. The City's Health Officer or Health Inspector is authorized to enforce and shall enforce the provisions of this Article. The City Clerk is also authorized to enforce the provisions of this Article.

(b) Fines. Any person violating any provisions of this Article shall be fined in an amount not to exceed five hundred dollars ($500) per violation. Each separate section and each day of a violation shall constitute separate violations. Any such fine may be in addition to any suspension or revocation imposed in accordance with the provisions below.

(c) License suspension or revocation.

(1) The Health Officer or Health Inspector may immediately suspend any license granted under this Article for reasons of public health or safety.

(2) The Health Officer or Health Inspector may immediately suspend any license granted under this Article upon denial of access to inspect the establishment.

(3) The City Clerk may suspend any license granted under this Article for violation of any provision of this Chapter.

Upon suspension, the licensee shall immediately surrender the license to the Health Officer or Health Inspector. If suspended by the Health Officer or Health Inspector, the license shall remain suspended until reinspection shows compliance with this Article. If suspended by the City Clerk, the license shall remain suspended until the licensee shows compliance with this Chapter.

Where a licensee fails to comply with the requirements of this Article or this Chapter within ten (10) days from the date of suspension, a hearing shall be scheduled before the City Council for revocation of the license. Upon scheduling of a revocation hearing before the City Council, the license shall remain suspended until the completion of the hearing and decision by the City Council. The City Council may revoke the license on the following grounds:

1. The licensee has failed to bring the establishment into compliance with this Article or this Chapter within ten (10) days of the date the license was suspended;
2. The license has been suspended three (3) times or more within the previous 12-month period; or
3. The Council finds that the establishment poses a significant threat to public health or safety.

Attachment C-14 Gleaning and Foraging

Gleaning & Foraging

Type: Program Development, Partner Coordination, Policy

Implementation Time: 3-8 months

Goal:

- To increase public awareness and acceptance of gleaning / foraging
- To identify opportunities for gleaning in community
- To identify barriers to gleaning and foraging, and work to reduce or eliminate them
- To connect gleaning to food distribution systems
- To provide public education on gleaning/foraging in Maine, including guidelines on ethics, health, and safety
- To increase accessibility to fresh locally grown produce and promote food security.
- To inspire a broad-based, multi-general community engagement in locally grown food systems.
- To improve public knowledge of the benefits of invasive plans, and opportunities to utilize and control invasive plants
- To increase access to culturally significant plants though restoration of knowledge.

Audience: The general public – Focus on Property Managers, Gardeners, Renters, Low-Income, and Food Insecure.

Question: Who in your community may have produce that goes to waste?

Question: Who in your community can benefit the most from utilizing un-used produce?

Overview:

Gleaning, or the collection of otherwise unharvested food for consumption, is a low-cost method to improve the efficiency of our locally based food system (Attachment i). Gleaning can take many forms, including:

- Collection of food from commercial farms after commercial-scale harvesting is completed.
- Collection of food from private or community gardens after gardeners have met their personal needs, or are unable to harvest.
- Collection of unharvested food from plants in common spaces, such as from "street trees" or community food forests.
- Collection from farms or sellers of unsold items near their expiration date or close of markets, for example after a farmers market has ended.
- Provides a use for 2nd quality or "ugly" produce, especially for processing.

Foraging is the collection of food from wild plant communities and can provide people with supplemental nutrition and also be a financial resource. The act of foraging is culturally significant for many people. Removing policies which create barriers to foraging can support the restoration of knowledge around foraging in a community.

Both of these harvest methods can increase the amount of local food that is available to the community. Food that has been gleaned is typically available for free or at a reduced cost which can make it more accessible to groups that support food security initiatives. Educating the community on safe foraging practices and the uses for less common plants can increase access to fresh local food. It can also shift the acceptance of some plants which are perceived as unwanted weeds if their edible uses are accepted more widely.

Implementation:

Communities can take measures which will promote safe, healthy, and ethical gleaning and foraging. Actions may include:

- Identification of barriers to gleaning and foraging in the community. This may include a lack of public access to lands, overly burdensome restrictions on collection of food in public spaces, police or other law enforcement harassment of individuals gleaning or foraging, racial profiling, lack of permission from commercial or private growers, etc.

  Question: What barriers does your community have to gleaning & foraging? Are there ordinances or policies in place that prevent either of these?

- Increasing access to processing equipment or facilities for food preservation that may be uneconomical at individual scales (See Community Resources module).

  Question: Are there any facilities with food preservation equipment that have the capacity to expand use to the community?

- Address barriers to safe, healthy, and ethical gleaning and foraging:
  - Create or participate in a public education campaign to increase awareness of the concepts using tools such as social or traditional media, fact sheets, posters, etc.
  - Create public signage, which may be tied into other community agriculture programming such as Edible Main Streets, food forests, or similar installations. This can also discourage harvesting of individually grown crops in community gardens.
  - Offer youth or adult education classes on the concepts to increase community knowledge.
  - Build connections between commercial growers, landowners, private gardens, or other producers with people who are food insecure or work for food security organizations.
  - Raise awareness of harvesting from brownfields or other sites which may have contaminated soils and not be fit for plant consumption.

  Question: Which barriers in your community are the highest priority to make gleaning & harvesting available?

While outside the traditional definition of gleaning, in some cases farms may be set up to exclusively grow food for donation, for example Growing to Give Farm, or Twin Villages Farm. Community gardens may adopt a similar initiative, such as the "grow a row" campaign.

Costs:

Personnel time:

a) Promotion or creation of education and outreach campaign
b) Coordination between producers and cleaners / foragers

Materials:

a) Signage
b) Posters

Partners to Support Implementation:

A. CCSWCD
B. Open space landowners / managers (i.e. land trusts)
C. Local farms/nurseries
D. Municipal Parks & Recreation Staff
E. Youth organizations
F. Neighborhood Associations
G. Master Gardeners

H. Food security organizations
I. Schools
J. Farmers markets
K. Local-oriented grocery stores
L. Other food businesses
M. Processing facilities (like community centers)
N. Merrymeeting Gleaners
O. Maine Gleaning Network

Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Community fundraising
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (grants)

Attachments:

i. Example Programs:
    a. Merrymeeting Gleaners FAQ – overview of gleaning and how much is harvested
    b. Healthy Acadia + UMaine Guide to Gleaning
    c. Maine Gleaning Network – Provides technical assistance to gleaning organizations statewide.

Ë ŅFFVR ŅŅÚŒRÕÇOŅKŔŅFUĊAĤU

A T-Rex weighed about 14,000. That's how much food was collected and given to people in need since June 2016 by the Merrymeeting Gleaners. Wow!

İ ÖKÚŌUÇOŅKŔŌRÕÅ

Ì Ŗ NŖOŅNÚÛFTOÛUÔŖŖÑĜFRR ÔKFR ŅFUĊŌŅOŅUKŔÑÔKFR ŅFUĊR KFPŅÚUKŔÑÑNOŌŅF ŌÚÑĜFŅŅÚQÚŖ ÔŖŖÑTKŔÚFŌŅUKŔÑŖÚÖŅFOŖNKOŖŖÑUŅNÛFŌÚVŖFŌKŔŌÝKÚŌŖŔUÚŖ MŅ NŖŔÛŖ ŅÑMVÚÖŖUŅŌŖŔŅŅÑB Ì ÖŌUÔŖŖÑÚŖÛOŅŖÚÖŅFÚŌŅÕŖÚŖ ŰKUÚŅĄOŅKÛŌŖÕ ŖKŔVKÑÑOŌŖŔKOTŅŖTOŅÖÛŔÕFVKŔÑÔKFR ŅFUÚŌÖÚÖŅMÛFÑŅŔŖÔÑOTŖUŌŖÕŖÔ ÚÖŌUŰKUÚŅB

İ ÖVÑŖÔKFR ŅFUÖKÛŅÔŖŖÑOŅÛÚŖÛŅFŌŖÚÖŅĜFŌŌŅOĜUÅ

- ÅÛŖTŅFNFŖTU
- ĎŖTŅFÔŅNÚTFŖŖÑÛŅŅÚÖKÚNKŔŔŖÚMŅUŖOÑÚŖÕFŖŅŅFVUŖFŅU
- BŔÑŖÔUŅKUŖŔÛFTOÛU
- Ì ŖŖŖ R KŔVNFŖTUFŌTŅŔŌŖÕKÚÚÖŅUKR ŅÚŌŖŅ
- Ì ŖŖ NŖUÚQÚŖ ÖKFÛŅÚÚNFŖTU

İ ÖŅFŅÑŖŅUÚÖŅÕOŅKŔŅÑÔŖŖÑÕŖ KÔŅFŌŌÛŌŅŖOŅÚŅÑÅ

Ì ŖOŖNKOŖŖÑTKŔÚFŌŅUĄŖÛT ÞŌÕÑÖŅŔUĄKŔÑÖŖÛUŌŖÕUÚŌŅUË R KVMŅŅÛŅŔÚŖ TŅŖTOŅŌŖ VŖÛFŔŅOŌÖMŖFÖŖŖÑĀ

İ ÖKÚÚŖÛOŅÖKTTŅŔÚŖÚÖŅÔŖŖÑŌŌŌÚKUŔĊÚÕOŅKŔŅÑÅ

Ì ÖŅÔŖŖÑÚŖÛOŅMŅTOŖÚŅÑŌŖÚŖÚÖŅÕFŖÛŔÑUŖÚÖŅÔŌŅOŅNKŔMŅÛUŅÑKÕKŌŖŌŖÚÖŅUKR ŅUŅKUŖŔŖFŔŅĄÚUŅKUŖŔB

İ ÖŖKFŅÚÖŅË ŅFFVR ŅŅÚŒRÕÇOŅKŔŅFUÅ

A ÕFŖÛT ŖÔÛŖOQŔÚŅŅFUÚÖŖ UÖKFŅK TKUUŌŖŔ ÔŖFÔŖŖÑKŔÑK ÑŅUĜŅÚŖ NOĄUŅÚÖŅÕKT MŅÚŰŅŅŔ ÔKFR UKŔÑÖÛŔÕFVR ŖÛÚÖUŌŖ ÚÖŅË ŅFFVR ŅŅÚŒRÕÅKV KFŅKB Ì ÖŅUŅÛŖOQŔÚŅŅFUKFŅTKFÚŖÔÚÖŅË ŅFFVR ŅŅÚŒRÕĊŖŖÑÅŖÛŔÑŌQKŔÑŰŖFPÚŖÕŅÚÖŅFÚŖ NŖR MKÚ ÔŖŖÑŌŖUŅŅÛFŌÛVB Ì ÖŅË ŅFFVR ŅŅÚŒRÕÇOŅKŔŅFUNŖOŅNÚŅÑKŔÑFŅÑŌÚFŌMÛÚŅÑŁ·ŃĄŁŁ TŖÛŔÑUŌŖŅŅÉÛŔŅMŁŁ·ÑB

DŖŰ R ÛNÖŌÛŁ·ŃĄŁŁ TŖÛŔÑUÅ

İ ŅOQÚÖŅKÛŅFKÕŅÌ VFKŔŔŖUKÛFÛUHFNŲŰŅŌÖÖŅÑŁ·ŃĄŁŁ TŖÛŔÑUB ĎŖ KÕŌŖŅÚÖKÚŖ ÛNÖÔŖŖÑËÈÌ ÕŖŌŖÕÚŖÛŰKUÚŅMŅNKÛUŅŖÔ ÚÖŅÖKFÑÚŖFPŖÔÕOŅKŔŅFUKŔÑÔKFR ŅFUŌŖË ŌÑÅŖKUÚË KŌŖŅB

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ÆŅŅŅR MŅFŁ·ÑĊAĤU

Guide to Gleaning

A Surplus and Seconds Management Best Practice

Presented by:

The Gleaning Initiative

A Project of Healthy Acadia and UMaine Cooperative Extension

Contact: Hannah Semler, hannah@healthyacadia.org / (207) 667-7171

This work was funded by USDA SARE 2014 as part of a larger project to create more awareness among farmers of the potential value of gleaning as it meets their goals of sustainable farming.

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Building vibrant communities

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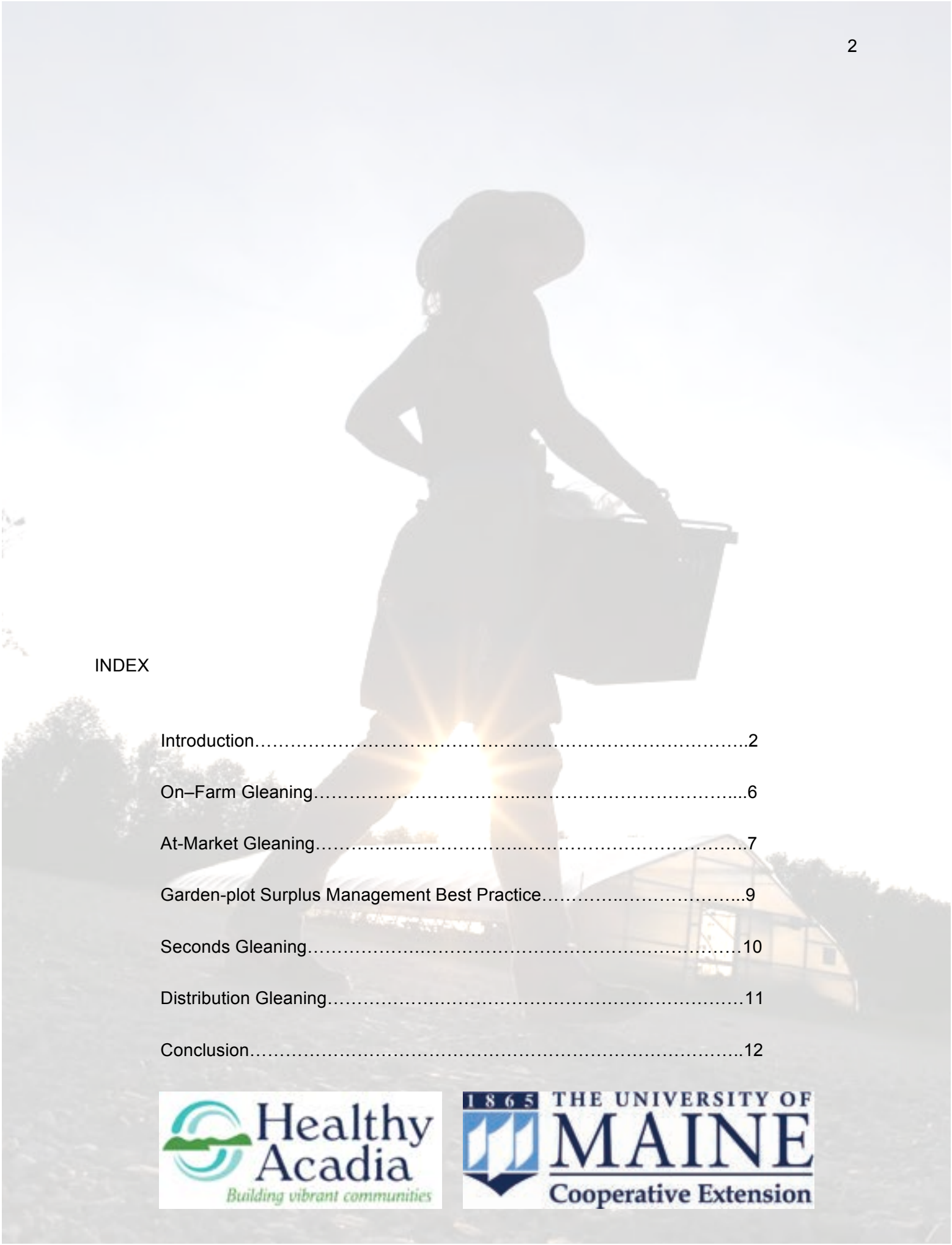

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Introduction

This *Guide to Gleaning* has the main goal to present the initial findings of ongoing research around the opportunities that gleaning can create for farmers as a seconds and surplus management best practice. Since the launch of The Gleaning Initiative in 2013, Healthy Acadia and UMaine Cooperative Extension, have worked closely with the Hancock County Food Security Network to design a plan to recover food from over thirty small-scale farms in Hancock County. For the past two years the framework for the gleaning activities have been perfected to best meet food security needs for farmers and food insecure populations. Maine ranks #1 in New England for food insecurity, with 13% of individuals counted as food insecure.

Under the USDA SARE the focus set out to answer the question of how gleaning activities can lead to surplus and seconds management services through a shared resource system and distribution network; including labor, transportation and marketing services. This *Guide to Gleaning* also draws from three reports that CYON Business Solutions developed after working with three farms, providing an additional service of on-farm resource-based consulting around infrastructure, labor force, efficiency and diversification design.

In Maine we recognize the need for a diversity of farms and scales of production, with the understanding that some of the bigger farms we have are sustaining some of the infrastructure, but that moving forward we need all kinds of farms to succeed. There is a lot of excitement building around startup farms and there is an increased support network to help them succeed: Maine Organic Farmers and Gardeners Association, Eat Local Foods Coalitions, Maine Farmland Trust, and Maine Coast Heritage Trust are some of the organizations working towards land conservation, support of local farm development, and consumer education. Professionals from these organizations, and many others, are collaborating in the process of informing the Maine Food Strategy which is in its fourth year of process development, working to establish a momentum to define the following goals: Economic Development, Healthy Food for All, Healthy Maine Environment, Vibrant Communities. The Gleaning Initiative considers itself part of the Healthy Food for All goal as we serve food insecure populations in Maine, and support local farming communities.

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The Maine Food Strategy's Healthy Food for All goal is currently defined as "Quality food support systems help vulnerable populations access local food and support local farms and fisheries" (working document Maine Food Strategy). The definition of *quality food* is that it be safe, be produced using best practices, promote health, and use integrated pest management strategies. While *support systems* include formal and informal kinds of public assistance, federal, state and local assistance, private food assistance, non-profit organizations, innovative programs that address food security, families, communities, and faith-based organizations. Also defined by the Maine Food Strategy is the concept of *vulnerable populations* defined as food insecure or at risk food insecurity because of short term or chronic issues. The concept of healthy food *access* is that food be available on a reliable basis through purchase, public or private food assistance, or self-provisioning. The Gleaning Initiative fits within this umbrella of the Healthy Food For All indicator as a program launched by Healthy Acadia, a non-profit in the public health sector, supported by UMaine Cooperative Extension, working with organic farms, in partnership with the Hancock Food Security Network, directly serving food assistance programs, while developing innovative programming to encourage self-provisioning opportunities for food insecure community members.

The Gleaning Initiative has so far worked with over 30 farms to get 60,000lbs of food distributed among 15 food security organizations. However, it is not sufficient to measure the success and benefits of the gleaning activities by the number of pounds that it has recovered and distributed. This *Guide to Gleaning* sets out to map the different kinds of value created through gleaning activities and shows how farms might navigate these opportunities in the future as Surplus and Seconds Management Best Practices that works in conjunction with and parallel to the gleaning efforts of food recovery for assistance programs. Conversations with representatives of fisheries have begun to develop around what food waste prevention practices could best benefit fishing communities, food assistance programs and food insecure in the future, however the focus of this document is to communicate the work done to support farmers through their partnership with The Gleaning Initiative.

Maine is pioneering the four season farming, based on the fact that there is enough light to work with hoop houses and greenhouses without a lot of energy use. Four Season Farm Eliot Coleman's work in Downeast Maine has inspired a lot of farmers to extend their growing season and serve local markets through the winters. Some of these farms are strategically integrating new and old technologies available to them, such as solar, horsepower and sometimes wind, to work towards diversified non-polluting energy sources for year-round growing. Most gleaning in Hancock County takes place from March through December. The months of January and February are mainly dedicated to project improvements, research and innovation. However there is an opportunity to close that two-month gap, and provide more diversity of food year-round with the notion of lightly processing foods that are available during the higher volume growing months, to support year-round markets and food assistance needs. This option is currently in the R&D stage pending grant funding to run a pilot project using a Mobile Kitchen for in-field value-added production. The idea is to start with apple sauce from one of the most successful gleaning operations at Johnston's Orchard in Ellsworth, ME where currently we glean 5,000 + apples, but where much more can be gleaned if provided the right opportunities.

The main source of volunteers is the Master Gardener course at UMaine Cooperative Extension, where between 5-20 volunteers engage in gleaning programs around Hancock County from May-October. This creates a certain seasonality to gleaning that meets the demand for volunteers as well as the expectation of food assistance programs to have more fresh food during the growing months. However, other inroads are being made to develop partnerships with schools, adult education programs, and other at-risk prevention programs to integrate gleaning volunteerism as a safety net for year-round recovery programs, troubled youth, and others.

If we consider the EPA's food waste prevention hierarchy of what should happen with food that no longer has a found commercial use, the priority is always to get it to people. When working with farms the quality of the food is mostly perfect, it is usually the cosmetics that make it unsellable within the traditional markets that farmers tend to focus on: CSA, Farmers Market, Restaurants. However, what farmers are able to do with their surplus and seconds is determined by the resources they have at hand such as labor, transportation, or marketing.

On–Farm Gleaning

In the past, gleaning was a part of community life in what was mainly an agricultural society. The harvest was an event that did not happen within the private confines of a family-owned farm, but was a community event, even if happening individually for different farmers. For example, the wheat harvest was a central part of community life, and at the end there was always more to be gleaned in the fields. People knew when to come in and harvest the corners of the fields that farmers had left for them. Sometimes mandated by the church, other times it was just an unquestioned tradition, but gleaning was common practice. At the heart of this tradition were values of generosity, connectivity, exchange, and resourcefulness.

These days traditional gleaning requires that a coordinator role serve as intermediary between community members and farmers, due to the disconnection from our agricultural cycles. Not only do people not know what the opportunities are for gleaning at each time of the year, but there is a sense that farms are private property and that trespassing to gather food is a form of stealing. A mediation role is needed to support the rebuilding of direct relationships between neighbors and their farmers. Sometimes farms have been there for fifty years, and other times they are a start-up farm; in both cases, the value of connectivity goes a long way.

What we now call *Traditional Gleaning* is when we are invited by farmers to come to the farm to glean a certain product for which they no longer have commercial use. Because the Gleaning Initiative works with mostly diversified organic vegetable farms, the kind of products being gleaned at each farm is usually the same during any given season. For example from April-May there is usually a tendency to be gleaning spinach, usually from hoop-houses, so we can say that it is Spinach Gleaning Season. This kind of gleaning requires that we go out to the farms in volunteer teams and harvest the greens, store them and redistribute them to food pantries and meal sites as soon as possible to avoid storing the product unnecessarily for too much time. If there is more product than we are able to distribute, or the farmer has voiced an interest in trying to sell the products, we can support farms in selling their surplus at a discounted rate. Sometimes if the labor, transportation or marketing are obstacles to making the sale, the gleaning program will step in and provide that service for the farmer to successfully get the most value possible from the sale. In the future the gleaning program will be designing a social

business model that will provide the labor, transportation and marketing for surplus and seconds that are not finding a home within the farmers' own markets

In order to organize the most efficient gleaning operation, the information from the farmer about what needs to be gleaned is key: how much is there to be gleaned, when does it need to be out by, what is the limit of people you would like on the farm? These three pieces of information are enough to design the gleaning operation. Other influencing factors are the destination of the product or the distance between harvest and delivery as also playing a role in determining what food goes where and when.

On-Farm Gleaning Protocol (2-35 gleaners on-site):

Clear communication about expectations of gleaning: what, how much and how long?
Signed liability waivers for all volunteers that will be on-farm and orientation required
Bring containers that are different from the farmers', and minimize use of resources
Make sure tools are provided so not to use farmers' resources
Use unbleached 100% cotton rags to drape on sensitive produce right after harvest
Assign a point person that overseas the flow of the in-field gleaning process
Track all gleaned produce to provide farmers with records of how much they donated

At-Market Gleaning

Farmers put a lot of work into preparing for a farmers market, and often have to bring more than what they will normally sell, just so they do not risk running out of product. This can be one of the more frustrating aspects of preparing for a farmers market is that you don't always know exactly what is going to be sold. Therefore, at the end of market, more often than not there is

leftover produce that needs a home, and if farmers market do not have other markets that week, than that might be the best place pass the food on to the Gleaning Initiative.

If farmers have other farmers markets during that week then it is usually best for the farmer to take the product back to the farm so they can try to sell it again at other markets. One important aspect of communication between farmers and gleaning coordinators about Farmer's Market is getting specific feedback on when and where farmers would rather participate in gleaning. Sometimes farmers will rather take the product back to the farm and weigh it, and consider what might be used on the farm before sending out with the gleaning program. This will require an on-farm pick up later on, but is still technically a farmers' market surplus management best practice. Also, if the community is having trouble figuring out storage for the produce right after the market or farm-stand, having the farmer store the produce overnight or until food security organizations are open can be a better option.

In terms of the visibility created by at-market gleaning, there are different mechanisms to create a *buzz* that will benefit the gleaning program, its partners, and of course participating farmers. There needs to be a common thread and similar operational system that represents gleaning at farmers markets or at farm-stands, because that is the most public space for customers to see gleaning in action. Farmers markets are a great place to talk about gleaning in a celebratory and engaging way one-on-one with interested observers, but actually the goal of the gleaning operation is to be as inconspicuous as possible, and leave the visibility for the farmers. This is why the Gleaning Initiative adopted a strategy to always glean with yellow bins, so that the containers never got mixed up with farmers' containers and, so that the gleaners would be readily identified and recognized by the farmers.

At-Market Gleaning Protocol (1-2 gleaners on-site):
If farmers are expecting gleaning at farmers market then someone has to show up
Carrying the flashy yellow bins identifies gleaners at the farmers market

Place bins next to/under farm stands out of the way until farmers are ready
Farmers fill bins as they pack up their stand and sort through the food that is left
As soon as gleaners pick up bins farm initials get tagged on the crate
Bins are measured and tag is completed (6.20.15 / KHF / Beets / 30lb)

Garden-plot Gleaning

When farms do not have the amount of surplus that would make gleaning at their farm valuable, sometimes they will develop rows specifically designated for a social project. This requires that the Gleaning Initiative be mindful of how to bring volunteer labor into the farm on a more regular basis. Usually the supervision for these kinds of projects comes from the UMaine Cooperative Extension office, using Master Gardener Volunteers and being supported also by a farmer who want to dedicate some of his/her time towards the educational and social project.

Teaching people to value the food they eat is part of a bigger goal that most small-scale organic farmers have in common. This is because it really does affect their ability to expand in the community if they are able to engage people in developing a taste and a demand for their products. Usually this is not something that farmers can spend too much time doing directly. Some farms grow specifically for social projects that have a budget, and are sometimes also involved in supporting volunteers to produce food on their land. There is an opportunity for farms with a social interest to be connected through the Gleaning Initiative to different nutrition education and public health prevention programs that can become long-term clients.

As part of the Real Food On Campus campaign for hospitals and schools, there is a growing institutional demand for products that are locally grown and even sometimes organic. The farms that are closest to these institutions and that are able to develop relationships with them can provide a variety of services for institutions as part of wellness programs or green teams: providing space for community gardening, producing healthy cafeteria food, serving employee

CSAs, supporting the design of a kitchen garden or even waste management through picking up waste for animals or composting.

Garden-Plot Gleaning Protocol (3-4 gleaners)
Clear agreement between what the farmer can and cannot provide before season
Assign roles for the different volunteers so they can manage their schedule
Require that the group meet at least once a week for joint work day
Keep plot clean and follow farmers guidance on how the space should be kept
Document with pictures and other thoughts and quotes what the process is like
Try to bring the story of how the products were grown to the end-recipients

Seconds Gleaning

During the Fall and Winter, a lot of times the gleaning activities will revolve around sorting through products in cold storage and cellar to quickly identify the items that might be going bad soon due to time and conditions of storage. This requires that farmers label their crates of root vegetables, or their bags of potatoes, so that these can be sorted according to date, and then gleaned as close to before expiration as possible without it becomes inedible waste. When the farmer has more than what the gleaning initiative can distribute, market development strategies kick in, where we offer the products to partners in the Food Security Netowrk, Schools and Hospitals, and other projects, at a reduced price, but still try to get a return for the farmer. This creates a new situation for gleaning in that we are longer responsible for the distribution, so the farmer can distribute their own seconds, usually making sure to piggy-back on exiting distribution routes so to minimize the overhead cost of an already reduced price item. For

example if they are going to the Farmers Market in a certain town where they have made a seconds sale, then they have the pantry director meet them at the pantry.

Seconds Gleaning Protocol (3-4 gleaners)
Establish a consistent schedule for going to the farm to sort seconds
Consider the work as a food waste prevention service for farms
Sales of items that are prioritized based on shelf-life will bring return to the farm
Items who are just passed prime will end up at meal-site or value-add processing
Consider the volunteer time having a value-added social impact (person in recovery)
Record the amount of time spent sorting and relate to amount of food recovered

Distribution Gleaning

Distribution companies often have an inventory that they are trying to work off and have to walk the balance between having enough food for their orders coming in and not over-purchasing from farmers and getting stuck with the product. In order to be able to provide a consistent gleaning service for distribution companies there needs to be high availability and flexibility of drop-off so that the transaction costs for the distribution company, of managing the delivery, do not exceed the value of having their waste disappeared.

In order to provide the kind of flexibility for distributors, farmers and gardeners to be able to deliver when they are able, but still have their products stored appropriately, a drop-off location per community needs to be designated. Self-managing drop-offs while simultaneously providing clear signage as to what products came from whom is the best balance for a food donations program.

Distribution Gleaning Protocol (3-4 gleaners)
Trust-based drop-off system with clear identification of where products come from
Refrigerated storage for perishable products: fruit, veg, dairy, eggs
A volunteer position that sorts through the food and keeps track of what is there
Document deliveries with pictures and also a spreadsheet (or automated system)
Communicate available foods to the food security organizations
Consider the sale of bulk items from a single producer to meet demands
Consider value-added processing for increased returns for farming community

Conclusion

This brief overview of how gleaning connections can provide support for farmers as they are developing an intentional surplus and seconds management system is meant to introduce the concept of gleaning as a service to farms. The flexibility of the work done under gleaning can help support the farms that partner with the Gleaning Initiative in ways that best meet their goals of sustainable growth. There is a lot more research that is needed in relation to whether there is enough unmet demand for local products that could be taken care of by a surplus management system that combined online and boots on the ground social platforms. However, in the meantime there are other programs that are providing grant money to farms, such as Maine Farmland Trust, and Mainers Feeding Mainers, to provide reduced price bulk items to food pantries and meal sites around Maine. These programs can also be seen as surplus management and are therefore worth considering for areas where there is still demand for local products and bigger connectivity barriers to gleaning, and a need to serve farms in this way.

More exploration of gleaning as a community safety net for both food insecure populations and the farming community needs to happen in Maine. Currently there are only three gleaning efforts in the state, and the biggest is Healthy Acadia and UMaine Cooperative Extension's The Gleaning Initiative in Hancock County with a sister project in Washington County. These efforts of trying to condense and model the gleaning programs that have started in the past three years is a helpful tool for farmers in other communities to encourage organization to take on gleaning to benefit their overall mission of feeding community members and meeting their own food security needs.

In recent months there has been an increased demand for sharing information on how gleaning works with farms and food pantries in our areas and there are innovative models and collaborations working themselves to the surface as a result of the newly made connections between farmers, community members, institutions and organizations serving the food insecure. There is a large potential for schools and hospitals to be a huge partner in developing more consistent mechanisms for food rescue and surplus and seconds placement as their goals move more in the direction of supporting local farms and the overall health of the community.

Gleaning can sometimes benefit farmers by using some of the contacts in the secondary food distribution network (food security organizations, schools, and hospitals) to sell their surplus rather than only donating it. This would still be meeting the EPA's hierarchy and creating a more tangible return for farmers, while also supporting institutions working with kids, seniors and disabled, and people suffering from chronic disease, with healthier and affordable options for sourcing local food. If we then consider all gleaning as a surplus and seconds management service, with market and charity destinations working alongside each other we can expand the benefits for farmers and ultimately collect more food and increase regional food security.

This project would not have been possible with the USDA SARE funding provided in 2014.

Healthy Acadia
Building vibrant communities

1865 THE UNIVERSITY OF MAINE
Cooperative Extension

Maine Gleaning Network Monthly Calls

1st Wednesday of the Month,

2-3pm

A collaborative farm surplus rescue effort gathering crops from Maine's fields, and engaging communities IN A MOreresourceful and equitable food system ACTIVITIES.

WHAT WE DO

Learn more about how we are working on changing the food system.

OUR EVENTS

Check out our list of amazing events and see what may be near you!

OUR PARTNERS

GET INVOLVED

FIND FOOD ASSETS IN YOUR COMMUNITY

Sign Up & Stay Connected

CONTACT >

E:

mainegleaningnetwork@gmail.com

Maine Gleaning Network sponsored by:

wclogoGrey.png

Attachment C-15 Soil Contamination

Soil Contaminants Education & Testing

Type: Program Development, Education Campaign

Implementation Time: 3-8 months

Goal: To raise awareness about possible contaminants in soil as a public health issue, with particular focus on low-income & New American communities.
To encourage home/community gardening and revitalize a community's value in local agriculture.
To inspire stewardship of local lands & natural life through hands-on engagement.
To implement remediation and contamination avoidance strategies to assist the public in gardening safely.
Expanding local capacity for food production

Audience: Gardeners & community gardening groups, specifically in areas with strong industrial and/or agricultural pasts as high-risk points of historical contamination.

Question: What was land historically used for in your municipality? Are there any areas with particularly heavy past industrial use or large numbers of houses build before 1978? If so, who lives in those neighborhoods?

Question: What value does gardening have in your municipality? What value does agriculture have in your municipality?

Overview:

This initiative encourages gardeners/anyone interested in gardening to test their soil for possible contaminants, as undetected contaminates in garden soils can cause serious chronic health issues, especially in children. Through partnering with community organizations and planning gardening/agriculture events, the program will raise awareness about possible soil contaminants and enhance accessibility to soil testing. If contaminants are present, the program will support gardeners to mitigate their exposure to contaminated soils or connect them with community resources that will assist in remediating their soils.

Lead is the most common contaminant in urban soils but is also often found in rural or suburban areas. The site of any current or former building constructed before 1978 may be at risk due to the use of lead in paint, plumbing, flashing, or other building material. Commonly used demolition practices, especially controlled burns, often result in widespread contamination of a site. Lead can even be found in former farmland, especially orchards, where lead arsenate was used as a pesticide. In short, due to Maine's long history of settlement, with cycles of population and depopulation, it should never be assumed a site in the state is lead-free until testing is performed.

Lead is not the only contaminant of concern in Maine. Other common contaminants are mercury, arsenic, copper, zinc, nickel, and PAHs (polyaromatic hydrocarbons). Initial outreach should include information on any suspected contaminants and if applicable, incorporate local history of land use.

Soil contamination is a concern for gardeners because of the increased exposure pathways for inhalation and ingestion. However, testing for soil contamination should also be considered for planning of all open spaces, both public and private, especially where children are likely to have direct contact with the soil.

In most cases, remediation of contaminated soil is costly and includes disposing of hazardous waste. Educational efforts focused on risk mitigation are recommended as this is a financially accessible route to decreasing exposure (Attachment i).

Implementation:

Phase I: Engage the Community

A soil contamination awareness campaign should attempt to work with pre-existing local agriculture organizations to plan community events or partner with existing events. Messaging of the need for soil testing can be incorporated into educational and community events associated with other community agriculture modules (e.g. building a community garden) and shared in public spaces/forums. (Attachments ii).

Questions:

- *What agriculture or open space projects are currently happening in your community?*
- *Are there at-risk neighborhoods or is the whole community at equal risk for contamination based on historical use?*
- *If you have areas of concern where soil contamination as an environmental health issue, who lives in those neighborhoods? Which outreach methods will be most effective for these neighborhoods?*
- *Are there ordinances or policies that require testing for soil contamination?*

Phase II: Soil Testing

Communities can provide information about soil testing opportunities, and even find ways to connect people with options for free or subsidized testing. A "first stop" option for testing is the University of Maine Analytical Lab & Soil Testing Service. It will provide organizations and individuals with as many soil test kits as is deemed necessary. Ideally, soil testing methods will be standardized to ensure soil samples are collected correctly (Attachment iii). Nonetheless, soil sample collection is relatively simple and can easily be done by individual gardeners. Soil samples will be sent the University of Maine Analytical Lab & Soil Testing Service for processing.

Other options for testing and screening should be considered based on availability. If soil contamination is prevalent in a community, it may consider purchasing equipment to directly offer testing to residents, such as instant-read devices like X-ray Florescence devices or "XRFs". Communities may also work together or through a regional organization to develop regional cost-share options to pool resources to purchase equipment to offer screening for lead and other toxic metals.

If your community composts yard waste, consider testing of compost available to residents.

Questions:

- *Should soil testing (or at minimum, lead screening) be included as a condition for permitting development in some cases?*
- *Should screening be a part of the standard home inspection process?*
- *Should a program to provide free or subsidized soil testing and / or lead screening be supported?*
- *Does your community provide compost for residents from yard waste collection? Is it tested for contaminants?*
- *Should soil testing be a requirement for compost or soil being brought into new areas?*

Phase III: Risk Mitigation

Mitigation efforts may be necessary for any location that tests positive for contaminants. Strategies for mitigation generally revolve around containment of lead, with efforts to reduce pathways to human exposure. Recommendations for mitigation include: building raised beds with clean soil for gardening, covering contaminated soil with at least 6 inches of wood chips, and changing how the area is used and interacted with. As detailed in the fact sheet in Attachment iii, some types of food crops may provide a greater pathway for lead exposure than others. Texture of crops may also have an effect on lead transport, with rough-textured plants posing more of a risk due to increased difficulty removing all soil particles.

Studies have shown that more acidic soil may cause a greater transport of lead into food crops. Therefore, for locations where food crops are grown in soil that may be marginally contaminated, it is important to maintain a soil ph within the upper (less acidic) bound of the recommended value for the plants being grown.

Necessary action is highly specific to individual sites and depends on the type of use the area receives as well as the severity of contamination (Attachment vii: Safe Soils Action Plan). Support will be provided to locations with soil contamination and/or individuals at locations with contamination will be connected with resources to help make their soil safe.

Questions:

- *Which mitigation methods are most feasible for your audience to implement?*
- *Are wood chips commonly available to assist with some forms of mitigation?*

Phase IV: Remediation (IF APPLICABLE)

Remediation (removal) of lead or other metals is expensive and is generally not practicable for marginally contaminated sites, though it may be indicated for highly contaminated sites such as former industrial areas (brownfields). Strategies may include:

- Physical removal of all contaminated soil and replacement with clean soil
- Phytoremediation, or the use of plants to take up lead. The plant material itself may become contaminated and require expensive disposal in landfills. Results on the efficacy of this strategy are mixed.

Questions:

- *Is the cost to do full remediation of the site justified by level of contamination and planned use of the site?*
- *Have options for risk mitigation (such as containment) been properly considered?*
- *Are the risks from soil disturbance to remove contamination being considered?*

Costs:

Personnel time:

- Collaborating with Partners
- Outreach
- Soil sample collection

Materials:

- Soil test kits (free)
- Standard soil test analysis ($18)
- XRF (X-ray Fluorescence equipment, large costs of $25k+but offers options to quickly screen many samples)

Partners to Support Implementation:

A. CCSWCD
B. University of Maine Analytical Lab & Soil Testing Service
C. University of Maine Cooperative Extension
D. Municipal Public Health Staff
E. Cultivating Community
F. Resilience Hub

Funding Opportunities:

A. Federal funding (EPA, USDA)
    a. Funding for testing

   b. Funding for remediation (HUD)
B. State funding
C. Regional Government funding
D. Municipal Funding
E. Other funding sources (private nonprofit organizations/foundations, grants)

Attachments:

i. Safe Soils Action Plan
ii. Outreach Materials
   a. Factsheet 1: What is Lead? (English, French, Lingala, Portuguese, Arabic)
   b. Factsheet 2: What is Soil Lead? (English, French, Lingala, Portuguese, Arabic)
   c. Factsheet 3: What can I do? (English, French, Lingala, Portuguese, Arabic)
   d. Doorhanger/Flyer
   e. Poster
   f. Safe VS Unsafe Plants Poster
iii. QAPP (EPA Soil Sample Collection)

Attachment i.

Safe Soils Action Plan – Secondary Test

Soil Lead Concentration	**Risk**	**Recommended Gardening Practices**	**Recommended Plants**
<100 ppm	Low	No specific action is needed. Generally, make sure to adhere to good gardening practices such as a) Washing hands thoroughly before and after gardening b) Washing produce thoroughly to remove *all* soil & dust before consuming c) Washing clothing after gardening	No restrictions.
100 – 400 ppm	Moderate	Strictly adhere to good gardening practices a), b), and c) above in order to minimize contact with contaminated soil. Gardening and consuming produce grown in moderate risk soils requires care to avoid unintentional consumption of soil. If you garden directly in the ground, make sure to d) Wear gloves while gardening e) Incorporate clean materials into your soil such as compost, peat moss, & manure f) Adjust soil pH to near neutral (~6.5-7.5) to limit bioavailability of lead g) Add barriers (such as mulch) between contaminated soil and plants to limit contaminated soil particles settling on produce. h) If it is difficult to remove *all* contaminated soil from produce, peel the vegetable or remove areas with dirt. Remove the outside layers of vegetable like cabbage and lettuce. i) Consider building a raised bed to grow edible plants. • Make sure not to disturb/remove/excavate oil soil and instead build your raised bed directly on the ground. This prevents contaminated soil from getting kicked up into the clean soil in the box. • Add a ground cloth/weed barrier (e.g. cardboard) under the new raised bed to avoid mixing old and new soil.	Plants that grow in moderately lead contaminated soil accumulate a lot of lead in their roots and a little bit of lead in their leaves, but do not store lead in the fruit. It is safe to grow all plants intended for consumption in a raised bed on top of moderately contaminated soil. If you garden directly in the ground, avoid planting leafy vegetables and root vegetables such as • Turnips • Onions • Beets • Potatoes • Yams • lettuce & cabbage • carrots & parsnip • spinach • kale Instead, try growing plants that produce fruit such as • Berries

		j) Consider planting phytoremediating plants that have shown to remove lead from soil by collecting lead in the plant's tissue. Spinach (Spinacea oleracea), sunflowers (Helianthus annus), or mustard greens (Brassica juncea) have been shown to remove over 100 ppm lead per year from contaminated soils. Please note that the efficacy of phytoremediation is still contested. If you choose to try phytoremediation, please dispose of the plants responsibly (avoid adding them to your compost!). Test your soil annually for lead contamination and use phytoremediation in concert with other methods. It is safe to grow produce intended for consumption in a raised bed on top of soil with moderate lead contamination. If the soil in your raised bed is contaminated, replace the soil. Make sure to continue good gardening practices a), b), and c) above. Alternatively, consider building a container garden to grow edible plants, as container gardens provide a complete barrier between clean and contaminated soil.	• Apples & other fruit trees • Cucumbers • Tomatoes • Peppers • Corn • Pumpkin & Squash • Eggplant If you choose to grow edible plants directly in the ground, consider covering the soil around the plants with a few inches of clean soil and compost, or mulch.
400 - 1200 ppm	High	Breathing in lead contaminated dust from the soil, ingesting contaminated soil on covering vegetable, clothing, and hands, and bringing lead contaminated soil into the house are all common sources of lead exposure from lead contaminated soils. Do not grow plants intended for consumption directly in the soil. Relocate your garden to a lower risk area (for example: away from an old building). Build raised beds or container gardens filled with new soil & compost to grow edible plants. When building a raised bed • Make sure not to disturb/remove/excavate oil soil and instead build your raised bed directly on the ground. This prevents contaminated soil from getting kicked up into the clean soil in the box. • Add a ground cloth/weed barrier (e.g. cardboard) under the new raised bed to avoid mixing old and new soil. • Cover the contaminated soil surrounding the garden box/raised bed or container garden is covered in 6 to 8 inches of mulch to prevent disturbing contaminated soil. Limit contact with the contaminated soil by	Do not grow edible plants intended for eating directly in contaminated soil. When selecting plants to grow in a raised bed, choose plants with shallow roots that will not grow into contaminated soil. Otherwise, there are no restrictions on plants grown in raised beds.

		k) Leave shoes at the door to prevent bringing dirty soil into your home l) Wash hands, toys, and other objects that are used daily to remove small bits of soil and dust m) Provide alternate places for kids to play (a sandbox) n) Cover soil with at least 6 inches of mulch or other soft material o) Discourage eating the soil Children are particularly at risk for lead poisoning. Consider planting phytoremediating plants that have shown to remove lead from soil by collecting lead in the plant's tissue. Spinach (Spinacea oleracea), sunflowers (Helianthus annus), or mustard greens (Brassica juncea) have been shown to remove over 100 ppm lead per year from contaminated soils. Please note that the efficacy of phytoremediation is still contested. If you choose to try phytoremediation, please dispose of the plants responsibly (avoid adding them to your compost!). Test your soil annually for lead contamination and use phytoremediation in concert with other methods.	
>1200 ppm	Very High	Breathing in lead contaminated dust from the soil, ingesting contaminated soil on hands, vegetables, and clothing, and bringing lead contaminated soil into the house are all common sources of lead exposure from lead contaminated soils. Do not grow plants intended for consumption directly in the soil. Minimize all contact with contaminated soil by following recommendation i) through m) above. Restrict children to only access areas designated as safe from lead contamination. Cover contaminated soil with 6 to 8 inches of mulch to minimize contact with lead. Alternatively, remove and replace contaminated soil (ensuring that contaminated soil is treated and disposed of in accordance with Maine Department of Environmental Protection Remediation Action Guidelines).	Do not grow edible plants intended for eating directly in contaminated soil. When selecting plants to grow in a raised bed, choose plants with shallow roots that will not grow into contaminated soil. Otherwise, there are no restrictions on plants grown in raised beds.

		Only garden in raised beds or container gardens with clean soil. When building a raised bed • Make sure not to disturb/remove/excavate oil soil and instead build your raised bed directly on the ground. This prevents contaminated soil from getting kicked up into the clean soil in the box. • Add a ground cloth/weed barrier (e.g. cardboard) under the new raised bed to avoid mixing old and new soil. Consider planting phytoremediating plants that have shown to remove lead from soil by collecting lead in the plant's tissue. Spinach (Spinacea oleracea), sunflowers (Helianthus annus), or mustard greens (Brassica juncea) have been shown to remove over 100 ppm lead per year from contaminated soils. Please note that the efficacy of phytoremediation is still contested. If you choose to try phytoremediation, please dispose of the plants responsibly (avoid adding them to your compost!). Test your soil annually for lead contamination and use phytoremediation in concert with other methods.	

Attachment ii.

What is Soil Lead?

What is Lead?

Lead is a naturally occurring metal found in small amounts all around the world. Lead is found at low levels in soil, water, air, and even in your home.[1] Throughout our history, lead has been a popular metal used because of its strength. In the early 1900s, doctors discovered that lead is harmful to the health of humans and plants.[1] There are now laws in place limiting the use of lead.[2] **Today, lead is the most common pollutant in urban soils.[3]**

Why is there Lead in my garden soil?

The biggest problem with lead in soils is that it doesn't go away.[3] **Once lead is in soil, it can stay there for hundreds of years.[3]** Before people found out that lead was dangerous, it was a commonly used material. Lead was used in:[3]

- Paints in homes
- Gasoline
- Water Pipes
- Batteries
- Building Materials
- Factory Processes

Smoke coming from factories and vehicles using leaded-gasoline released lead into the air.[3] In places near old factories or roads in Portland, the lead in smoke released decades ago may have settled into your soil.[3] If your home was painted with lead paint, the paint could have chipped off your house directly into your soil.[3] **No matter where it came from, all the lead that has entered your soil over the past few hundred years is still there.**

Although lead is no longer used in many products found in your home, lead can still be found in many industrial paints used on cars, trucks and ships. Lead is used inside batteries, electronics, mixed metals, and beyond.[4]

The Great Portland Fire of 1866

In 1866, the Great Fire burned down a third of the City of Portland leaving behind a lot of debris.[5] To clean the city and recover from the tragedy, they pushed large amounts of rubble into the Back Cove to form the foundation of what we now know as the East Bayside and Bayside neighborhoods. The buildings in Portland before 1866 were made from materials that used lead, so the debris from the burned buildings contained a lot of lead. If you live in **East Bayside or Bayside, the ground your house is built on is likely contaminated by lead from the debris left after the Great Fire of 1866!**

For more information:

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] EPA, "Lead in Paint, Dust, and Soil," (https://www.epa.gov/lead/lead-regulations#paint).
[3] Soil Science Society of America, "Lead" (https://www.soils.org/discover-soils/soils-in-the-city/soil-contaminants/lead).
[4] International Lead Association, "Lead Uses—Statistics," (https://www.ila-lead.org/lead-facts/lead-uses--statistics).
[5] Portland Press Herald, "The Night Portland Burned," (specialprojects.pressherald.com/portlands-great-fire/)

Prepared by Cumberland County Soil & Water Conservation District | (207) 892-4700 | www.cumberlandswcd.org
March | 2020

ما هو رصاص التربة؟

ما هو الرصاص؟

الرصاص معدن طبيعي يوجد بكميات صغيرة في جميع أنحاء العالم. يوجد الرصاص بمستويات منخفضة في التربة والماء والهواء وحتى في منزلك.[1] على مر تاريخنا ، كان الرصاص معدنًا شائع الاستخدام بسبب قوته. اكتشف الأطباء في أوائل القرن العشرين أن الرصاص ضار بصحة الإنسان والنباتات. توجد الآن قوانين تحد من استخدام الرصاص.[2] اليوم ، الرصاص هو الملوث الأكثر شيوعًا في التربة الحضرية.

لماذا يوجد رصاص في تربة حديقتي؟

أكبر مشكلة في الرصاص في التربة هي أنه لا يختفي.[3] **بمجرد أن يكون الرصاص في التربة ، يمكن أن يبقى هناك لمئات السنين.** قبل أن يكتشف الناس أن الرصاص خطير ، كانت مادة شائعة الاستخدام. تم استخدام الرصاص في:

- طلاء المنزل
- البطاريات
- البنزين
- مواد البناء
- أنابيب المياه
- عمليات المصنع

الدخان القادم من المصانع والمركبات باستخدام البنزين المحتوي على الرصاص يطلق الرصاص في الهواء. في الأماكن القريبة من المصانع القديمة أو الطرق، الرصاص في الدخان الذي صدر قبل عقود ربما استقر في تربتك. إذا كان منزلك مطليًا بطلاء من الرصاص. فقد يكون تكاسر الطلاء مباشرة في التربة. **بغض النظر عن المكان الذي جاء منه ، كل الرصاص الذي دخل التربة على مدى بضع مئات من السنوات الماضية لا يزال هناك.** على الرغم من أن الرصاص لم يعد يستخدم في العديد من المنتجات الموجودة في منزلك ، لا يزال من الممكن العثور عليه في العديد من الطلاء الصناعي المستخدم في السيارات والشاحنات والسفن. الرصاص يستخدم في داخل البطاريات, المعادن المخلوطة, والمزيد.[4]

حريق بورتلاند الكبير في ١٨٦٦

في ١٨٦٦, احرق الحريق ثلث مدينة بورتلاند وترك وراءه الكثير من الحطام.5 لتنظيف المدينة وإعادة الاستقرار، قامت المدينة بدفع كميات كبيرة من الأنقاض في منطقة الBack Cove لتشكيل الأساس لما نعرفه الآن بحيي East Bayside وBayside. كانت المباني في بورتلاند قبل عام ١٨٦٦ مصنوعة من مواد التي تستخدم الرصاص، وبالتالي فإن الحطام من المباني المحروقة يحتوي على الكثير من الرصاص. إذا كنت تعيش في East Bayside أو Bayside, من المحتمل أن تكون الأرض التي بني عليها منزلك ملوثة بمادة الرصاص من الحطام المتروك بعد الحريق الكبير في عام ١٨٦٦.

للمزيد من المعلومات, قم بزيارة المواقع الاتية :

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] EPA, "Lead in Paint, Dust, and Soil," (https://www.epa.gov/lead/lead-regulations#paint).
[3] Soil Science Society of America, "Lead" (https://www.soils.org/discover-soils/soils-in-the-city/soil-contaminants/lead).
[4] International Lead Association, "Lead Uses–Statistics," (https://www.ila-lead.org/lead-facts/lead-uses--statistics).
[5] Portland Press Herald, "The Night Portland Burned," (specialprojects.pressherald.com/portlands-great-fire/)

Le plomb dans le sol

Qu'est-ce que c'est que le plomb?

Le plomb est un métal naturel qui se trouve en petites quantités partout dans le monde. Il existe des traces de plomb dans le sol, l'eau, l'air, et même chez vous.[1] Le plomb était utilisé tout au long de l'histoire au cause de sa force. Au début des années 1900, des médecins ont découvert que le plomb est nuisible à la santé des humains et des plantes.[1] Maintenant, on a des lois qui limitent l'usage de plomb.[2] **Aujourd'hui, le plomb est le polluant le plus courant dans les sols urbains.[3]**

Why is there Lead in my garden soil?

Le plus grand problème de plomb dans le sol c'est qu'il ne disparaît pas.[3] **Le plomb peut rester dans le sol pendant des centaines d'années.[3]** Avant qu'on a découvert que le plomb est dangereux, c'était un matériau couramment utilisé. Le plomb était utilisé dans:[3]

- La peinture pour la maison
- L'essence
- Les tuyaux d'eau
- Les piles
- Les matériaux de construction
- Les processus industriels

Les usines et les véhicules qui utilisaient de l'essence au plomb émettaient du plomb dans l'air.[3] Le plomb émis dans la fumée il y a quelques décennies aurait pu se déposer sur le sol près des anciens usines ou des rues.[3] Si votre maison était peinte avec la peinture au plomb, la peinture aurait pu s'écailler et entrer dans le sol.[3] **Peu importe d'où il est venu, le plomb qui entrait dans le sol au cours des cent dernières années existe encore.**

Même si on n'utilise plus le plomb dans beaucoup des produits dans votre maison, on peut trouver le plomb dans plusieurs peintures industrielles utilisé pour les voitures, les camions, et les bateaux. Le plomb est aussi utilisé dans les piles, les électroniques, les métaux mélangés, et plus.[4]

Le Grand Incendie de Portland en 1866

En 1866, un grand incendie a ravagé un tiers de la cité de Portland et il a laissé beaucoup de débris.[5] Les peuples de Portland ont enlevé les grand quantités des décombres et les ont poussé dans le Back Cove. Les décombres ont formé la fondation de ce que nous appelons aujourd'hui les quartiers East Bayside et Bayside. Avant 1866 les meubles de Portland ont été construit des matériaux qui utilisait de plomb, donc le débris des meubles brûlés contient beaucoup de plomb. **Si vous habitez dans les quartiers East Bayside ou Bayside, la terre sous votre maison est probablement contaminée par le plomb dans le débris du grand incendie de 1866!**

For more information:

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] EPA, "Lead in Paint, Dust, and Soil," (https://www.epa.gov/lead/lead-regulations#paint).
[3] Soil Science Society of America, "Lead" (https://www.soils.org/discover-soils/soils-in-the-city/soil-contaminants/lead).
[4] International Lead Association, "Lead Uses−Statistics," (https://www.ila-lead.org/lead-facts/lead-uses--statistics).
[5] Portland Press Herald, "The Night Portland Burned," (specialprojects.pressherald.com/portlands-great-fire/)

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Soil Lead Elingi Koloba Nini?

Lead elingi koloba nini?

Soil lead ezali mabele oyo eza na lead na kati Lead ezali metal to ebende naturel ezwami na biteni mike mike mokili mobimba.[1] Lead ezwami na se ya mabele, na mayi, mupepe pe na kati ya ndako nayo. Na histoire na biso, lead eyebani mingi pona makasi na yango.[1] Na ebandeli ya ba mbula 1900s, minganga bamonaki ete lead ezali mabe po na sante ya mutu pe na nyonso ebotamaka na mabele. Sika mibeko ya l'Etat esili ko limiter misala ya lead.[2] **Lelo, lead ezali bosoto mingi na mabele Nzinga Nzinga ya ba mboka.[3]**

Po na nini lead ezali na mabele ya jardin na ngayi?

Probleme monene ya lead na mabele ezali que ekokende esika te.[3] **Tango lead ezali na mabele, ekotikala na kati pona na ba mbula kama na kama.** Liboso batu bayeba lead ezali mabe makasi, ezalaki mingi kozala utilise na ba materiels. Lead ezalaki kosala na kati ya:[3]

- Langi ya kopakola na ba ndako
- Na essence
- Na ba tuyaux ya mayi
- Piles
- Materiels de construction
- Processus d'usine

Milinga oyo eza kobimela na ba usines, na mituka oyo esalaka na essence ya lead na kati, epanzaka lead na mupepe.[3] Na bisika oyo ezali pene ya ba usines ya kala to ba balabala na Portland, lead na milinga oyo ebimaki ba mbula eleka, ekoki kozala evanda na mabele na bino.[3] Soki ndako nayo epakolamaki na langi ya lead, langi wana ekoki kozala ebandaki kolongwa ndambu ndambu na ndako nayo ti na kati ya mabele nayo.[3] **Ata ndenge nini, esika nyonso oyo ewutaki, lead nyonso oyo ekotaka mabele nayo uta mbula na ba mbula, ezali kaka wana.**

Ata soki lead ezali kozwama lisusu te na ba produits na ndako nayo, lead ekoki kozwama kaka na ba usines ebele ya langi oyo basalelaka na mituka, camions na masuwa. Basalelaka lead na kati ya ba piles, appareils electroniques, mélange ya bibende pe biloko mingi.[4]

Compagnie Monene ya Moto ya 1866

Na mbula ya 1866, moto mingi epelaki na 1/3 ya cite ya Portland, etikaka na sima bosoto mingi.[5] Po na kopetola cite pe kobikisa cite na likama yango, batindikaki ba decombres ebele na esika tobengi Back Cove pona kosala fondation ya ba quartiers oyo toyebi lelo na kombo ya East Bayside pe Bayside. Ba buildings ya Portland liboso ya 1866 etongamaki na materiels oyo ezalaki na lead, yango ba decombres ya ba buildings ezikaka etondakalead mingi. **Soki ovandi na East Bayside to Bayside, nse ya ndako nayo esika etongami, ezali contamine na lead ya bosoto ya moto epelaka na 1866!**

Po na information misusu:

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] EPA, "Lead in Paint, Dust, and Soil," (https://www.epa.gov/lead/lead-regulations#paint).
[3] Soil Science Society of America, "Lead" (https://www.soils.org/discover-soils/soils-in-the-city/soil-contaminants/lead).
[4] International Lead Association, "Lead Uses—Statistics," (https://www.ila-lead.org/lead-facts/lead-uses--statistics).
[5] Portland Press Herald, "The Night Portland Burned," (specialprojects.pressherald.com/portlands-great-fire/)

O que é chumbo do solo?

O que é o chumbo?

O chumbo é um metal natural encontrado em pequenas quantidades em todo o mundo. O chumbo é encontrado em baixos níveis no solo, na água, no ar e até mesmo na tua casa.[1] Ao longo de nossa história, o chumbo tem sido um metal popular, utilizado devido à sua força. No início dos anos 1900, os médicos descobriram que o chumbo é prejudicial à saúde de seres humanos e plantas.[1] Agora, existem leis que limitam o uso do chumbo.[2] **Atualmente, o chumbo é o poluente mais comum em solos urbanos.[3]**

Por que existe chumbo no solo do meu jardim?

O maior problema do chumbo nos solos é que não desaparece do solo.[3] **Uma vez que o chumbo esteja no solo, pode permanecer lá por centenas de anos.[3]** Antes de se descobrir o seu perigo, o chumbo era um material comumente usado. O chumbo era utilizado em:[3]

- Tintas em casas
- Gasolina
- Tubos de água
- Baterias
- Materiais de construção
- Processos de fábrica

A fumaça proveniente de fábricas e veículos que utilizavam gasolina com chumbo liberava chumbo no ar.[3] Em Portland nos locais próximos a antigas fábricas ou estradas, o chumbo liberado décadas atrás pode ter se instalado no solo.[3] Se a tua casa fosse pintada com tinta de chumbo, a tinta poderia ter (quebrado) lascado a tua casa diretamente no solo.[3] **Não importa de onde veio, todo o chumbo que entrou no teu solo nas últimas centenas de anos ainda está lá.**

Embora o chumbo não seja mais usado em muitos produtos encontrados na tua casa, o chumbo ainda pode ser encontrado em muitas tintas industriais usadas em carros, caminhões e navios. O chumbo é utilizado dentro de baterias, materiais eletrônicos, metais mistos e outros.[4]

O Grande Incêndio de Portland de 1866

Em 1866, o Grande Incêndio queimou um terço da Cidade de Portland, deixando para trás muitos destroços.[5] Para limpar a cidade e se recuperar da tragédia, empurrou-se grande quantidade dos destroços para Back Cove para formar a base do que hoje conhecemos como os bairros de East Bayside e Bayside. Antes de 1866 os edifícios em Portland eram feitos de materiais que utilizavam chumbo, então os destroços dos prédios queimados continha muito chumbo. Se você mora em **East Bayside ou Bayside, o terreno em que a tua casa está construída provavelmente está contaminado pelo chumbo dos destroços deixados após o Grande Incêndio de 1866!**

Para obter mais informações:

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] EPA, "Lead in Paint, Dust, and Soil," (https://www.epa.gov/lead/lead-regulations#paint).
[3] Soil Science Society of America, "Lead" (https://www.soils.org/discover-soils/soils-in-the-city/soil-contaminants/lead).
[4] International Lead Association, "Lead Uses−Statistics," (https://www.ila-lead.org/lead-facts/lead-uses--statistics).
[5] Portland Press Herald, "The Night Portland Burned," (specialprojects.pressherald.com/portlands-great-fire/)

Why is Soil Lead Bad?

Lead Poisoning

Gardening in soil with high levels of lead causes **lead poisoning**. Small amounts of lead enter your body by breathing in dust from lead-contaminated dirty soil and eating vegetables that are covered in dust from dirty soil. Lead builds up inside your body over months and years and slowly makes you sick. The worst effects of lead poisoning don't happen until harmful amounts of lead are already inside of your body. Once lead is inside of you, it is **difficult to get it out of your body**.[1] That is why it's so important to know if there is lead in your environment!

Effects of Long Term Lead Poisoning

Every part of your body is affected by lead. Children under seven years old and pregnant women are most at risk. In children, lead poisoning can cause:[1]

- Behavior and learning problems
- Hearing Problems
- Lower IQ
- Slowed growth

During pregnancy, lead stops the baby from developing properly and can cause a miscarriage.[1] In all adults, lead poisoning causes problems with the heart, kidneys, and reproductive system.[1]

Treatment of Lead Poisoning from Dirty Soils[2]

The first step to treat lead poisoning is to stop contact with the dirty soil in order to stop lead from getting into your body. A healthy diet with food rich in iron and calcium helps your body process and remove lead slowly. In cases where people have large amounts of lead in their bodies, Chelation Therapy may be recommended. If you or a family member are worried about lead poisoning, ask a doctor about symptoms and possible treatment options.

Level of Risk

At low levels, lead in soil can be perfectly safe. Lead in soil becomes unsafe when there is too much. **The only way to know how much lead is in your garden soil is to take a soil test.** The test will tell you how much lead is in your soil by giving you the number of PPMs of lead in your soil.

What is PPM?

PPM means parts-per-million. 100 ppm of lead in your soil is the same as one penny in $100.[1] It's a really small number, but **more than 100 ppm in your soil will make you sick![1]**

Low Risk	Less that 100 ppm	Your soil is safe![3]
Moderate Risk	100 to 400 ppm	Lead in your soil could be a risk to your health.[3]
High Risk	More than 400 ppm	The amount of lead in your soil is dangerous.[3]

Lead in Portland's Soils

An Environmental Protection Agency funded study from 1999 to 2007 found the average amount of lead in soil in **Bayside, Parkside, and West End neighborhoods was 1086 ppm**. Soil samples from these neighborhoods ranged from 10 ppm to more than 25,000 ppm lead! Test your soil to make sure your garden is safe.

For more information:

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] Kids Healthy from Nemours, "Lead Poisoning," (https://kidshealth.org/en/parents/lead-poisoning.html).
[3] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).

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لماذا يعتبر رصاص التربة سيء؟

التسمم بالرصاص

إن الزراعة في التربة التي تحمل معدلات عالية من الرصاص تسبب التسمم بالرصاص. إن دخول كميات قليلة من الرصاص في جسمك يتم عن طريق استنشاق الغبار من التربة المتسخة والملوثة بالرصاص وكذلك تناول الخضار المغطاة بالغبار من التربة المتسخة. يتراكم الرصاص داخل جسمك على مدى الشهور والسنوات مما يجعلك تمرض ببطء. لا تحدث أسوأ آثار التسمم بالرصاص إلا إذا كان هنالك كميات ضارة من الرصاص داخل جسمك بالفعل. بمجرد أن يصبح الرصاص داخل جسمك **من الصعب اخراجه من جسمك** و لهذا السبب انها ذات الاهمية معرفة ما اذا كان هناك رصاص في بيتك.

آثار التسمم بالرصاص على المدى البعيد

جميع اجزاء الجسم تتأثر بالرصاص . ان الاطفال دون سن السابعة والنساء الحوامل هم الأكثر عرضة للخطر.[1] في الأطفال يمكن أن يسبب التسمم بالرصاص في:[6]

- مشاكل في السلوك والتعلم
- انخفاض في مستوى معدل اختبارات الذكاء (ال)IQ
- مشاكل في السمع
- بطء في النمو

خلال فترة الحمل يعمل الرصاص على توقف النمو الطبيعي لدى الطفل ويمكن ان يسبب الاجهاض. يتسبب التسمم بالرصاص لدى البالغين بحدوث مشاكل في القلب والكلى والجهاز التناسلي.

معالجة التسمم بالرصاص من التربة المتسخة[2]

الخطوة الاولى لعلاج التسمم بالرصاص هي التوقف عن التلامس مع التربة المتسخة من أجل منع دخول الرصاص اللى جسمك. إن اتباع النظام الغذائي الصحي مع تناول الطعام الغني بالحديد والكالسيوم واللذان يساعدان الجسم على معالجة وإزالة الرصاص ببطء من الجسم. في حالة الأشخاص الذين لديهم كميات كبيرة من الرصاص في اجسامهم قي يوصي باستخدام طرق علاج خاصة لازالة المعالجة الثقيلة من الجسم. اذا كان لديك أي شعور بالقلق او احد افراد عائلتك من التسمم بالرصاص عليك استشارة طبيبك عن الأعراض خيارات العلاج المتوفرة.

مستويات الخطر

في المستويات المنخفضة, يمكن أن يكون الرصاص في التربة امنا تماما. ويصبح الرصاص غير آمن في التربة عندما يكون هنالك الكثير منه. إن الطريقة الوحيدة لمعرفة مقادير الرصاص في تربة حديقتك هو إجراء اختبار التربة. من خلال هذا الاختبار ستتعرف على مقادر الرصاص الموجود في التربة باعطائك عدد PPMللرصاص في تربتك.

الاقل خطرا	اقل من ١٠٠PPM	التربة الخاصة بك آمنة [3]
الخطورة الاعتدالية	ما بين ١٠٠ الى ٤٠٠ PPM	قد يكون الرصاص في تربتك خطرا على صحتك
الخطورة العالية	االكثر من ٤٠٠ PPM	كمية الرصاص في تربتك الخاصة خطيرة.

ما هو الPPM؟

ال PPMتعني أجزاء لكل مليون . ١٠٠ جزء في المليون من الرصاص في التربة الخاصة بك هي مساوية لنسبة القرش الواحد في ال ١٠٠ الدولار الأمريكي. نعتبر هذا العدد صغير جدا ولكن أكثر من مائة جزء من المليون في التربة الخاصة بك ستجعلك مريضا!

الرصاص في تراب مدينة بورتلاند

وجدت دراسة ممولة من وكالة حماية البيئة بين عامي ١٩٩٩ - ٢٠٠٧ أن متوسط كمية الرصاص في التربة في منطقة Baysideو West End Neighborhood و Parksideكانت ١٠٨٦ .PPMتراوحت عينات التربة من هذه الاحياء من ١٠ الى PPM أكثر من ٢٥,٠٠٠ PPMمن الرصاص! قم باختبار تربتك الخاصة للتأكد من ان حديقتك امنة.

للمزيد من المعلومات, قم بزيارة المواقع الاتية :

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] Kids Healthy from Nemours, "Lead Poisoning," (https://kidshealth.org/en/parents/lead-poisoning.html).
[3] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).

L'empoisonnement au plomb

Pourquoi le plomb dans le sol est-il mauvais?

Le jardinage dans les sols avec un niveau de plomb élevé cause un **empoisonnement au plomb**. Des traces de plomb entrent dans le corps quand on inspire de la poussière des sols contaminé par le plomb, et aussi quand on mange des légumes qui portent ces mêmes traces de sol contaminé. Le plomb s'accumule dans le corps au cours des mois et des ans, et il vous rende malade. Les effets les plus mauvais de l'empoisonnement au plomb n'apparaît pas lorsqu'un niveau de plomb nocif est déjà dans le corps. **Lorsque le plomb est dans votre corps, c'est très difficile de le extraire.**[1] Donc il est très importante de savoir s'il y a de plomb dans vos environs!

EffetsLes effets à long terme de l'empoisonnement de plomb

Chaque partie du corps peut être affectée par le plomb. Les enfants de moins de sept ans et les femmes enceintes sont les plus à risque. Pour les enfants, l'empoisonnement de plomb peut causer:[1]

- Des problèmes de comportement et d'apprentissage
- Une ralentissement de la croissance
- Des problèmes auditifs
- Une baisse de QI

Pendant la grossesse, le plomb empêche le développement correct de l'enfant et peut causer une fausse couche.[1] Pour tous les adultes, l'empoisonnement de plomb cause des problèmes du coeur, des reins, et du système reproducteur.[1]

Le traitement de l'empoisonnement de plomb causé par les sols contaminés[2]

La première étape du traitement de l'empoisonnement de plomb c'est de cesser le contact avec le sol contaminé. Une alimentation saine avec des aliments riche en fer et en calcium aide le corps à traiter le plomb et l'éliminer lentement. Dans les cas où les personnes ont beaucoup de plomb dans le corps, le *Chelation Therapy* (thérapie de Chélation) peut être recommandé. Si vous ou un membre de votre famille vous inquiétez au sujet de l'empoisonnement de plomb, demandez à un médecin pour les symptômes et les options de traitement.

Niveau de risque

À de bas niveaux, le plomb dans le sol peut être parfaitement sûr. Le plomb devient dangereux quand il y a trop dans le sol. **Une analyse de sol c'est la seule moyenne à découvrir combien de plomb est dans votre sol de jardin.** L'analyse vous donne le niveau des PPM de plomb dans votre sol.

Qu'est-ce-que c'est que PPM?

PPM signifie parties par million. **100 ppm de plomb dans votre sol vous rendra malade!**[1]

Faible risque	Moins de 100 ppm	Votre sol est sûr![3]
Risque modéré	100 à 400 ppm	Le plomb dans votre sol peut poser un un risque sanitaire.[3]
Risque élevé	Plus de 400 ppm	La quantité de plomb dans votre sol est dangereux.[3]

Le plomb dans le sol de Portland

Une étude financée par le Environmental Protection Agency a trouvé que la quantité moyenne de plomb dans le sol des quartiers **Bayside, Parkside, et West End de 1999 jusqu'à 2007 était 1086 ppm**. Les échantillons de sol de ces quartiers ont varié entre 10 ppm jusqu'à plus de 25,000 ppm de plomb! Analysez votre sol pour vous assurez que votre jardin est sûr.

For more information:

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] Kids Healthy from Nemours, "Lead Poisoning," (https://kidshealth.org/en/parents/lead-poisoning.html).
[3] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).

Empoisonement ya Lead

Po na nini mabele ya lead eza mabe?

Kolona jardin na mabele ya lead ya niveau ya likolo ezalaka cause ya **empoisonement ya lead.** Ndambu ya lead ekokota nzoto nayo tango ozali kopema poussiere ewuti na bosoto ya mabele oyo eza contamine na lead pe koliya legumes oyo eza na poussiere ewuti na mabele ya bosoto. Lead ekotonda kati na nzoto nayo ba sanza pe ba mbula, pe malembe malembe ekobelisa yo. Mabe mingi ya empoisonement ya lead ekomonana ti kino quantite mingi ya lead mabe esili kokota kati na nzoto na yo. **Na tango lead esili kokota kati nayo, ezali pasi po na kobimisa yango.**[1] Yango ezali malamu mingi koyeba soki lead ezali na environment!

Effets ya Empoisonement ya Lead na Tango Molayi

Biteni nyonso ya nzoto nayo ezali affectes. Bana ya se ya mbula sambo pe basi ya zemi bazali na risqué mingi. Empoisonement ya lead ekomemela bana:[1]

- Bizaleli mabe pe kokoso ya koyekola
- Kokoso ya koyekola
- Mayele muke
- Ekolembisa nzoto na kokola

Na tango ya zemi, lead ekokangisa developpement ya bebe na ndenge esengeli pe ekoki kosopa zemi.[1] Na bato bakoli, empoisonement ya lead ekopesa kokoso to probleme na motema, reins na systeme ya reproduction (kobota).[1]

Traitement ya empoisonement ya lead kowuta na bosoto ya mabele[2]

Eloko ya liboso pona kosalisa contre empoisonement ya lead, ezali kokata contact na bosoto ya mabele, po lead ekoka kokota nzoto nayo te. Bileyi malamu oyo etondi fer na calcium ekosalisa nzoto nayo kobimisa lead na malembe. Na bato baye bazali na quantite mingi ya lead na nzoto na bango, therapie ya Chelation ekosengama bazwa yango. Soki yo to ndeko na libota nayo azali na bobangi pona empoisonement ya lead, tuna munganga po na bilembo nango pe ndenge nini ya kosunga pe kosalisa.

Niveau ya risque

Na niveau ya se, lead na mabele ekoki kozala mwa malamu. Lead na mabele ekomaka mabe soki eleki mingi. **Lolenge moko ya koyeba quantite nini ya lead ezali na jardin nayo, ezali kosala test ya mabele.** Test ekolakisa yo quantite ya lead na mabele, ekopesa nombre ya PPMs ya lead na mabele nayo.

PPM ezali nini?

PPM elingi koloba biteni par millions. 100 ppm ya lead na mabele nayo eza lokola cent moko na $100.[1] Ezali quantite muke penza, kasi, **koleka 100 ppm na mabele nayo, ekobelisa yo![1]**

Risque ya muke	Na se ya 100 ppm	Mabele eza malamu.[3]
Risque ya moyen	100- 400 ppm	Lead ekozala malamu te po na sante nayo.[3]
Risque ya likolo	Koleka 400 ppm	Quantite ya lead na mabele nayo eza mabe mingi.[3]

Lead na mabele ya Portland

Agence ya Protection Environemental na ya mosolo ya boyekoli kobanda mbula ya 1999 ti na 2007 emonaki **ete moyenne ya quantite ya lead na mabele ya ba quartiers ya Bayside, Parkside na West End ezalaki 1086 ppm.** Echantillons ya mabele na ba quartiers oyo ezalaki entre 10 ppm ti koleka 25.000 ppm ya lead! Tester mabele nayo pona kozala sur jardin nayo eza malamu.

Po na information misusu:

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] Kids Healthy from Nemours, "Lead Poisoning," (https://kidshealth.org/en/parents/lead-poisoning.html).
[3] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).

Por que o Chumbo do Solo é Prejudicial

Intoxicação por Chumbo

A jardinagem ou plantio em solo com altos níveis de chumbo causa **intoxicação por chumbo**. Pequenas quantidades de chumbo entram no teu corpo quando você inspira poeira do solo contaminado por chumbo e come vegetais cobertos de poeira proveniente do solo sujo. O chumbo se acumula dentro do teu corpo durante meses e anos, e lentamente deixa você doente. Os piores efeitos da intoxicação por chumbo não ocorrem até que quantidades prejudiciais de chumbo já estejam dentro do teu corpo. Quando o chumbo já está dentro de você**,** é **difícil tira-lo do teu corpo**.[1] É por isso que é muito importante saber se existe chumbo no teu ambiente!

Efeitos a Longo Prazo da Intoxicação por chumbo

Cada parte do teu corpo é afetado pelo chumbo. Crianças menores de sete anos e mulheres grávidas correm maior risco. Nas crianças, a intoxicação por chumbo pode causar:[1]

- Problemas de comportamento e aprendizagem
- Problemas de audição
- Menor QI
- Crescimento lento

Durante a gravidez, o chumbo impede o bebê de se desenvolver adequadamente e pode causar o aborto.[1] Em todos os adultos, a intoxicação por chumbo causa problemas no coração, nos rins, e no sistema reprodutivo.[1]

Tratamento da Intoxicação por Chumbo proveniente de Solos Sujos[2]

O primeiro passo para tratar a intoxicação por chumbo é parar o contato com o solo sujo, a fim de impedir que o chumbo entre no teu corpo. Uma dieta saudável com alimentos ricos em ferro e cálcio ajuda o teu corpo a processar e remover o chumbo lentamente. Nos casos em que as pessoas têm grandes quantidades de chumbo em seus corpos, pode ser recomendada a terapia quelante. Se você ou um membro da família estiverem preocupados com a intoxicação por chumbo, pergunte a um médico sobre os sintomas e possíveis opções de tratamento.

Nível de Risco

Em níveis baixos, o chumbo no solo pode ser perfeitamente seguro. O chumbo no solo se torna inseguro quando existe em demasia. **A única maneira de saber quanto chumbo existe no solo do teu jardim é fazer um teste de solo.** O teste indicará a quantidade de chumbo que existe no teu solo, fornecendo o número de PPMs de chumbo no teu solo.

O que é PPM?

PPM significa partes por milhão. 100 ppm de chumbo no teu solo é o mesmo que um centavo em $100.[1] É um número muito pequeno, entretanto, **mais de 100 ppm no teu solo vai fazer você ficar doente![1]**

Baixo Risco	Menos de 100 ppm	O teu solo é seguro![3]
Risco Moderado	100 a 400 ppm	O chumbo no teu solo poderia ser um risco para tua saúde.[3]
Alto Risco	Mais de 400 ppm	A quantidade de chumbo no teu solo é perigosa.[3]

Chumbo nos Solos de Portland

Um estudo financiado por uma Agência de Proteção Ambiental de 1999 a 2007 descobriu que a quantidade média de chumbo no solo nos bairros **Bayside, Parkside, e West End era de 1086 ppm**. As amostras do solo desses bairros variaram de 10 ppm a mais de 25.000 ppm de chumbo! Teste o teu solo para garantir que o teu jardim esteja seguro.

Para obter mais informações:

[1] EPA, "Learn about Lead" (https://www.epa.gov/lead/learn-about-lead).
[2] Kids Healthy from Nemours, "Lead Poisoning," (https://kidshealth.org/en/parents/lead-poisoning.html).
[3] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).

What can you do?

Test your soil!

The first step towards safe garden soils is to **take a soil test**! Whether you are just beginning to start a garden or you have been gardening for years, it is important to know if there is harmful lead in your soil.

University of Maine's Soil Testing Service

If you are interested in a soil test, you can request a free soil test kit (with instructions) online via the University of Maine's Soil Testing Service. The Standard Soil Test costs $18 and will tell you if your soil has high levels of lead, in addition to basic information about nutrients and the general qualities of your soil.

For a limited time through the fall of 2020, the Cumberland County Soil and Water Conservation District will provide a free soil test to anyone living in Portland neighborhoods identified with potentially high levels of lead in their soil. The high-risk neighborhoods include *Bayside, East Bayside, Park Side, and West End*.

- Sign up for a FREE soil test at https://tinyurl.com/FREESoilTest
- For more information, please contact us at lheinlein@cumberlandswcd.org or (207) 892-4700

For people living outside of these neighborhoods, free tests may be provided if additional funds become available.

Safe Soils Action Plan

Low Risk Soils

Low Risk soils contain **less than 100 ppm** of lead. This amount of lead safe and natural![1] No action is needed.

Moderate Risk Soils

Moderate Risk garden soils contain **between 100 and 400 ppm** of lead. It is OK to garden in moderate risk soils, but you need to be careful! When you garden, you unintentionally consume small amounts of soil that stick to the vegetables, your hands, and everything you touch. Follow these steps to keep you safe from lead poisoning.[1]

1. Wash your hands and gardening clothes very well. Wash your clothes directly after touching your soil.
2. Wash everything grown in your garden thoroughly to remove *all* dirt. If the soil is difficult to remove, peel the vegetable or remove areas with dirt. Remove the outside layers of vegetable like cabbage and lettuce.
3. Add compost to your soil before planting to naturally lower the amount of harmful lead in your soil.
4. Avoid planting leafy vegetables and root vegetables. Plants that grow in soil with high levels of lead store a lot of lead in their roots and a little bit of lead in their leaves, but do not store lead in the fruit. Try growing plants that produce fruit, such as tomatoes! (See backside for what plants are safe to grow)
5. Consider building a raised bed to fully protect you and your family from the lead in your soil.

High Risk Soils

High Risk garden soils contain **more than 400 ppm** of lead and are unsafe to directly garden in. Protect yourself from the lead in your garden soil with the following steps as well as the recommendations listed above.[1]

1. Limit your contact with the dirty soil.
   - Leave shoes at the door to prevent bringing dirty soil into your home
   - Wash hands, toys, and other objects that are used daily to remove small bits of soil and dust
   - Provide alternate places for kids to play (a sandbox, a public playground)
   - Cover soil with at least 6 inches of mulch or other soft material
   - Discourage eating the soil
2. Build a raised bed and fill it with clean soil to grow your plants in. (Turn the page to learn how!)

How to build a raised bed[2]

Raised beds (or garden boxes) are **the best way to garden safely** in soils with moderate (100 to 400 ppm) or high (above 400 ppm) levels of lead. A raised bed creates a barrier between the dirty soil in the ground and clean soil in the box, keeping your plants safe from the lead in the soil.

Step 1. Build the box frame.

Use clean, untreated, rot-resistance woods (such as Cedar). Do not use wood that was treated with chemicals (called "pressure treated wood") or old painted wood. The box should be between 12 and 24 inches tall (depending on what you grow) and can be any size. If your wood isn't rot-resistant, cover the inside of the box with heavy duty plastic.

Step 2. Add a barrier.

To protect the soil in the box and your unsafe garden soil from mixing, you need to add a barrier. You can do this with landscape fabric, wire mesh, or by covering the bottom of your raised bed with cardboard.

Step 3. Put down your box frame.

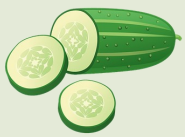
Step 4. Fill your box with soil and compost

Fill the box with nutrient-rich soil and compost. Using compost keeps your soil healthy and will naturally absorb lead that may enter your raised bed garden.

Step 5. Maintain your raised bed.

Choosing the right plants[1]

Safe Plants



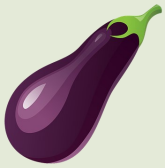
Cucumbers

Tomatoes

Peppers

Corn

Pumpkin & Squash



Eggplant

Berries

Apples

Unsafe Plants

Turnips

Onions

Beets

Potatoes & Yams

Lettuce & Cabbage

Carrots & Parsnip

Spinach

Kale

For more information:

[1] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).
[2] Lowe's, "How to Build a Raised Garden Bed," (https://www.lowes.com/n/how-to/how-to-build-a-raised-garden-bed).
[3] EPA, "Lead Poisoning And Your Children," (https://www.epa.gov/sites/production/files/2018-02/documents/epa_lead_brochure-posterlayout_508.pdf).
[4] EPA, "Fighting Lead Poisoning with a Healthy Diet," (https://www.epa.gov/sites/production/files/2019-10/documents/fight_lead_poisoning_with_a_healthy_diet_2019.pdf).

ماذا الذي تستطيع القيام به؟

اختبر التربة الخاصة بك!

الخطوة الأولى نحو تربة الحدائق الآمنة هي **إجراء اختبار للتربة !** سواء كنت قد بدأت للتو في بدء حديقة أو كنت تعمل في البستنة لسنوات ، فمن المهم معرفة ما إذا كان هناك الرصاص الضار في التربة الخاصة بك.

خدمة اختبار التربة من جامعة مين (University of Maine)

اذا لديك الرغبة لاختبار التربة, ، فيمكنك طلب عدة الاختبار التربة مجانًا)مع التعليمات (عبر الإنترنت من خلال خدمة اختبار التربة بجامعة مين. يكلف اختبار التربة القياسي 18 دولارً ا و سيخبرك ما إذا كانت التربة بها مستويات عالية من الرصاص ، بالإضافة إلى المعلومات الأساسية حول العناصر الغذائية والصفات العامة للتربة.

لفترة محدودة حتى خريف عام 2020 ، ستوفر مقاطعة كمبرلاند للتربة ومنطقة الحفاظ على المياه اختبارًا مجانيًا للتربة لأي شخص يعيش في أحياء بورتلاند المحددة بمستويات عالية من الرصاص المحتمل في التربة. تشمل الأحياء عالية المخاطر منطقة Bayside, East Bayside, Park Side, وال West End.

- قم بالتسجيل في اختبار التربة المجاني على https://tinyurl.com/FREESoilTest
- لمزيد من المعلومات ، يرجى الاتصال بنا على: 4700 - 892 - 207 أو lheinlein@cumberlandswcd.org

بالنسبة للأشخاص الذين يعيشون خارج هذه الأحياء ، قد يتم تقديم اختبارات مجانية في حالة توفر أموال إضافية.

خطة عمل التربة الآمنة

التربة المنخفضة من المخاطر ◆

تحتوي التربة منخفضة المخاطر على أقل من 100 جزء في المليون من الرصاص. هذه الكمية من الرصاص آمنة وطبيعية! مطلوب أي إجراء.

التربة معتدلة المخاطر ◆ ◆

تحتوي تربات الحدائق ذات المخاطر المتوسطة على ما بين 100 و 400 جزء في المليون من الرصاص. لا بأس العمل في التربة ذات المخاطر المعتدلة ، ولكن يجب أن تكون حذرًا! عندما تقوم بالعمل في الحديقة ، فإنك تستهلك عن غير قصد كميات صغيرة من التربة التي تلتصق بالخضروات ويديك وكل ما تلمسه. اتبع هذه الخطوات لحمايتك من التسمم بالرصاص:

١. اغسل يديك وملابس الحدائق جيدًا. اغسل ملابسك مباشرة بعد لمس التربة
٢. اغسل كل ما يزرع في حديقتك جيدًا لإزالة جميع الأوساخ. إذا كانت التربة صعبة الإزالة ، قشر الخضروات أو أزل المناطق التي بها أوساخ. إزالة الطبقات الخارجية من الخضار مثل الملفوف والخس.
٣. أضف السماد إلى التربة قبل الزراعة لتقليل كمية الرصاص الضارة في التربة بشكل طبيعي.
٤. تجنب زراعة الخضار الورقية والخضروات الجذرية. تخزن النباتات التي تنمو في التربة بمستويات عالية من الرصاص الكثير من الرصاص في جذورها وقليلاً من الرصاص في أوراقها ، ولكنها لا تخزن الرصاص في الفاكهة. جرب زراعة النباتات التي تنتج الفاكهة مثل الطماطم! (انظر إلى المؤخر لمعرفة ما هي النباتات الآمنة للنمو)
٥. يجب أن تفكر في بناء سرير مرتفع لحمايتك وحماية أسرتك من الرصاص في تربتك.

التربة عالية المخاطر ◆ ◆ ◆

تحتوي تربات الحدائق عالية المخاطر على أكثر من 400 جزء في المليون (PPM)من الرصاص وهي غير آمنة للحديقة مباشرة. احمي نفسك من الرصاص في تربة حديقتك من خلال الخطوات التالية بالإضافة إلى التوصيات المذكورة أعلاه.[1]

١. قلل من تلامس التربة المتسخة.
- اترك الأحذية عند الباب لمنع دخول التربة المتسخة إلى منزلك.
- اغسل اليدين والألعاب والأشياء الأخرى المستخدمة يوميًا لإزالة قطع صغيرة من التربة والغبار.
- وفير أماكن بديلة للأطفال للعب (صندوق رمل ، منتزه عام).
- تغطية التربة بما لا يقل عن 6 بوصات من المهاد أو غيرها من المواد اللينة.
- تثبيط أكل التربة.

٢. قم ببناء سرير مرتفع واملأه بتربة نظيفة لتنمو نباتاتك فيه.)اقلب الصفحة لتتعلم كيف!

كيفية بناء سرير مرتفع[2]

تعتبر الأسرة المرتفعة (أو صناديق الحدائق) **أفضل طريقة لممارسة الزراعة بأمان** في التربة ذات مستويات معتدلة (100 إلى 400 PPM)أو عالية (فوق 400 PPM)من الرصاص. يخلق السرير المرتفع حاجزًا بين التربة المتسخة في الأرض والتربة النظيفة في الصندوق ، مما يحافظ على نباتاتك آمنة من الرصاص في التربة.

الخطوة الاولى: قم ببناء إطار الصندوق

استخدم أخشابًا نظيفة وغير معالجة ومقاومة للعفن)مثل خشب الأرز(. لا تستخدم الخشب المعالج بالمواد الكيميائية (يسمى "الخشب المعالج بالضغط"(أو الخشب المطلي القديم. يجب أن يتراوح طول الصندوق بين 12 و 24 بوصة) حسب ما يزرع في التربة(ويمكن أن يكون بأي حجم.

الخطوة الثانية: اضف الحاجز

ماية التربة في الصندوق وتربة حديقتك غير الآمنة من الاختلاط ، تحتاج إلى إضافة حاجز. يمكنك القيام بذلك باستخدام نسيج أرضي أو شبكة سلكية أو من خلال تغطية الجزء السفلي من سريرك المرتفع بالكرتون.

الخطوة الثالثة: ضع إطار الصندوق الخاص بك.

الخطوة الرابعة: املأ الصندوق بالتربة والسماد

املأ الصندوق بالتربة الغنية بالمغذيات والسماد. يحافظ استخدام السماد العضوي على التربة صحية ويمتص بشكل طبيعي الرصاص الذي قد يدخل إلى حديقتك المرتفعة.

الخطوة الخامسة: حافظ على سريرك المرتفع

اختيار النباتات الصحيحة[1]

النباتات الغير آمنة

النباتات الآمنة

للمزيد من المعلومات, قم بزيارة المواقع الاتية :

[1] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).
[2] Lowe's, "How to Build a Raised Garden Bed," (https://www.lowes.com/n/how-to/how-to-build-a-raised-garden-bed).
[3] EPA, "Lead Poisoning And Your Children," (https://www.epa.gov/sites/production/files/2018-02/documents/epa_lead_brochure-posterlayout_508.pdf).
[4] EPA, "Fighting Lead Poisoning with a Healthy Diet," (https://www.epa.gov/sites/production/files/2019-10/documents/fight_lead_poisoning_with_a_healthy_diet_2019.pdf).

Que pouvez-vous faire?

Analysez votre sol!

La première étape vers le sol de jardin sûr, **c'est l'analyse de sol!** C'est important de savoir s'il y a du plomb dangereux dans votre sol, si vous démarrez un jardin ou si vous faisiez du jardinage depuis des années.

l'Université du Maine offert le service de l'analyse de sol

Si vous vous intéressez au analyse de sol, vous pouvez demander une trousse d'analyse de sol gratuit (avec des instructions) en ligne par le *Soil Testing Service* (service de l'analyse de sol) de l'Université du Maine. *Le Standard Soil Test* (l'analyse de sol standard) coûte $18 et vous dira si votre sol contient des niveaux élevés de plomb, aussi que des informations fondamentals des nutriments et qualités générales de votre sol.

D'ici automne 2020, le *Cumberland County Soil and Water Conservation District* fournira des analyses de sol gratuit aux personnes demeurant dans les quartiers de Portland qui ont des niveaux potentiellement élevés de plomb dans le sol. Ces quartiers de risque élevé inclure *Bayside, East Bayside, Park Side, et West End.*

- Inscrivez-vous pour un analyse GRATUIT https://tinyurl.com/FREESoilTest
- Pour plus d'information, contactez-nous s'il vous plaît à lheinlein@cumberlandswcd.org ou (207) 892-4700

Pour des personnes qui habitent hors de ces quartiers, des analyses gratuits peut être fournis si nous obtenons des fonds additionnels.

Plan d'action des sols sûrs

Sols de faible risque

Les sols de faible risque contient **moins de 100 ppm de plomb.** Ce niveau de plomb est sûr et naturel.[1] Aucune action est nécessaire.

Sols de risque modéré

Les sols de jardin avec un risque modéré contient **entre 100 et 400 ppm de plomb**. Vous pouvez jardiner dans les sols de risque modéré, mais soyez prudent! Quand on fait du jardinage, on consomme involontairement des traces de sol qui collent à des légumes, les mains, et tout ce qu'on touche. Suivez ces étapes pour vous protéger de l'empoisonnement de plomb.[1]

1. Lavez bien les mains et les vêtements de jardinage. Lavez les vêtements directement après le contact avec le sol.
2. Lavez à fond tout ce qui pousse dans votre jardin pour enlever tout le sol. Si c'est difficile d'enlever le sol, epluchez le légume ou couper les parties avec du sol. Enlevez la couche extérieure des légumes comme le chou et la salade.
3. Ajoutez du compost à votre sol avant de planter, pour baisser naturellement la quantité de plomb nocif.
4. Évitez de planter des légumes à feuilles et des légumes-racines. Des plantes qui pousse dans les sols avec des quantités de plomb élevés emmagasinent beaucoup de plomb dans les racines et un peu de plomb dans les feuilles, mais elles n'emmagasinent pas de plomb dans les fruits. Essayez de cultiver des plantes qui produisent des fruits, comme des tomates! (Pour une liste des plantes sûr à cultiver, voir au verso)
5. Considérez un jardin surélevé pour protéger complètement vous et votre famille de plomb nocif dans le sol.

Sols de risque élevé

Les sols de risque élevé **contient plus de 400 ppm de plomb** et il est dangereux de faire du jardinage là-dedans. Protégez-vous contre le plomb dans le sol de jardin avec les étapes suivants aussi que les recommandations énumérés ci-dessus.[1]

1. Limitez votre contact avec le sol contaminé
   - Laissez les chaussures à l'entrée pour qu'on n'introduise pas de sol contaminé dans la maison
   - Lavez les mains, les jouets, et des autres objets utilisés souvent pour enlever des traces de sol et de poussière
   - Fournissez des endroits alternatives pour les enfants de jouer (un bac à sable, un terrain de jeu publique)
   - Couvrez le sol avec au moins de 6 pouces de paillis ou un autre matériau doux
   - Ne mangez pas le sol
2. Construisez un jardin surélevé et le remplissez avec de sol propre pour cultiver vos plantes.

Comment construire un jardin surélevé[2]

Un jardin surélevé (ou parterre surélevé) c'est **le method le plus** sûr de faire du jardinage dans les sol avec un niveau de plomb modéré (100 à 400 ppm) ou un niveau de plomb élevé (plus de 400 ppm). Un jardin surélevé crée un barrière entre le sol contaminé du terre, et le sol propre dans la boîte, ce qui protège vos plantes du plomb dans le sol.

Étape 1. Construire le châssis

Utilisez des bois propres, non traités, et résistants à la pourriture comme du cèdre. N'utilisez ni du bois traité par les produits chimiques (ce qu'on appelle "bois traité sous pression") ni du vieux bois peint. La boîte devrait mesurer entre 12 et 24 pouces de hauteur (selon les plantes qu'on cultive) n'importe les dimensions. Si le bois n'est pas résistant à la pourriture, couvrez l'intérieur de la boîte avec de plastique ultra résistant.

Étape 2. Préparez l'endroit

Enlevez les 2-3 pouces supérieurs du sol de jardin originel à l'endroit de votre jardin surélevé. Utilisez le châssis pour mesurer la zone correcte.

Étape 3. Ajoutez une barrière

Pour prévenir le mélange du sol dans la boîte avec le sol de jardin dangereux, il faut ajouter une barrière. On peut utiliser un géotextile d'aménagement paysager, un treillis métallique, ou du carton placé au fond du jardin surélevé.

Étape 4. Posez le châssis sur terre (ou sur la barrière).

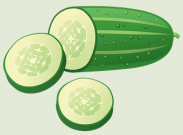
Étape 5. Remplissez la boîte avec du sol et compost

Remplissez la boîte avec du sol et du compost riche en nutriments. Le compost aide à garder le sol sain, et il absorbe naturellement le plomb qui peut entrer dans votre jardin surélevé.

Étape 6. Entretenez bien le jardin surélevé

Choisissez les bonnes plantes[1]

Plantes sûres



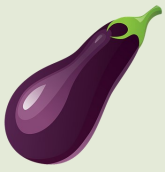
Les concombres

Les tomates

Les poivrons

Le maïs

Les citrouilles et les courges



Les aubergines

Les baies

Les pommes

Plantes peu sûres

Les navets

Les oignons

Les betteraves

Les patates et les ignames

La laitue et le chou

Les carottes et les panais

L'épinard

, Le chou kale

For more information:

[1] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).
[2] Lowe's, "How to Build a Raised Garden Bed," (https://www.lowes.com/n/how-to/how-to-build-a-raised-garden-bed).
[3] EPA, "Lead Poisoning And Your Children," (https://www.epa.gov/sites/production/files/2018-02/documents/epa_lead_brochure-posterlayout_508.pdf).
[4] EPA, "Fighting Lead Poisoning with a Healthy Diet," (https://www.epa.gov/sites/production/files/2019-10/documents/fight_lead_poisoning_with_a_healthy_diet_2019.pdf).

Prepared by Cumberland County Soil & Water Conservation District | (207) 892-4700 | www.cumberlandswcd.org
March | 2020

Eloko nini okosala?

Tester mabele nayo!

Eloko ya liboso ya kosala pona mabele ya jardin ezala malamu, **ezali ko tester mabele!** Ezala ebandeli po nayo kosala jardin to osala yango ba mbula na ba mbula, ezali malamu mingi koyeba soki eloko mabe eza na mabele nayo te.

Service ya test ya mabele ya Universite ya Maine

Soki ozali koluka test ya mabele, okoki kosenga packet ya test ya mabele pe okofuta te (pe mode d'emploi) na website ya universite ya Maine's Soil Testing na internet. Test ya mabele normal ezali $18, ekolakisa yo soki mabele nayo eza na niveau ya lead ya likolo, pe information mosusu de base pona bileyi na qualite generale ya mabele nayo.

Po na tango muke na saison ya Automne 2020, District ya Conservation ya mabele na mayi ya Cumberland County akopesa test ya mabele ofele na mutu nyonso avandaka na ba quartiers Nzinga Nzinga ya Portland oyo bakoyebana baza na niveau ya likolo ya lead na mabele nabango. Ba quartiers ya niveau ya risqué ya likolo kati nango, Bayside,East Bayside,Parkside na West End.

- Bomikomisa po na test ofele ya mabele na website oyo: https://tinyurl.com/FREESoilTest
- Pona information misusu, bo contacter biso na: lhein@Cumberlandswcd.org to na numero oyo: (207)892-4700

Po na baye bavandi libanda ya ba quartiers oyo, bakozwa ba tests ofele tango mosolo mosusu ekomonana.

Plan ya Action ya Mabele Malamu

Mabele ya Risque Muke

Mabele ya risque muke **ezali na 100 ppm** ya lead. Quantite oyo ya lead malamu pe naturel,.[1]

Risque Moyen (modere) ya Mabele

Risque moyen ya mabele ya jardin **ezali entre 100 ppm na 400 ppm** ya lead. Okoki kolona na jardin ya risque moyen, kasi zala ekenge tango ozali kolona na jardin, okoki ko consommer mwa quantite ya mabele oyo ekangama na ba legumes sans que oyeba, pe na maboko nayo na eloko nyonso okosimba. Landa ba etapes oyo pona komibatela na poison ya lead.[1]

1. Sokola maboko pe bilamba ya jardinage malamu. Sokola bilamba nayo mbala moko na sima ya kosimba mabele.
2. Sokola biloko nyonso ekoli na na mabele nayo malamu po na kolongola bosoto nyonso. Soki mabele ezali pasi kolongola, longola poso na ba legumes to longola esika ezali na bosoto. Longola poso ya libanda lokola oyo ya choux to salade. Add compost to your soil before planting to naturally lower the amount of harmful lead in your soil.
3. Bakisa angrais chimique na mabele nayo liboso olona pona kokitisa naturellement quantite ya lead mabe na mabele nayo.
4. Kolona legumes ya kasa na legumes ya racines te. Plantes oyo ekolaka na mabele ya niveau ya likolo ya lead ezalaka na lead mingi na racines na ndambu na kasa na yango, kasi lead ezalaka na mbuma te. Meka kolona plantes nyonso eza na mbuma, ndakisa tomates. (Tala na sima ya page po na plantes nini ezali malamu kolona) Consider building a raised bed to fully protect you and your family from the lead in your soil.
5. Meka kotonga mabele ya kotombwama lokola mbetu mwa likolo pona komibatela pe kobatela libota nayo mosika ya lead na mabele nayo

Mabele ya Risque ya Likolo

Jardin ya mabele ya risque ya **likolo eza na 400 ppm** ya lead koleka pe mabe mingi kolona na kati. Mibatela mosika na lead kati ya mabele ya jardin nayo na kolanda ba etapes pe mibeko ekomami na se.[1]

1. Zala mosika na contact na mabele ya bosoto.
    - Tika sapatu na porte pona kokebisa kokotisa mabele ya bosoto na ndako nayo
    - Sokola maboko, jouets pe biloko misusu oyo osalelaka mikolo nyonso pona kolongola mwa mabele pe poussiere
    - Luka bisika mususu po na bana kosakana (court de recreation)
    - Zipa mabele na 10 pouces ya pailles (matiti ya kokawuka) to eloko mosusu ya makasi te.
    - Pekisa koliya mabele
2. Build a raised bed and fill it with clean soil to grow your plants in. (Turn the page to learn how!)

Ndenge ya kotonga mabele ya kotombwama[2]

Mabele ya kotombwama (to boite ya jardin) ezali **facon malamu ya kosala jardinage na mabele** ya lead moyen (100 a 400 ppm) to ya niveau ya likolo(koleka 400 ppm) ya lead. Boite ya jardin ekotiya barriere entre mabele ya bosoto na se pe na mabele kitoko na boite, ekobatela ba plantes to biloko nayo ozali kolona mosika ya lead kati ya mabele.

Etape 1. Tonga cadre ya boite.

Salela mabaya malamu oyo eliyamaka na ba nyama te, lokola Cedar (bois de Cedre na francais). Kosalela mabaya oyo ya ba produits chimiques (na francais babengi bois traites sous pression) to mabaya bapakola langi kala. Boite esengeli ezala na mesure entre 12 na 24 pouces na molayi (ekolandana na oyo olingi kolona), pe ekoki kozala monene nyonso. Soki mabaya nayo ezali oyo eliyamaka na ba nyama, zipa kati na boite na plastique ya misala makasi.

Etape 2. Kolengela esika.

Longola 2 a 3 pouces ya mabele na likolo ya jardin nayo ya liboso na esika nayo ya mabele ya kotombwama. Salela cadre ya boite pona koyeba esika.

Etape 3. Bakisa barrage.

Po na kobatela mabele na boite pe mabele na jardin nayo ya mabele mabe po esangana te, osengeli kobakisa barrage. Okoki kosalela elamba ya landscape (treillis metallique na francais) to kozipa nse ya boite ya jardin na carton.

Etape 4. Kitisa cadre ya boite.

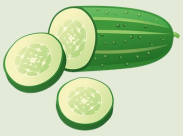
Etape 5. Tondisa boite na mabele pe angrais chimique.

Tondisa boite na bileyi malamu ya mabele pe angrais chimique. Kosalela angrais chimique ekosalisa mabele nayo ezala malamu pe na bokono te. Pe ekomela naturellement lead oyo ekokaki kokota na jardin ya mabele ya kotombwama.

Etape 6. Kobatela mabele ya kotombwama.

Kopona ba plantes malamu [1]

Plantes ya Malamu



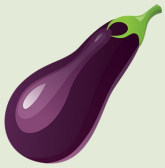
Concombres

Tomates

Poivrons

Masango

Courge



Solo

Fruits lokola fraises

Pommes

Plantes ya Malamu Te

Ognons & Matungulu

Navets

Betteraves

Pommes de terress

Salade & Choux

Carottes & Panais

Epinards

Choux Fries

Po na information misusu:

[1] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).
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O que você pode fazer?

Teste o teu solo!

O primeiro passo para garantir que os solos de jardim sejam seguros, é **fazer um teste de solo**! Quer você esteja apenas começando a implementação de um jardim ou já tens feito trabalhos de jardinagem há anos, é importante saber se existe chumbo prejudicial no teu solo.

Serviço de Teste de solo da Universidade de Maine

Se você estiver interessado em um teste de solo, podes solicitar um kit de teste de solo gratuito (com instruções) online através do Serviço de Teste de Solo da Universidade de Maine. O teste de solo tem um custo padrão de 18 dolares e informa-o se o teu solo tem níveis elevados de chumbo, além de informações básicas sobre nutrientes e as qualidades gerais do teu solo.

Por um tempo limitado até o outono de 2020, o (Cumberland County Soil and Water Conservation District) Distrito de Conservação de Solo e Água do Condado de Cumberland providenciará testes gratuito de solo para qualquer pessoa que resida nos bairros de Portland e identificado como tendo níveis altos de chumbo no seu solo. Os bairros de alto risco incluem *Bayside, East Bayside, Park Side, e West End*.

- Inscreva-se para um teste de solo GRATUITO em https://tinyurl.com/FREESoilTest
- Para obter mais informações, por favor contacte-nos em lheinlein@cumberlandswcd.org ou (207) 892-4700

Para pessoas que moram fora desses bairros, testes gratuitos podem ser providenciados se fundos adicionais estiverem disponíveis.

Plano de Ação Para Solos Seguros

Solos de Baixo Risco

Os solos de baixo risco contêm **menos de 100 ppm de chumbo**. Essa quantidade de chumbo é segura e natural![1] Não é necessária nenhuma ação.

Solos de Risco Moderado

Os solos de jardim de risco moderado contêm **entre 100 e 400 ppm** de chumbo. Não há problema em cultivar em solos de risco moderado, mas você precisa ter cuidado! Porque, quando você cuida do jardim, consomes involuntariamente pequenas quantidades de solo que ficam nos vegetais, nas tuas mãos, e em tudo o que você toca. Siga estes passos para mantê-lo protegido da intoxicação por chumbo.[1]

1. Lave bem as mãos e as roupas de jardinagem. Lave tuas roupas logo após tocar o solo.
2. Lave tudo o que for cultivado no teu jardim para remover *toda* a sujeira. Se o solo for difícil de remover, descasque o vegetal ou remova as áreas com sujeira. Retire as camadas externas de vegetais, como repolho e alface.
3. Adicione adubo ao solo antes de plantar para reduzir naturalmente a quantidade de chumbo prejudicial no solo.
4. Evite plantar vegetais folhosos e vegetais de raiz. As plantas que crescem no solo com altos níveis de chumbo armazenam muito chumbo em suas raízes e um pouco de chumbo em suas folhas, mas não armazenam chumbo nas frutas. Tente cultivar plantas que produzam frutas, como tomates! (Veja no verso as plantas que são seguras para cultivar).
5. Considere construir um canteiro para proteger completamente você e a tua família do chumbo tóxico no teu solo.

Solos de Alto Risco

Os solos de jardim de alto risco contêm **mais de 400 ppm** de chumbo e não são seguros para jardinagem directa. Proteja-se do chumbo no solo do teu jardim com os passos a seguir e também com as recomendações listadas acima.[1]

1. Limite teu contato com o solo sujo.
   - Deixe os sapatos na porta para evitar transportar solo sujo para dentro da tua casa
   - Lave as mãos, brinquedos e outros objetos usados diariamente para remover pequenos pedaços de solo e poeira
   - Providencie locais alternativos para as crianças brincarem (uma caixa de areia, um parque público)
   - Cubra o solo com pelo menos 15 cm de palha ou outro material macio
   - Desencoraje a tendência de comer ou mastigar (areia) solo
2. Construa um canteiro para jardinagem e encha-a com solo limpo para cultivar tuas plantas. (Vire a página para aprender como!)

Como construir um canteiro para jardinagem[2]

Canteiros elevados (ou caixas de jardim) é **a melhor maneira para cultivar com** segurança em solos com níveis moderados (100 a 400 ppm) ou altos (acima de 400 ppm) de chumbo. Um canteiro cria uma barreira entre o solo sujo no terreno e o solo limpo na caixa, mantendo suas plantas protegidas do chumbo no solo.

Passo 1. Construa a moldura da caixa.

Use madeira limpa, não tratada e resistente à podridão (como o Cedro). Não use madeira que foi tratada com produtos químicos (chamada "pressure treated wood") ou madeira velha pintada. A caixa deve ter entre 31 e 61 cm de altura (dependendo do que você cultiva) e pode ter qualquer tamanho. Se a tua madeira não for resistente à podridão, cubra a parte interna da caixa com plástico resistente.

Passo 2. Prepare o local.

Retire 5 a 8 cm da superficie superior do solo original do teu jardim no local da implementação do teu canteiro. Use a moldura da caixa para estimar a área.

Passo 3. Adicione uma barriera.

Para impedir que o solo na caixa e o solo inseguro do teu jardim se misturem, você precisa adicionar uma barreira. Você pode fazer isso com tecido, malha de arame ou cobrindo o fundo do teu canteiro com papelão.

Passo 4. Coloque a moldura da caixa no local.

Passo 5. Encha a caixa com terra e adubo

Encha a caixa com solo rico em nutrientes e adubo. Utilizar adubo mantém teu solo saudável e absorverá naturalmente o chumbo que porventura entrar no teu canteiro elevado

Passo 6. Mantenha o teu canteiro.

Escolha as plantas certas[1]

Plantas Seguras

Pepinos

Tomates

Pimentos

Milho

Abóbora

Berinjela

Bagas

Maçãs

Plantas Inseguras

Nabos

Cebolas

Beterraba

Batatas e Inhames

Alface e repolho

Cenouras & Pastinaga

Espinafre

Couve

Para obter mais informações:

[1] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).
[2] Lowe's, "How to Build a Raised Garden Bed," (https://www.lowes.com/n/how-to/how-to-build-a-raised-garden-bed).
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Elaborado pelo Cumberland County Soil & Water Conservation District | (207) 892-4700 | www.cumberlandswcd.org
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Get your soil tested for FREE!

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Teste seu solo GRATUITAMENTE!

Votre sol est-il sûr pour le jardinage?
Faites tester votre sol GRATUITEMENT!

Soki mabele ya bilanga na yo ezali malamu te?
Tokoki kosunga kotalela yo yango ya ofele!

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Seu solo pode ter uma quantidade perigosa de chumbo. Estamos oferecendo testes de solo gratuitos para jardineiros e pessoas interessadas em jardinagem em East Bayside, Bayside, Parkside e West End.

Votre sol peut contenir une quantité dangereuse de plomb. Nous offrons des analyses de sol gratuites aux jardiniers et aux personnes intéressées par le jardinage à East Bayside, Bayside, Parkside et West End.

Mabele na yo ekoki kozala na quantite to montant ya dangereux (mabe mingi) ya lead. Tozali kopesa tests ya mabele ofele po na mutu nyonso aza na jardin pe na oyo nyonso azali interesse na jardinage na East Bayside, Bayside, Parkside, pe na West End.

ميكن أن تحتوي التربة على كيمة خطيرة من الرصاص .حنن نقدم اتخبارات التربة المجانية للبستانيين والأشخاص المهتمين ابلبستنة في East Bayside وParkside وBayside وWest End.

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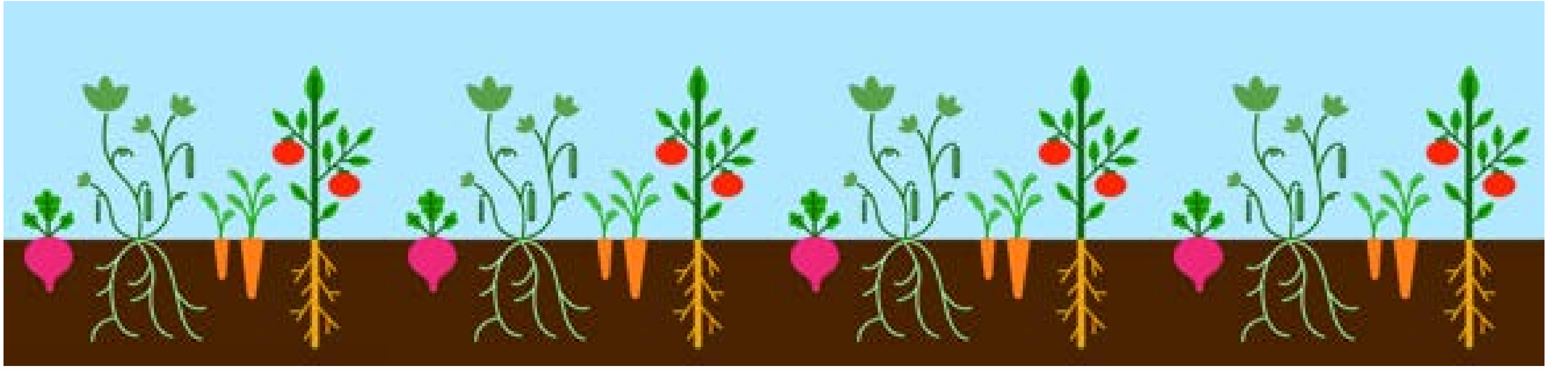

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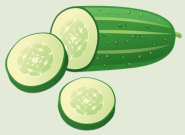
Safe Plants

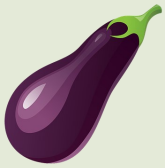

Cucumbers


Tomatoes


Peppers


Corn


Pumpkin & Squash


Eggplant


Berries


Apples

Unsafe Plants


Turnips


Onions


Beets


Potatoes & Yams


Lettuce & Cabbage


Carrots & Parsnip


Spinach


Kale

For more information:

[1] EPA, "Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soil," (https://semspub.epa.gov/work/HQ/174577.pdf).
[2] Lowe's, "How to Build a Raised Garden Bed," (https://www.lowes.com/n/how-to/how-to-build-a-raised-garden-bed).
[3] EPA, "Lead Poisoning And Your Children," (https://www.epa.gov/sites/production/files/2018-02/documents/epa_lead_brochure-posterlayout_508.pdf).
[4] EPA, "Fighting Lead Poisoning with a Healthy Diet," (https://www.epa.gov/sites/production/files/2019-10/documents/fight_lead_poisoning_with_a_healthy_diet_2019.pdf).

Prepared by Cumberland County Soil & Water Conservation District | (207) 892-4700 | www.cumberlandswcd.org
March | 2020

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QUALITY ASSURANCE PROJECT PLAN (QAPP)

Updated 3/24/2020

Project: Soil Lead Testing & Outreach to Home Gardeners in Portland, Maine

EPA Grant #: 00A00649

Awarded: 9/25/2019

A. Quality Assurance Project Plan Acceptance

The following shall be signed and dated by all project principals as well as all sampling staff.

Title: USEPA Region 1 EPA Healthy Communities Grant Manager Name (printed): Robert Guillemin Signature: Robert Guillemin	Date: 5/8/20
Title: USEPA Region 1 EPA QA Chemist Name (printed): Nora J. Conlon, Ph.D. Signature:	Date:
Title: Cumberland County Soil & Water Conservation District Grant Manager Name Damon Yakovleff Signature:	Date: 5/1/20
Title: Cumberland County Soil & Water Conservation District Project Manager Name (printed): Jenna Martyn-Fisher Signature:	Date: 5/1/20
Title: Cumberland County Soil & Water Conservation District Sampling Staff Name (printed): Laura Heinlein Signature:	Date: 5/1/20

B. Background

USEPA Administrative Order 5360.1 requires that "*all projects involving environmental monitoring performed by or for the USEPA shall not be undertaken without a Quality Assurance Project Plan (QAPP)*".

The purpose of this document is to describe the process used to identify, perform, and manage soil samples collection during this project, as well as quality assurance goals and methods, ensuring that the project will meet or exceed USEPA requirements for quality assurance.

C. Project Information

The Cumberland County Soil and Water Conservation District (CCSWCD) is performing this project through a grant issued on September 25, 2019 by the USEPA Region 1 through its 2019 Healthy Communities Grant.

Portland, Maine has a growing interest in local food production. However, there is a general lack of awareness by home gardeners that their urban garden soil may be contaminated with lead: according to a recent survey conducted by the District, few home gardeners have tested their soil for lead. Further, over 70% of respondents said they have no knowledge of which plants should not be grown in soil that contains low levels of lead.

Soil lead levels have been documented as extremely elevated in lower-income areas of Maine's largest city, where communities of New Immigrants make up large proportions of the population. For perspective, concentrations greater than 100 ppm are considered by some regional workgroups to be a reason for concern, and a lead concentration of more than 400 ppm in waste qualifies it as hazardous by the USEPA. The *average* soil lead concentration in all neighborhoods in a recent study was over 1,300 ppm with a maximum of 25,100 ppm, demonstrating the need for further work in these areas. The project addresses this environmental and public health problem of lead exposure through cultivation and consumption of vegetables grown in contaminated soil.

Through year one of this project, CCSWCD will perform soil sampling in home gardens in four specific neighborhoods. Home gardeners, including New Immigrant families, will be informed about the levels of lead present in these garden soils and will be provided with information about whether these levels are: too high for any vegetable production; suitable for productions of certain vegetables only; or safe for any vegetables. This will reduce the target population's lead exposure.

During the end of project Year 1 and through project Year 2, follow up plant tissue sampling will be conducted on up to 30 sites with the highest levels of soil contamination. Two samples will be taken: One prior to any mitigation effort, and one sample subsequent to implementation of best management practices in an implementation action plan.

D. Sampling Overview

District staff will collect soil samples from home gardens and other residential areas, as described in Section E, below. A target of 120 soils samples will be collected in Year 1.

At the end of Year 1 and during Year 2, up to 60 plant tissue samples (2 samples at up to 30 sites) will be collected of plants cultivated for culinary use. The plant tissue sampled will be the components consumed directly (i.e the fruit of a tomato plant rather than leaves).

To the greatest extent possible, same-species will be collected in Year 1 and Year 2 unless not possible due to guidelines in action plans to shift protection to more lead-safe species.

E. Locations

Sampling will be performed at residential properties in four targeted neighborhoods in Portland: East Bayside, Bayside, Parkside, and the West End.

Residential properties in this project will include areas with high accessibility to sensitive populations, and include properties containing single and multi-family dwellings, apartment complexes, vacant lots in residential areas, schools, day-care centers, community centers, playgrounds, parks, green ways, and any other areas where children may be exposed to site-related contaminated media.

Site data will be collected and recorded in a tracking sheet, which will include:

Contact Name
Contact Email
Contact Phone
Neighborhood
Address
Building Year Constructed
Number of Children under 6
Food Production? (y/n)
Major Crop Types
Garden Layout (raised bed, etc.)
Sample Date
Sample ID
Lead Level
Results Delivered?
Action Plan Delivered?
Follow up tissue sample date
Tissue Sample Type
Tissue Sample Result
Follow-up Tissue
Sample Date
Follow-up Tissue Sample Type
Follow-up Tissue Sample Result
Notes

In addition, all relevant information will be recorded in the UMaine Soil Test Lab fillable form.

Sample ID will be generated using the following formula:

- 1st Letter of Sample Neighborhood: (E)ast Bayside, (B)ayside, (P)arkside, (W)est End, (O)ther
- First 3 letters of street name
- Street Number
- Sample A, B, C, D, etc. from same parcel

F. Sampling Methods and Decontamination

With respect to risk assessment, the top six inches of soil best represent exposure to contaminants from gardening and agriculture, so this depth will be the focus of sampling efforts. This sample will be collected with either a disposable sample scoop (made of a non-reactive material) or a stainless-steel scoop that was decontaminated prior to mobilizing and has been stored and packaged in a way to prevent cross-contamination.

A five-point composite surface soil sample should be collected from any portion within the 0- to 6-inch depth interval in order to fill the sample container. Composite samples will consist of discrete aliquots of equal amounts of soil. The soil from each aliquot will be composited in a stainless-steel bowl that was decontaminated prior to mobilizing and has been stored and packaged in a way to prevent cross-

contamination. Samples will not be sieved. Each sample container will be labeled with a unique identification number, the collection date, and the sampler's initials and placed in a gallon-sized zippered plastic bag. Samples will be stored in a secure area until such time as they are shipped to the analytical laboratory. Sample shipments will include a chain-of-custody and be sealed with a custody seal.

Plant tissue samples submitted for analysis will triple rinsed on site with distilled water using a stainless steel colander, dried with paper towel, placed in a sealed paper bag, and promptly shipped to the analytical laboratory via first class mail.

Used sample equipment will be placed in a zippered plastic bag and/or a trash bag and sealed completely until such time as decontamination or disposal can occur.

G. Analytical Methods and Reporting Limits

Soil samples collected by CCSWCD staff will be analyzed by the University of Maine Analytical Lab and Maine Soil Testing Service ("the laboratory"; also known as MAFES) at no cost to participants. This laboratory has a detailed "*Quality Assurance Plan for MAFES Analytical Laboratory*", most recently updated October 2016, which is included as ***Attachment A*** to this document and is at available at:

https://umaine.edu/soiltestinglab/wp-content/uploads/sites/227/2016/10/anlab-qaplan.pdf

The laboratory will use a standard test (Modified Morgan) on all soil samples, method 207.0. For all samples that flag as positive for presence of lead above approximately 50 mg/kg threshold, the lab will repeat analyses with a more rigorous nitric acid extraction test. The method is described in the laboratory SOP as "comparable to EPA 3050 or EPA 3051". This method is described as more accurate than method 3050 (see Chanet et. al., 1984), has a confirmed 90-110% lead recovery, and a minimum detection limit of 0.1 mg/kg. Lead values above 50 mg/kg will be reported, rounded to the nearest ten. For more information see ***Attachment B***, *"Total Lead Estimated by Nitric Acid Extraction".*

For plant tissue samples, the lab will use EPA Acid Digestion Method 3051, the "Dry Ash Mineral Analysis Method", to conduct analysis for lead. Lead concentration will be reported in mg/kg with a limit of 1 mg/kg. See **Attachment C** "*Dry Ash Mineral Analysis Method*" for more information.

H. Equipment and Supplies

Equipment that will be used to perform surface soil sampling may include but are not limited to:

- Maps of neighborhood;
- Personal Protective Equipment (PPE), including:
  - Nitrile gloves of multiple sizes.
  - Protective eyewear.
- Tyvek booties (optional, depending on sample location and visibility)
- Survey equipment or global positioning system (GPS) device;
- Survey flags;
- Digital camera;
- Decontaminated stainless steel bowl
- Decontaminated stainless steel colander
- Decontaminated (or disposable) sample scoop (stainless steel or inert material);
- Soil sample containers provided by the analytical laboratory;
- Zippered plastic bags;
- Logbook or sample form;

- Labels;
- Chain of Custody records forms; and
- Custody seals

I. Resident Notification

Once soil test results have been received from MAFES, District staff will contact the individual listed for each soil test. The District will inform the individual about the level of lead in the soil, give recommendations regarding possible next steps and best gardening practices to safely utilize the soil, and provide resources about how to implement the recommended action plan.

For those sites with the highest levels of lead in their soil, a detailed action plan will be provided. This "second phase" of the project will include a target of 30 individual sites. The action plan will detail measures which can be taken to reduce the impacts of lead exposure through home gardening. Project partners, including the City of Portland, will provide additional resources for mitigation.

In addition to providing support to implement the action plan, the project will also include performance of lead tests on plant tissue samples. The District will reach out to the contact people for top thirty soil lead concentrations once all soil lead tests have been collected and processed.

J. Quality Control

No specific quality assurance (QA) activities will apply to the implementation of this project, i.e., no duplicates or matrix spikes will be collected. However, all data must be documented on field data sheets or within site logbooks including the official Maine Soil Test Lab data collection sheet.

K. References

1. Standard Operating Procedure 4230.l9A. "Soil Sampling at Lead-Contaminated Residential Sites". July 3, 2007
2. Chaney, R.L., S.B. Sterrett and H.W. Mielke. 1984. The potential for heavy metal exposure from urban gardens and soils In J.R. Preer (ed.) Proc. Symp. Heavy Metals in Urban Gardens. Univ. Dist. Columbia Extension Service, Washington, DC. pp 37-84

L. Attachments

A: "Quality Assurance Plan for MAFES Analytical Laboratory"

B: MAFES Analytical Laboratory SOP "Total Lead Estimated by Nitric Acid Extraction".

C: MAFES Analytical Laboratory SOP "Dry Ash Mineral Analysis Method"

ATTACHMENT A

University of Maine
Agricultural & Forestry Experiment Station
Analytical Laboratory
Quality Control/Quality Assurance Plan

Last update: 10/20/16

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Quality Assurance Project Plan Identification

Document Title: Quality Assurance Plan for MAFES Analytical Laboratory

Organization Title:	MAFES Analytical Laboratory
Address:	Analytical Lab 5722 Deering Hall University of Maine Orono ME 04469-5722
Responsible Official:	Bruce Hoskins Assistant Scientist/Supervisor 207-581-2945
Q. A. Officers:	Suzanne Perron Assistant Chemist/Supervisor 207-581-2917
	Bruce Hoskins Assistant Scientist/Supervisor 207-581-2945

Plan Coverage: This document describes the quality control measures to be followed by the MAFES Analytical Laboratory (Analytical Lab). The quality control measures will apply to all analytical data measurements run on regulated materials for the purpose of environmental monitoring.

Table of Contents

1.0 Introduction

This plan is intended to provide a formal guideline to ensure accurate and precise analytical results generated by the MAFES Analytical Laboratory. The primary function of the Analytical Lab is the analysis of horticultural and agricultural-related products such as soils, plants, feed, compost, manure, and other waste samples for nutrient content. Environmental and nutrient management rules require monitoring of many of these materials for potentially toxic or environmentally sensitive elements. A quality assurance/quality control program is essential to ensuring accuracy and precision in environmental analysis. The outlined quality control measures are primarily directed toward environmental and regulated materials analysis, but the applicable techniques for ensuring accurate and precise results will also be applied towards general nutrient analysis for horticultural and agricultural applications.

2.0 Program Description

2.1 General description

The Analytical Lab is the general service lab of the Maine Agriculture & Forestry Experiment Station and is administratively within the Department of Plant, Soil, and Environmental Sciences, at The University of Maine. The Analytical Lab exists to serve the needs of research programs at the University of Maine, the agricultural/horticultural community, and any other government agency, company, or individual with regard to chemical analysis of soil, water, plants, feed, and waste materials such as manure, sewage sludge, and processing waste. Interpretation of soil fertility and plant tissue test results is provided. Recommendations for soil and foliar amendments are made in conjunction with the University of Maine Cooperative Extension, where appropriate. General consultations on test results and testing methods are provided upon request.

2.2 Intended use of data

Data generated at the Analytical Lab is intended to determine the quality of soil and waste products for use in plant growth or crop production, to determine the nutrition of plants, and to assess whether soil or waste materials could pose a hazard to plants, animals, humans, or the environment.

3.0 Program Organization and Responsibility

3.1 Program organization and line of authority

Organization of Analytical Lab is presented below with the highest level of responsibility being represented at the top of the diagram.

Laboratory Organization:

Laboratory Director:	M. Susan Erich, Ph.D.
Assistant Chemist/Supervisor:	Suzanne Perron
Assistant Scientist/Supervisor:	Bruce Hoskins
IT Specialist:	G. Dixon
Scientific Technician:	J. Elmer
Scientific Technician:	A. Hilton
Scientific Technician:	K. Lesniewicz
Scientific Technician:	K. Senter

3.2 Identification of key QA personnel

Both Laboratory Supervisors function as Quality Control Officers within the laboratory and are responsible for ensuring that the data produced by the technicians meet the specified QA/QC plan.

4.0 Quality Assurance Objectives

4.1 Precision and accuracy for each parameter

General data quality objectives for accuracy and precision for all analytes are listed in appendix 17.1.

Specific data quality objectives for accuracy and precision for each method are listed within individual method SOP's, appearing in appendix 17.2.

4.2 Data quality objectives

The basic quality assurance objectives are to produce accurate and precise analytical results. Each client will ensure that their sampling techniques will yield results that are representative of the system being measured.

5.0 Sampling Procedures

5.1 Techniques or guidelines used to select sites

Guidelines used to select sites are determined by clients.

5.2 Specific procedures to be used

Specific sampling procedures used are determined by clients. These will vary with the type of material and specific objectives. It is the responsibility of the client

to ensure proper sampling of materials submitted to Analytical Lab, which must be addressed within each client's respective Quality Assurance Project Plan.

5.3 Charts, diagrams or tables of sampling operations

Sampling operations are performed by clients and should be addressed in their respective Quality Assurance Project Plans.

5.4 Containers and tools

The Analytical Lab provides cardboard sample containers for soil samples only. These are available at any county office of Cooperative Extension or by request on the lab's web site: http://anlab.umesci.maine.edu. Sample container recommendations are as follows:

A. Manure, sludge, processing waste - sealed pint or quart plastic container.
B. Compost - sealed plastic gallon bag.
C. Soil sampling for nutrients or metals - avoid galvanized or brass tools or containers. Use steel, stainless steel or plastic tools and buckets. Use cardboard or plastic shipping containers.

5.5 Sampling equipment and container preparation

The choice, decontamination, and proper use of sampling equipment and container preparation is the responsibility of the client and should be addressed in their respective Quality Assurance Project Plans.

5.6 Sample preservation and holding times prior to delivery

A. Manure, sludge, processing waste: keep cool at 4^{o}C or frozen at -18 ^{o}C
B. Compost: keep cool at 4 ^{o}C.
C. Soil nitrate analysis: deliver to the lab or completely dry on the same day sampled.
D. Nitrate, ammonium, or orthophosphate in undried samples: keep cool at 4 ^{o}C and deliver to the lab within 24 hours or freeze at -18 ^{o}C and deliver to the lab frozen.

5.7 Chain-of-Custody procedures

The chain-of-custody is initiated by the client. If the client does not have access to chain-of-custody forms, the general Analysis Request form for the Analytical Lab may be used. Analysis Request/COC forms may be downloaded from the lab's website: http://anlab.umesci.maine.edu. All chain-of-custody samples will be received by a Supervisor. Chain-of-custody form(s) will be stored with the Analysis Request form in 407 Deering.

5.8 Record keeping (forms, notebooks and documentation procedures)

The client is responsible for record keeping concerning sampling.

6.0 Sample Custody

6.1 Field sampling documentation

Sample custody during field operations is the responsibility of each client and should be addressed in their respective Quality Assurance Project Plans.

6.2 Laboratory operations

6.2.1 Sample rejection criteria

Upon arrival at the laboratory, the samples are checked for appropriate appearance. Any apparent problems will be documented. If a problem appears to exist, the client will be contacted before the samples are analyzed. The laboratory retains the right to reject any sample that, in the opinion of a QA officer, has not been properly handled prior to arrival at the laboratory or may contain substances harmful to laboratory personnel.

6.2.2 Monitoring of sample holding times

A computerized sample-tracking database is maintained for all samples submitted to the laboratory, containing the date the samples are received, the analysis requested, the expected date of completion, and the date the analysis was actually completed. Sample holding times can be determined from the “date received” in the computer record and recorded on the Analysis Request form, stored in 407 Deering.

6.2.3 Identification of sample custodian

Each of the Supervisors functions as a sample custodian. An available Supervisor will log in the sample(s). After sample archival times are exceeded, samples are disposed of with the approval of one of the Supervisors.

6.2.4 Sample custody log

Upon arrival at the laboratory the sample(s) should be accompanied by an Analysis Request form, which will be stored in a notebook (along with any chain-of-custody form or other documentation) in 407 Deering. A parallel record is kept in a computerized sample-tracking database. The Analysis Request form and database contain the client's name, client's sample identification, date received, assigned laboratory job number, laboratory analyses to be performed, report date, and billing information. All identification and sample collection information provided with

the sample will be kept in the notebook.

7.0 Calibration / Standardization Procedures and Frequency

Instrument calibration will be completed with each batch of analyses following the instrument manufacturers' recommended procedures. The number and concentration of standards for each parameter is specified within each method SOP, in Appendix 17.2. Calibrated instrument response will be checked by running a QCCS a minimum of every 10 samples. Control limits are 90 - 110 % recovery of known content for all analytes. On QC failure, the instrument will be recalibrated and all samples rerun since the last QCCS in control.

Calibration standards will be prepared whenever possible in the same matrix as the prepared samples.

8.0 Analytical Procedures

8.1 Method reference

Analytical procedures will follow published and approved methodologies. Method references are listed at the end of each SOP, appearing in Appendix 17.2. Methods are adapted from EPA, AOAC, USDA-NRCS, Standard Methods for the Analysis of Water & Wastewater (SM), Test Methods for the Evaluation of Composting and Compost (TMECC), Recommended Methods for Manure Analysis, and regional plant and soil testing methods manuals. Methods are periodically reviewed by Supervisors, with any changes documented within the written SOP.

8.2 List of MDL's

The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. It is statistically determined as 3 times the standard deviation of at least 10 repeat measurements of a method blank or matrix blank. Method detection limits are specific to calibration standard concentrations and the sample matrix and are given within each SOP, appearing in Appendix 17.2.

9.0 Data Reduction, Validation and Reporting

9.1 Data reduction scheme

The data reduction scheme depends on the analytical procedure. Final results for sample pH or EC are read directly from the calibrated meter. Data output from

combustion analysis is reported directly as the final concentration for each sample.

Data generated from solution analysis on ICP, IC, or ion analyzer are output as concentrations in the analyzed solution. Further calculations to factor in any blank correction and extraction/digestion dilution factor are completed by a Supervisor.

For other analyses, which do not compute final concentrations, measured values, such as titration volumes, are used by a Supervisor to calculate final reported values.

9.2 Example equation used to calculate concentrations

For solution analysis:

Final sample conc = (measured soln conc - reagent blank conc) * (dilution factor)

For additional equations, refer to individual method SOP's in appendix 17.2.

9.3 Data validation criteria

Data validation and integrity during sample collection are the responsibility of the client and should be addressed in their respective Quality Assurance Project Plans.

Analytical data will be assessed for precision within each batch of samples run, by replicating ten percent of all samples run for each parameter, unless otherwise specified in method SOP. Replicate percent differences (RPD's) will be calculated for each replicated analysis. Control limits on replicated samples will be 10 % RPD, unless concentration is < 2 x MDL or otherwise specified in Appendix 17.1 or in the method SOP.

Precision will also be assessed by repeat measurement of internal reference samples, run with each batch of samples. Results from ongoing reference sample analysis will be compared using quality control charts and appropriate statistical analyses. Precision control limits will be the mean +/- 3 SD based on a population of at least 20 data points. The mean and standard deviation will be recalculated with every batch of samples.

Data accuracy will be assessed by running at least one internal reference and/or one SRM (standard reference material) with every batch of samples. Percent recoveries of known content will be calculated for SRM's. Control limits will be 90 - 110 % recovery of known content for all analytes, unless otherwise specified in Appendix 17.1 or in the method SOP. Accuracy control limits for internal reference samples will be 90 - 110 % recovery of statistical mean content for all analytes. Means will be based on a population of at least 20 data points, recalculated with every batch of samples.

Any data exceeding control limits will initiate corrective action outline in

section 14.0.

9.4 Identification and treatment of outliers

Outliers will be determined according to the criteria listed in section 9.3. Samples in analysis runs containing outliers will be reanalyzed. The analyst will try to determine the cause of the outlier prior to reanalysis.

9.5 Data flow on reporting scheme

The laboratory file server is divided into several subdirectories, specific to each analytical process, which are archived at the end of each working day. Titration, EC, and miscellaneous pH data will be recorded by the technician on laboratory data sheets and in the appropriate spreadsheet or database on the server. Soil pH and all sample weights are computer-captured and automatically stored in the appropriate database or spreadsheet on the server. Data output from ICP, IC, combustion analysis, and ion analyzer is generated in batch files by each operating system. These batch files are also stored in the appropriate subdirectory on the server. All data are referenced to analytical job number and by sample ID or lab number.

All reports are generated, validated, and reviewed by one of the Supervisors before being sent to the client. Data accuracy and analytical precision are checked based on reference sample and replicate analysis, respectively. Related parameters are cross-checked to further validate results. Any potential problems will be checked before the analytical results are released. A paper copy of the report will be held in the files for five years. Electronic copies of all reports will be held for five years or longer, as space permits.

10.0 Internal Laboratory QC Checks and Frequency

10.1 Quality control charts

Quality control data will be kept for routinely analyzed parameters on internal reference samples and SRM's. Individual analyses of reference samples will be plotted on quality control charts versus the cumulative mean and two and three times the standard deviation.

10.2 Blanks

A calibration blank is an aqueous solution that is as free of analyte as possible. It is prepared in the same matrix used in the preparation of calibration solution(s). The calibration blank is used to give the null reading for the instrument response versus concentration on the calibration curve. One calibration blank should be analyzed as part of each calibration procedure, where normal sample concentration range approaches MDL.

A reagent blank is an aqueous solution that is as free of analyte as possible and contains all the reagents used in processing the samples. The reagent blank must be carried through the complete sample preparation procedure and contains the same reagent concentrations in the final solution as in the sample solution used for analysis. The reagent blank is used to document and correct for any systematic contamination from reagents, containers, or the lab environment in the preparation or processing of the samples. Two reagent blanks should be prepared for every sample batch or for every 20 samples, whichever is more frequent, unless otherwise specified in method SOP.

10.3 Reference samples

To verify extraction or digestion efficiency, a standard reference material (SRM) will be analyzed with every batch of 20 samples, where an appropriate material exists. Accuracy will be documented as percent recovery of known or guaranteed content for each parameter.

Where no SRM is available, an internal reference samples will be carried through the digestion or extraction procedure with every batch of 20 samples. Accuracy will be documented as percent recovery of statistical average content for each parameter. Where possible, internal reference sample content will be validated by parallel analysis with one or more SRM's for all parameters.

Repeat analysis of an internal reference material is also used to document precision. Cumulative mean and standard deviation statistics are generated to document long-term method precision. The data will be documented on quality control charts for each parameter.

10.4 Duplicate or replicate analysis

A duplicate sample analysis will also be performed with every sample batch or every 10 samples, unless otherwise specified in method SOP. Precision data will be documented as replicate percent difference (RPD) for each parameter.

10.5 Matrix spike

A matrix spike is employed to provide a measure of bias for the method used within a given matrix. A matrix spike analysis is performed by adding a predetermined quantity of stock solutions of certain analytes to a duplicate sample matrix prior to sample extraction/digestion and analysis. Where required, a matrix spike sample will be analyzed with every batch or every 20 samples, whichever is more frequent.

10.6 Matrix spike duplicates

When required, a duplicate of the matrix spike sample will be analyzed with the matrix spike sample, if a matrix spike is required.

10.7 Quality control check samples

A quality control check sample (QCCS) is a sample prepared from an independent standard at a concentration within the calibration range. An independent standard is defined as a standard derived from a different source than that used in the preparation of calibration standards. QCCS solutions can be purchased ready-made from several suppliers. A QCCS is intended as an independent check of technique, methodology, and standards and should be run with every solution analysis batch.

10.8 Calibration standards

Calibration standards will be prepared according to instrument manufacturer's suggested guidelines. Two-point calibrations are used for ICP analysis. Multi-point calibrations are used for IC, ion analyzer, and combustion analysis. Standards will be checked against previous standards and validated by running a QCCS. If QCCS analysis does not meet 90 - 110% recovery control limit for any analyte, the calibration standards will be remade. The standard curve and instrument response will be verified by analysis of at least one calibration standard or QCCS every 10 samples.

For matrices other than water, matrix-matched calibration standards shall be used.

10.9 Reagent checks

Reagents used in sample and calibration standard preparation shall be verified as free of analyte (below MDL) by analysis of the reagent blanks. If one or more analytes are consistently detectable in the reagent blanks and the source cannot be eliminated, the average reagent blank content is subtracted from each of the samples run in the same batch with the blank(s). This will correct for any systematic error, due to reagent content of each analyte.

10.10 Blind field spikes and duplicates

Blind field spike and duplicates are the responsibility of the client and should be addressed in their respective Quality Assurance Project Plans.

11.0 Performance and System Audits

11.1 Schedule

The Analytical lab participates quarterly in the North American Proficiency Testing (NAPT) program for soil fertility analysis, soil metals analysis, and plant nutrient analysis. The Analytical lab also participates three times annually in the Compost Analysis Proficiency (CAP) program and annually in the Manure Analysis

Proficiency (MAP) program.

System audits will be carried out by the Supervisors upon repeated QC failure of any method, to evaluate relevant components of the laboratory QA/QC system.

12.0 Equipment

12.1 Decontamination of equipment

All labware used for digestion, extraction, or solution storage is processed for decontamination between each use. All containers are rinsed with deionized water after use and any adhering particulates or colloid are removed by scrubbing with a laboratory detergent and tap water. All containers, stoppers, and caps are then soaked in 0.2 % $AlCl_3.6H_2O$ cleaning solution overnight to desorb any adhering ions. All labware is then rinsed 3 times with deionized water. Open containers are then allowed to dry upside down on a plastic drying rack and then stored in a closed cupboard. Capped or stoppered containers are filled with deionized water and stored full after sealing. Containers which are filled with deionized water before storage are emptied and shaken out just before use.

For equipment used in low-level determinations of Al or Cl, substitute 5 % HNO_3 as a decontaminating solution, to avoid possible labware contamination with these elements.

12.2 QC Monitoring (Temperatures, etc.)

Drying oven temperatures will be monitored daily

The conductivity of the deionized water supply is checked continuously by the deionizing system. Deionized water is not dispensed to storage carboys unless resistance reading is > 17 megaohms. If resistance reading repeatedly drops below 17 megaohms, ion exchange cartridges are replaced.

12.3 Preventive maintenance schedule, procedures, and logs

Preventive maintenance scheduling and procedures will be completed according to manufacturers' recommendations. Routine instrument problems can be corrected by the technician in most cases. Any serious or repeated equipment failure will be reported to the Supervisors.

12.4 Critical components

The analytical capabilities of the MAFES Analytical Laboratory include:

Thermo-Jarrell Ash model IRIS 1000 dual-view ICP-OES

Thermo Electron model iCAP 6300 ICP-OES
Dionex model ICS-1000 Ion Chromatagraph
LECO Tru-Mac Carbon/Nitrogen combustion analyzer
OI Analytic dual-channel automated Flow Injection Analyzer
Lachat QuikChem 8000 automated Flow Injection Analyzer
Perkin-Elmer FIMS-100 mercury analyzer
Labfit AS-300 automated pH analyzer
AIM-600 Automated Block Digestion System
CEM MDS-2100 Microwave digestion system
Barnstead/Thermolyne E-pure water deionizer
Miscellaneous equipment including pH and EC meters, dispensers, balances, drying ovens, muffle furnaces, grinders, shakers, sievers, etc.

13.0 Assessment Procedures for Data Acceptability

13.1 Precision acceptance limits

Data will be assessed for precision each day or after each run. Ten percent of all parameter analyses for samples requiring EPA QA/QC protocols will be replicated for precision evaluation. Precision control limit will be 10-20 % RPD for all parameters above 2 x MDL. A general listing of precision control limits by parameter appears in Appendix 17.1 and specifically by method in Appendix 17.2.

Precision will also be assessed daily by running an internal reference sample with each batch or every 20 samples, whichever is fewer. The results will be compared using quality control charts and appropriate statistical analyses. The precision control limits will be mean +/- 3 SD based on a population of at least 20 data points. Warning limits, indicating a possible emerging problem, will be mean +/- 2 SD. The mean and standard deviation will be recalculated daily or after every 10 new data points.

13.2 Accuracy acceptance limits

Data accuracy will be assessed daily or after each run. At least one SRM (where available) or internal reference sample will be analyzed with every batch of samples or every 20, whichever is fewer. Results will be compared to known content for SRM's or cumulative mean values for internal reference samples. Percent recovery will be calculated for SRM's or internal reference samples. The control limits for reference samples recovery will be +/- 10-20 % of known or mean content. A general listing of accuracy control limits by parameter appears in Appendix 17.1 and specifically by method in Appendix 17.2.

Data accuracy will also be evaluated, where required, by running a spiked sample and a spike duplicate with every batch or every 20 samples, whichever is fewer. Percent recovery will be calculated for spiked samples, with a control limit of 90-110 %

of known addition.

Any data exceeding control limits will initiate corrective action outlined in Section 14.0.

14.0 Corrective Action

14.1 Limits

Corrective actions will be initiated according to the following criteria: (1) daily data assessment found to be beyond control limits as stated in Section 13.1; (2) unacceptable results on performance evaluation or system audits; (3) unacceptable results on interlaboratory comparison studies or proficiency sample analysis.

14.2 Procedures

Corrective action will be initiated by the analyst. The analyst will identify and define the problem. The analyst, with a Supervisor if necessary, will then investigate and determine the cause of the problem. The analyst, with a Supervisor if necessary, will then determine a corrective action to eliminate the problem and implement the corrective action. The analyst and a Supervisor will evaluate the effectiveness of the corrective action and verify that the corrective action has eliminated the problem.

Corrective actions will be initiated by the analyst in the following sequence: 1) Determine if the instrument is functioning properly (for example: proper flow of gases and/or solutions, proper function of sample introduction system). Recalibrate the instrument and reanalyze QCCS and reference sample(s). 2) Remake calibration standards and reanalyze QCCS and reference sample(s). 3) Re-extract or redigest the affected batch of samples and reference material(s) and reanalyze. If the analyst cannot determine the reason for unacceptable results, he/she will obtain the aid of a Supervisor.

14.3 Identification of responsible person

The analyst will initiate corrective actions. A Supervisor will ensure all corrective actions have been implemented and were effective, during the data validation process prior to report generation.

15.0 Quality Assurance Reports to Management

15.1 Schedule

All QA/QC problems which develop will be reported to a Supervisor.

16.0 List of Recipients of Quality Assurance Plan

- Laboratory Director
- Analytical lab Staff
- Any client requesting a copy of the Quality Assurance Plan

17.1 Appendix A - Quality Assurance Goals for Analytical Parameters

Analyte (method)	Method Reference	Precision	Accuracy
METALS			
Aluminum (ICP)	EPA 200.7	± 20%	± 20%
Arsenic (ICP)	EPA 200.7	± 10%	± 10%
Cadmium (ICP)	EPA 200.7	± 30%	± 10%
Chromium (ICP)	EPA 200.7	± 10%	± 10%
Cobalt (ICP)	EPA 200.7	± 10%	± 10%
Copper (ICP)	EPA 200.7	± 10%	± 10%
Iron (ICP)	EPA 200.7	± 10%	± 10%
Lead (ICP)	EPA 200.7	± 10%	± 10%
Mercury (AAS)	EPA 245.1	± 20%	± 10%
Manganese (ICP)	EPA 200.7	± 10%	± 10%
Molybdenum (ICP)	EPA 200.7	± 50%	± 10%
Nickel (ICP)	EPA 200.7	± 15%	± 10%

Selenium (ICP)	EPA 200.7	± 25%	± 10%
Silver (ICP)	EPA 200.7	± 25%	± 25%
Tin (ICP)	EPA 200.7	± 20%	± 20%
Titanium (ICP)	EPA 200.7	± 10%	± 10%
Vanadium (ICP)	EPA 200.7	± 10%	± 20%
Zinc (ICP)	EPA 200.7	± 15%	± 10%

Analyte (method)	Method Reference	Precision	Accuracy
MINERALS			
pH	SM 4500-H	± 10%	± 10%
Elec. Cond.	SM 2510A	± 10%	± 10%
Barium (ICP)	EPA 200.7	± 15%	± 10%
Beryllium (ICP)	EPA 200.7	± 15%	± 15%
Calcium (ICP)	EPA 200.7	± 10%	± 10%
Chloride (Ion chromatography)	SM 4500-Cl	± 15%	± 15%
Lanthanum (ICP)	EPA 200.7	± 15%	± 15%
Lithium (ICP)	EPA 200.7	± 15%	± 15%

Analyte (method)	Method Reference	Precision	Accuracy
Magnesium (ICP)	EPA 200.7	± 10%	± 10%
Potassium (ICP)	EPA 200.7	± 20%	± 20%
Sodium (ICP)	EPA 200.7	± 15%	± 15%
Total Alkalinity (Titrimetric)	SM 2320B	± 20%	± 20%
Total Solids (Gravimetric)	SM2540B	± 10%	± 10%
Total Volatile Solids (Gravimetric)	SM2540E	± 10%	± 10%

Analyte (method)	Method Reference	Precision	Accuracy
NUTRIENTS			
Ammonium N (Colorimetric)	SM 4500-NH3-G	± 10%	± 10%
Boron (ICP)	EPA 200.7	± 15%	± 15%
Total C (Combustion)	EPA 440.0	± 5%	± 10%
Nitrate (Colorimetric)	SM 4500-NO3-F	± 10%	± 10%
Total Kjeldahl N (Block digestion)	EPA 351.2	± 10%	± 10%
Total N (Combustion)	EPA 440.0	± 5%	± 10%
Orthophosphate (Colorimetric)	EPA 365.1	± 10%	± 10%

Total Phosphorus (ICP)	EPA 200.7	± 15%	± 15%
Sulfur (ICP)	EPA 200.7	± 15%	± 15%

17.2 Appendix B - Individual Method SOP's

Individual SOP’s for environmental sample analysis are available on request.

ATTACHMENT B

TOTAL LEAD ESTIMATED BY NITRIC ACID EXTRACTION

1.0 SCOPE AND APPLICATION

This method is used to estimate total labile lead content in soil.

2.0 SUMMARY OF METHOD

Soil samples are extracted in 1M nitric acid at room temperature for 1 hour, filtered, and the filtrate analyzed by ICP-OES. This method extracts about 95 % of total labile lead content in soil, as compared to EPA 3050 or EPA 3051.

3.0 INTERFERENCES

3.1 Spectral interferences are possible during solution analysis by ICP. Choice of appropriate wavelength and background correction for all elements is necessary to correct for any background enhancement or depression of emission intensity.

4.0 SAFETY

4.1 Gloves, goggles, and lab coat are required for this procedure.

4.2 Safety Data Sheets (SDS) are available in room 407 Deering to all laboratory personnel. The following reagents are potentially toxic or hazardous:

4.2.1 Nitric acid

5.0 EQUIPMENT AND SUPPLIES

5.1 Electronic balance, $\pm$ 0.01 g sensitivity

5.2 Adjustable bottle-mounted pump dispenser, 25 or 50 ml capacity

5.3 Adjustable pipettors, 5 ml and 1 ml capacity

5.4 Routine soil test extraction racks (12 x 50 ml Erlenmeyers)

5.5 Routine soil test filter racks (12 x 20 ml flared glass filter tubes)

5.6 Ahlstrom 642 – 9 cm folded filter paper

5.7 ICP-Optical Emission Spectrometer.

5.8 Operating fume hood

5.9 Volumetric flasks – 100ml, 200 ml, 1 liter

6.0 REAGENTS AND STANDARDS

6.1 Concentrated Nitric Acid – trace metal grade.

6.2 Certified Environmental Express Pb Stock solution (1000 mg/L). Dilute 1/10 w/ DI H_2O for 100 mg/L sub-stock.

6.3 Preparation of 1.0 M nitric acid (1L): in a fume hood, slowly add 63.3 ml concentrated (15.8M) nitric acid to 500 ml DI H_2O. Bring to 1L volume with DI H_2O.

6.4 Preparation of Calibration Standards

6.3.1 Low Cal Std (1 mg/L): add 2 ml 100 ppm sub-stock to 200 ml volumetric flask, bring to volume with DI H_2O.

6.3.2 High Cal Std (50 mg/L): add 1 ml 1000 ppm stock to 200 ml volumetric flask, bring to volume with DI H_2O.

6.5 Initial Calibration Verification (ICV) Solution (5 mg/L Pb): 1/10 dilution from 50 ppm SCP Science concentrate in DI H_2O.

7.0 SAMPLE COLLECTION, PRESERVATION AND STORAGE

7.1 Soil samples sent for routine fertility analysis are cataloged, air-dried and sieved 2 mm for routine analysis. Dried samples are stable in storage indefinitely.

8.0 QUALITY CONTROL AND QUALITY ASSURANCE

8.1 Replicate 1 sample in every 10 or 1/batch to document precision. Control limit = 5% RPD, except near MDL. Failure action: rerun all samples not bracketed with successful replicates.

8.2 Include 1/batch Certified Reference Material (ISE 921 River clay) to document recovery. Control limit = 80 – 110 % recovery.

8.3 Include 1/batch internal reference material to document precision from repeated measurements. Control limit = 90 – 110 % cumulative mean value from repeated measurements.

8.4 Include 2 Method Blanks/batch to document any contribution of reagents or extraction vessels. Subtract any average blank value above MDL from concentrations of unknowns in the run.

8.4 Run Calibration Verification solution ICV, after initial calibration, to verify calibration standards. Control limit = 95-105% recovery. Failure action: recalibrate instrument and recheck ICV. If failure continues, remake calibration standards.

8.5 Run low calibration standard as a continuing calibration verification (CCV) every 10 samples during solution analysis to monitor drift in instrument response. Control limit (forces recalibration and recheck) = 90 - 110 % recovery.

9.0 CALIBRATION / OPERATION

9.1 Calibrate instrument by running low and high calibration standards.

9.2 Run Calibration Verification solution ICV, after initial calibration, to verify calibration standards. Control limit = 95-105% recovery. Failure action: Recalibrate and restart run. If failure continues, remake calibration standards.

9.3 Run 10 unknowns. Recheck low standard CCV to verify stability. Control limit = 90-110 % recovery. Failure action: Recalibrate and rerun all samples since last check in control. On second failure, halt run and determine cause of QC failure.

9.4 At end of run, recheck both low and high calibration standards. Control limit = 90-110 % recovery. Failure action: Recalibrate and rerun all samples since last calibration check in control.

10.0 PROCEDURE

10.1 Weigh 2.0 (+/-0.02) gm dried and sieved soil into 50 ml erlenmeyer flask in routine soil test shaker rack.

10.3 Add 20 ml 1M nitric acid extraction solution, using a bottle dispenser.

10.4 Shake at 180 oscillations/minute for 60 minutes.

10.5 Gravity filter through Ahlstrom 642 paper.

10.6 Discard paper and soil. Load autosampler tubes with sample filtrates. If samples are to be held, cap with parafilm.

10.7 Analyze filtrates by ICP-OES. Output as mg/L in extract.

10.8 Dilute 1/10 any sample extract above 50 mg/L and rerun.

10.8 After data validation, discard samples into acid-waste container in Satellite Accumulation area.

11.0 DATA ANALYSIS, CALCULATIONS, AND REPORTING

11.1 Extractable Pb (mg/kg) = (Pb mg/L – Blk) x 10.

11.2 Use in-house developed regression to convert to EPA 3050 equivalent Pb

11.2.1 EPA 3050 Equivalent Pb = Extractable Pb (mg/kg) x 1.05 + 14.

11.3 Report Total Labile Lead Equivalent levels to nearest 10 mg/kg

11.3.1 MDL (solution basis) = 0.1 mg/L

11.3.2 Reporting limit: Report any value below MDL as “< 1.0 mg/kg”

12.0 REFERENCES

12.1 Chaney, R.L., S.B. Sterrett and H.W. Mielke. 1984. The potential for heavy metal exposure from urban gardens and soils *In* J.R. Preer (ed.) Proc. Symp. Heavy Metals in Urban Gardens. Univ. Dist. Columbia Extension Service, Washington, DC. pp 37-84

Dry Ash Mineral Analysis Method

1.0 SCOPE AND APPLICATION

Non-volatile nutrient content is determined by ashing plant tissue, compost, manure and sludge. Increasing detection limits (Cd, Pb) in some samples with higher sample weights than used in microwave digestion (EPA 3051).

2.0 SUMMARY OF METHOD

Oven-dried and ground material is ashed at 550 °C for 5 hr in a muffle furnace.
(450 °C for 5 hr, if Cd and/or Pb is to be determined)
Ash is cooled, dissolved in 50 % HCl on a hotplate, and brought to volume with DI H_2O.
Solution analysis is by plasma emission (ICP).

3.0 INTERFERENCES

3.1 This method is not suitable for volatile elements.

3.2 This method may not recover all of the zinc, copper, iron and manganese in plant material high in silica.

3.3 Spectral interferences are possible during solution analysis by ICP. Choice of appropriate wavelength and background correction for all elements is necessary to correct for any background enhancement or depression of emission intensity.

4.0 SAFETY

4.1 Normal protective clothing, hand, and eye protection are adequate for this procedure.

4.2 Material Safety Data Sheets (MSDS) are available in room 407 Deering to all laboratory personnel. The following reagents are potentially toxic or hazardous:

4.2.1 Hydrochloric acid

5.0 EQUIPMENT AND SUPPLIES

5.1 Electronic balance, $\pm$ 0.01 g sensitivity

5.2 Porcelain crucibles

5.3 Metal tongs

5.4 Hot plate

5.5 Muffle furnace

5.6 Volumetric flasks, 50 or 250 ml.

5.7 ICP-OES

6.0 REAGENTS AND STANDARDS

Specific standards depend on the sample type and method of analysis. The description given below is a general overview.

6.1 Hydrochloric acid, 70% and 50%

6.2.1 Primary Stock Solutions: purchased 1000 and 10000 ppm single element stock (Assurance, Spec Certiprep), and in-house stock (eg. 10000 ppm K, 19.070 g oven dried KCl/L, and 10000 ppm Ca, 24.93 g oven dried $CaCO_3$/L).

6.2.2 Secondary stock solns: 10, 100 and 1000 ppm standards prepared from primary stock in 3% HCl.

6.3 Low and high multi-element matrix matched (5 % HCl) calibration standards made from primary and secondary stock solutions. (Or matrix matched to other acids substituted for non-routine samples).

6.4 Quality Control Solution (QCALLHI): multi-element standard prepared from purchased stock (SCP Multi-element Standard)

7.0 SAMPLE HANDLING AND PREPARATION

7.1 Plant samples are dried to a constant weight in a 70 °C oven and ground in a Wiley mill with a 20 mesh screen (1 mm). Manures and composts are stored in a refrigerator (4°C) until processing.

8.0 QUALITY CONTROL AND QUALITY ASSURANCE

8.1 1/batch standard reference material comparable to sample type (i.e. orchard leaves, blueberry leaves, petiole, forage, etc) to document accuracy.
Control limit = 95 - 105 % recovery on any element

8.2 Replicate 1 in every 10 samples or 1/batch to document precision.
Control limit = 5 % RPD

8.3 Run QCCS (1/batch) to verify calibration standards. Control limit = 95 - 105 % recovery. Failure action: remake calibration standards and rerun samples.

8.4 Run internal reference QCCS (calibration std) every 10 samples during solution analysis to monitor instrument drift. Control limit = 95 - 105 % recovery (5 % drift maximum). Failure action: recalibrate instrument and reanalyze all samples since last successful QCCS check.

8.5 Run process blanks (2/batch) to quantify any systematic and significant contribution of apparatus, water, or reagents. Subtract mean blank values (above MDL) from solution concentrations of samples run in same batch.

9.0 CALIBRATION

9.0 Calibrate instrument by running low and high calibration standards.

9.1 Run low standard check or QCS to verify stability of response at low concentration. Control limit = 90-110 % recovery. Failure action: Recalibrate until control limit is met.

9.2 Run high standard check to verify stability of response at high concentration. Control limit = 90-110 % recovery. Failure action: Recalibrate until control limit is met.

9.3 Run applicable QCS (if not already run as low check) to validate calibration standards. Control limit = 90-110 % recovery. Failure action: Remake calibration standards and rerun.

9.4 Run 10 unknowns. Recheck low standard or QCS to verify stability. Control limit = 90-110 % recovery. Failure action: Recalibrate and rerun all samples since last check in control. On second failure, halt run and determine cause of QC failure.

9.5 At end of unknown run, recheck both low and high calibration standards. Control limit = 90-110 % recovery. Failure action: Recalibrate and rerun all samples since last calibration check in control.

10.0 PROCEDURE

10.1 Weigh an approximately 1.0 g dried, ground, homogenized plant material (approx. 20 g fresh weight for manure, compost and sludge) to nearest 0.01 g on an electronic balance and place in a porcelain crucible.

10.2 For liquid or semi-solid samples, dry at 100 °**C** in a forced-draft oven to a constant weight (record wet and dry weights in the database).

10.3 Place in a muffle furnace and ash at 550 °**C** for 5 hours.

10.3.1 If Cd and/or Pb are to be determined, ash at 450 °**C** for 5 hr to avoid possible volatilization loss.

10.4 Cool and wet ash with deionized water. Add 5ml, 50% HCL (25 ml for manure, compost and sludge), and fill crucibles ¾ full with ddH_2O. (Other acids/concentrations may be employed if more suitable for the specific analyte for non-routine samples)

10.5 Heat gently on a hotplate for about 30 min. If solution has evaporated re-fill crucibles to about ¾ full with ddH_2O. Turn off hotplate and let sample cool slowly while on the hot plate (~15 min).

10.6 Transfer digest solution to 50 ml volumetric flask (250 ml for manure, compost and sludge) and bring to volume with ddH_2O.

10.7 Transfer plant solutions to plastic bottles for storage until analysis. Manures, composts and sludge may remain in the volumetric flasks if analysis is to be performed within 48 hrs.

11.0 DATA ANALYSIS, CALCULATIONS, AND REPORTING

11.1 Raw data are converted by the ICP-OES operating system to solution concentration and are reported as mg/L or ppm. Plant and compost are reported on a dry weight basis and manures are reported on an as received basis.

11.2 Any solution concentrations above the high calibration standard will be diluted as needed with sample matrix and rerun.

11.3 Any solution concentration below MDL will be reported as less than the detection limit on a dry weight basis for plant material and compost or as received for manure samples = (MDL, ml/L x soln. volume, ml)/sample weight, g.

Method detection/reporting limits: MDL's depend on the analytical method and the dilution factor. The following is a general list of reporting limits:

Ca - 0.05 %
K - 0.07 %
Mg - 0.005 %
P - 0.01 %
B - 3 mg/kg
Cu - 0.5 mg/kg
Fe - 5 mg/kg
Mn - 1 mg/kg
Zn - 1 mg/kg
Cd - 1 mg/kg
Pb – 1 mg/kg

11.4 Solution data are converted to the appropriate basis as follows: mg/kg sample = (solution concentration, mg/L X volume)/ sample weight, g. To report the data as a percentage the sample concentration is divided by 10,000.

12.0 REFERENCES

"Methods manual for forest soil and plant analysis", Kalra & Maynard. Forestry Canada. Report NOR-X-319, 1991. p 101-103.

"Methods of Analysis for Soils, Plants, and Waters", Chapman & Pratt. University of California. 1961. p 60.

Miller, J.E., J.J. Hassett, and D.E. Koeppe, Interactions of Lead and Cadmium on Metal Uptake and Growth of Corn Plants, J. Environ. Qual., 6: 18-20 (1977)

"A Comparison of Four Digestion Procedures Not Reqiring Perchloric Acid for the Trace-Element Analysis of Plant Material" Land Reclamation Program, Argonne National Laboratory. ANL/LRP-TM-18.

Attachment C-16 Soil Systems and Fertility

Soil Systems and Fertility

Type: Program Development, Education Campaign

Implementation Time: 2-8 months

Goal: To discourage the excessive use of inorganic chemical fertilizer nutrients which ultimately impact the health of water resources.
To educate the public on the importance of soil health
To promote understanding of ecological relationships as a way to create habitat and food sources that are self-sustaining.
To improve awareness and understanding of local food systems as a means of community resilience.
To inspire the community to engage in locally grown food systems.

Audience: Community members who are interested in engaging with food systems: Home gardeners, community gardeners, homeowners or renters.

Overview:

Healthy living soil is the base of a healthy ecosystem. This concept is applicable to undisturbed habitat as well as areas that are maintained by people. Healthy soil will promote healthy and resilient plants whether it is a lawn, ornamental garden, or edible garden.

There are several common indicators of poor soil health. This includes: Visible signs on plants (browning leaves, stunted growth, etc); Bare, dry, or compacted ground; or poor diversity in plant species. For example, an abundance of unwanted weeds or poor infiltration can be indicative of soil health problems. Healthy soil, by contrast, is less compacted and has more space to hold water when it rains, has a large diversity of plan species, and will show vigorous and healthy plant growth.

While signs of poor soil health may be visible in some cases, the best way to fully understand the state of the soil ecosystem is to complete a soil test, such as those available through the University of Maine Soil Lab. This test will give an analysis on nutrients and minerals, soil pH, organic matter, and scan for toxic metals (see Action Plan: Soil Contamination Awareness). Recommendations are provided for specific steps to take towards building healthier and more fertile soil based on the unique soil profile of each sample. A soil test should be completed before adding any amendments to a lawn or garden to ensure it is a good choice for promoting a healthy soil system. This step can help save money on yard care and an advanced understanding of soil ecology can promote the recycling of free materials back into the soil to build organic matter.

The presence of organic materials is a key factor is soil health. It provides nutrients, habitat for microorganisms, and retains moisture levels in the soil. Moisture promotes biological life and the mobility of nutrients, contributing to the flow of the water, carbon, and nitrogen cycles. It can also promote the filtration of nutrients out of runoff which would otherwise contribute to water pollution. This helps to improve the quality of both groundwater and local waterways which may receive the filtered runoff.

Understanding soil health and how it may react to various inputs and outputs in the system are essential to productive and low maintenance food production. While beneficial for food production, practices promoting healthy soil can be implemented in areas where ornamental plants are growing as well. Investing in soil health broadly can help transition areas that may be used for future food production.

Implementation:

Phase I: Define Target Area, Audiences, & Tangential Programs

Connect with the local community groups to determine what programs currently exist that would be enhanced by soil systems.

> *Question: Where is the focus area for this program? What will the primary audience be within the focus area? Homeowners? Renters? Demographics? Etc.*
>
> *Question: Which of the identified goals are the focus of your community?*
>
> *Question: Are there garden groups? Homeowner associations? Town yard waste facility? Yardscaping/Bayscaping programs? Permaculture courses?*
>
> *Question: Who in your community will benefit the most and/or provide the most benefit to the community's soils?*

Phase II: Identify Existing Outreach Materials, Methods and Programs

Work with existing groups who may already have educational materials around soil testing and soil health. Material topics may vary on the importance of understanding soil health, methods for collecting soil, or information on understanding soil test results. Outreach methods could include email marketing, posters and handouts, social media marketing, display at local events, adult education courses, and traditional media outreach.

> *Question: What types of media do your audience interact with?*
>
> *Question: Do relevant materials for your audience already exist?*
>
> *Question: How can the existing efforts be enhanced? Is it more valuable to fund existing partners to extend their reach or create a new approach?*
>
> *Question: What are the primary soil health concerns (sandy soil, poor drainage, excessive nutrients, etc) in your community? What actions or best management practices will help to alleviate those concerns and build healthy soil? How can those actions or BMPs be taught or encouraged?*

Phase III: Engagement

Partners: Coordinate with community partners to deliver educational materials and implement outreach strategies that reach the identified audience.

> *Question: What steps can the municipality take to support outreach efforts?*

Ordinance: Creating a pesticide or fertilizer ordinances can help support the outreach goals of building healthy soil in your community (Attachment i). Ordinance development draws valuable public input and can help build interest and support around the need for healthy soil in a community. It demonstrates that the municipality is committed to the need and is taking the action to uphold the importance of the need. It opens dialogues for education with community members who may not understand the importance or their role in achieving the community's healthy soil goals.

Education: Adult education programming can build community engagement in soil health and alter the sense of "social norm" for yard appearances (Attachment ii). Programs may guide participants to further engage with their home ecosystems and gain a better understanding of their soil's health based on appearance, texture, and soil testing. They will gain knowledge to understand how their soil will then adjust based on different inputs and how it interacts with a larger community system. Increasing community knowledge around soils can include opportunities for peer-to-peer education as well as connects into local schools or other youth programs.

> *Question: Does your municipality offer a formal adult education program?*
>
> *Question: Which partners are available to deliver educational programs?*

Costs:

Personnel time

a) Program Development
b) Partner Coordination
c) Education & Outreach

Materials:

a) Printing costs
b) Advertising costs
c) Tabling Materials
d) Online advertisements

Facility use

Partners to Support Implementation:

A. CCSWCD
B. UMaine Cooperative Extension
C. Local businesses
D. Local farms/nurseries
E. Municipal Parks & Recreation Staff
F. Neighborhood Associations
G. Master Gardeners

Funding Opportunities:

A. Private nonprofit organizations/foundations
B. Regional Government funding
C. Municipal Funding
D. Other funding sources (grants)

Attachments:

i. South Portland Fertilizer Ordinance
ii. Healthy Soil Outreach Tools
    a. Yardscaping Soil Testing Factsheets
    b. Yardscaping Adult Ed Workshop

CITY OF SOUTH PORTLAND

KATHERINE W. LEWIS
Mayor

SCOTT T. MORELLI
City Manager

EMILY F. SCULLY
City Clerk

SALLY J. DAGGETT
Jensen Baird Gardner & Henry

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District Two
KATHERINE W. LEWIS

District Three
MISHA C. PRIDE

District Four
APRIL L. CARICCHIO

District Five
DEQA DHALAC

At Large
KATELYN S. BRUZGO

At Large
SUSAN J. HENDERSON

IN CITY COUNCIL

ORDINANCE #8-20/21

(as amended at first reading on 11/05/20)

THE COUNCIL of the City of South Portland hereby ordains as follows:

Section 1. Findings related to the Fertilizer Ordinance.

WHEREAS, the City of South Portland (the "City") wishes to protect the health of Casco Bay and other waterways that support the economic vitality of local fisheries and businesses; and

WHEREAS, the City recognizes that healthy soils serve as the foundation for vibrant ecosystems and plant life; and

WHEREAS, healthy soils play an important role in climate change mitigation by storing carbon (carbon sequestration) and decreasing greenhouse gas emissions in the atmosphere; and

WHEREAS, vegetation plays a vital role in both storing carbon and preventing soil erosion by slowing down water as it flows over the land allowing much of the rain to soak into the ground, and plant roots hold the soil in position and prevent it from being blown or washed away; and

WHEREAS, the City wishes to promote organic landcare practices that support the development of healthy soils to minimize the need for applying fertilizers, curtail the use of synthetic fertilizers, and ultimately support organic landcare practices; and

WHEREAS, the City recognizes that, in certain circumstances, synthetic fertilizers may play a role in boosting the growth of plants, and organic fertilizers may boost the health of soil; and

WHEREAS, the City also recognizes that organic fertilizers feed soil microbes, which cycle nutrients naturally as food for plants, while synthetic fertilizers expedite plant growth with water soluble synthetic nutrients that may deplete the health of the soil; and

WHEREAS, having adopted a Pesticide Use Ordinance, the City and a growing number of municipalities have embraced a precautionary approach to the application of landcare products in order to protect the health of people and the environment from their harmful effects; and

WHEREAS, the City has 16 miles of coastline and 143 coastal waterfront parcels that comprise 944 acres of land area; and

WHEREAS, excess and misapplied fertilizers are apt to run off into streams and coastal waters; and

WHEREAS, the City has five streams designated by the Maine Department of Environmental Protection as “urban impaired” for failing to meet State water quality standards primarily due to the adverse effects of stormwater runoff from surrounding development; and

WHEREAS, an algal bloom (algae bloom) is a rapid increase or accumulation in the population of many types of aquatic photosynthetic, microscopic, unicellular organisms, in freshwater or marine water systems, often recognized by the discoloration from their pigments in the water or on shorelines; and

WHEREAS, algal blooms are the result of nutrients, such as phosphorus and/or nitrogen from fertilizer runoff, pet waste, sewage, and other sources, entering aquatic and marine systems and causing excessive growth of the algal population; and

WHEREAS, nuisance algal blooms are an excessive population of algae that is characterized by obvious green or blue-green pigmentation in the water, settled or floating mats of algae, reduced light transparency, oxygen deprivation, aesthetic degradation, loss of recreational use, and possible harm to the aquatic community; and

WHEREAS, harmful algal blooms occur when algal populations grow out of control while producing toxic or other harmful effects on people, fish, shellfish, marine mammals, and birds; and

WHEREAS, the decomposition of algal blooms in the coastal environment contributes to coastal acidification; and

WHEREAS, when these algal blooms die and decay, decomposing bacteria

consume oxygen and release carbon dioxide in bays and coves, and the increase in carbon dioxide lowers the pH of the water and the mudflats, and exacerbates ocean acidification caused by the mixing of carbon dioxide from tailpipes and smokestacks, with seawater; and

WHEREAS, while nitrogen is essential to the health of marine ecosystems, too much nitrogen leads to nuisance and harmful algal blooms, coastal acidification, and degradation of water quality which can impact eelgrass and harvestable marine resources; and

WHEREAS, phosphorus is a naturally occurring mineral nutrient that is an essential part of photosynthesis necessary for plant growth, but excessive phosphorus concentrations in freshwater bodies can lead to algal and aquatic plant growth that harm aquatic life and impair recreational uses; and

WHEREAS, elevated phosphorus levels can cause toxic algal blooms, reduce water clarity and deplete oxygen levels, which can stress or kill fish and other aquatic animals; and

WHEREAS, excess nitrogen can enter marine waterways from a variety of sources, compelling the need to limit nitrogen inputs from any and all elective sources; and

WHEREAS, in recent years, the community has seen an increase in the occurrence of nuisance and harmful algal blooms in the region; and

WHEREAS, the remediation and restoration of impaired streams and marine waters can be cost prohibitive, and the City can make a difference by using and promoting organic landcare practices; and

WHEREAS, the City has already demonstrated leadership in sustainability and climate action through the adoption of the Clear Skies Ordinance, Pesticide Use Ordinance, and Climate Emergency Resolve, the implementation of the State’s largest municipal solar array, the installation of energy upgrades in municipal buildings, the deployment of electric vehicles and charging infrastructure, the implementation of an Energy Benchmarking Ordinance, the establishment of a citywide Food Waste Recycling Program, and the advocacy for state energy policies;

NOW, THEREFORE, the Fertilizer Ordinance is a continuation of those processes.

Section 2. The text of Chapter 32, "Pesticide Use Ordinance," of the "Code of Ordinances of the City of South Portland, Maine" be and hereby is amended as shown below (deletions are ~~struck out~~; additions are underlined):

Chapter 32

LANDCARE MANAGEMENT~~PESTICIDE USE~~ ORDINANCE

ARTICLE I. PESTICIDE USE

Sec. 32-1. Title.

This Article~~ordinance~~ shall be known as the "City of South Portland Pesticide Use Ordinance."

Sec. 32-2. Purpose.

The purpose of this ordinance is to safeguard the health and welfare of the residents of the City and to conserve and protect the City's waterways and natural resources by curtailing the use of pesticides for turf, landscape and outdoor pest management.

Sec. 32-3. Definitions.

The following words, terms and phrases, when used in this ordinance, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Broadcast application. The spreading of pesticides over an entire area.

Commercial Agriculture. The production of crops for sale, crops intended for widespread distribution to wholesalers or retail outlets and any non-food crops.

EPA. The United States Environmental Protection Agency.

FIFRA. The Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136 *et seq*.

Golf course. An area of land laid out for playing the game of golf with a series of 9, 18 or more holes. Mini-golf courses are not considered golf courses.

Golf course playing surfaces. The tees, fairways, greens and roughs of a golf course.

Golf course non-playing areas. Areas of golf courses that are not golf course playing surfaces, such as lawns, driveways, paths, patios, trees, shrubs, ornamental plantings and gardens.

Inert ingredient. Any substance (or group of structurally similar substances if designated by the EPA), other than an active ingredient, that is intentionally included in a pesticide product.

Invasive Species. A plant or insect that is not native to a particular ecosystem, and whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species include those plants listed under the Maine Department of Agriculture, Conservation and Forestry's Natural Areas Program as currently invasive, potentially or probably invasive, and highly likely but not currently invasive, as well as those insects listed by the Maine Forest Service as threats to Maine's forests and trees.

Landcare Management Advisory Committee (LMAC). The Landcare Management Advisory Committee as described in this Chapter.

Natural, organic or "non-synthetic." A substance that is derived from mineral, plant, or animal matter and does not undergo a "synthetic" process as defined in the Organic Foods Production Act, 7 U.S.C. § 6502(21), as the same may be amended from time to time.

Organic pest management. An extension of the principles and practices of organic agriculture to the care of turf and landscape.

Performance turf. Grounds devoted to athletic fields and golf courses.

Person. Any individual natural person, partnership, joint venture, society, association, company, club, trustee, trust or corporation; or any officer, agent, employee, or personal representative of any thereof, in any capacity acting either for her or himself or for any other person under either personal appointment or pursuant to law.

Pest. This term shall have the same meaning as the term set forth in 40 C.F.R. § 152.5, as the same may be amended from time to time.

Pesticide. Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest; any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant. It does not include multicellular biological controls such as mites, nematodes, parasitic wasps, snails or other biological agents not regulated as pesticides by the EPA. Herbicides, fungicides, insecticides and rodenticides are considered pesticides.

Pests of significant public health importance. Pests listed by the EPA, in conjunction with the U.S. Department of Health and Human Services and the U.S. Department of Agriculture, as pests of significant public health importance.

Preemptive application. The application of pesticides as a measure against something possible, anticipated or feared, *i.e.*, as a preventive or deterrent measure.

Public utility. Any transmission and distribution utility, telephone utility, water utility, gas utility, or natural gas pipeline utility that is subject to the jurisdiction of the Maine Public Utilities Commission.

Synthetic. A substance that is formulated or manufactured by a chemical process or by a process that chemically changes a substance extracted from naturally occurring sources, except that such term shall not apply to substances created by naturally occurring biological processes.

Waiver Committee. The Waiver Committee as described in this Chapter.

***Water body*.** Any great pond, river, stream or tidal area as those terms are defined in the City's Zoning Ordinance, Chapter 27 of the Code of Ordinances.

***Wetland*.** A coastal or shoreland freshwater wetland as those terms are defined in the City's Zoning Ordinance, Chapter 27 of the Code of Ordinances.

Sec. 32-45. Applicability of Pesticide Use Ordinance.

(A) Allowed and prohibited pesticides.

~~Subject to the applicability dates set forth in Sec. 32-14 herein, f~~For turf, landscape and outdoor pest management activities in the City, the following shall apply:

(i) Synthetic substances are prohibited unless specifically listed as "allowed" on the U.S. Department of Agriculture's National List of Allowed and Prohibited Substances (the "National List");
(ii) Non-synthetic substances are allowed unless specifically listed as "prohibited" on the National List;
(iii) Pesticides determined to be "minimum risk pesticides" pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and listed in 40 C.F.R. § 152.25(f)(1) or (2), as may be amended from time to time, are allowed; and
(iv) The use or application of pesticides (whether natural, organic, "non-synthetic," synthetic or otherwise) within 75 feet of of a water body or wetland is prohibited.

(B) Exempt pesticides.

(i) The following activities or materials are exempt from the provisions of this ordinance (and so are allowed):

(a) Commercial agriculture;
(b) Pet supplies, such as shampoos and tick and flea treatments, when used in the manner specified by the manufacturer;
(c) Disinfectants, germicides, bactericides, miticides and virucides, when used in the manner specified by the manufacturer;
(d) Insect repellents when used in the manner specified by the manufacturer;
(e) Rat and rodent control supplies when used in the manner specified by the manufacturer;
(f) Swimming pool supplies when used in the manner specified by the manufacturer; and
(g) General use paints, stains and wood preservatives and sealants when used in the manner specified by the manufacturer.

(ii) The following applications are exempt from the provisions of this ordinance (and so are allowed):

(a) Specific health and safety application – Prohibited pesticides may be used to control plants that are poisonous to the touch, such as poison ivy; pests of significant health importance such as ticks and mosquitoes; and animals or insects that may cause damage to a structure, such as carpenter ants or termites;
(b) Golf course playing surfaces application – Prohibited pesticides may be used on non-City owned golf course playing surfaces and on the tees and greens of City-owned golf courses *provided that* the course is designated through Audubon International as a Certified Audubon Cooperative Sanctuary;
(c) Grub control on performance turf application - Products with only the active ingredient chlorantraniliprole are permitted for the control of root feeding white beetle grubs on performance turf; provided, however, that such applications are limited to one every other year on performance turf; and provided further that this exemption shall expire on December 31, 2023;
(d) Invasive insect application – Prohibited pesticides may be used to control the Emerald Ash Borer, Asian Longhorned Beetle, Hemlock Woolly Adelgid, Browntail Moth and other insects identified as invasive by the Maine Forest Service; and
(ed) Right-of-way spraying – Prohibited pesticides may be used by a public utility that maintains a right-of-way through the City.

Sec. 32-56. Waivers.

(A) In situations that threaten the public health and safety or for the control of invasive species that pose a threat to the environment, persons may apply to the Waiver CommitteePMAC for a waiver from the provisions of this ordinance prior to the use of a prohibited product or prior to the conduct of a prohibited application.

(B) The waiver application shall be filed with the Waiver CommitteePMAC, on a form prescribed by the LPMAC, and shall include the following: the proposed location(s); details on the timing(s) of use, substance(s) and amounts to be applied; date(s) of application; management plan that excludes broadcast and preemptive applications; a pest identification and threshold report; and reason for requesting the use/application of a prohibited pesticide.

(C) In order to approve a waiver application, the Waiver CommitteePMAC must first find that all of the following criteria are met:

(i) A situation exists that threatens the public health and safety and/or where invasive species pose a threat to the environment;
(ii) The applicant has carefully evaluated all alternative methods and materials;
(iii) The applicant will, to the greatest extent practical, minimize the impact of the application on abutting properties; and
(iv) The grant of the waiver will not be detrimental to the public health, safety or welfare.

~~(C) Waiver applications must be filed with the Waiver Committee, with a copy provided to the Sustainability Coordinator. The Waiver Committee shall act upon a waiver application within five business days of receipt of a completed application. Both members of the Waiver Committee must agree that approval of the application is appropriate in order for the application to be approved; otherwise, the application is deemed denied.~~

~~(D) In approving any waiver application, the Waiver Committee may prescribe conditions and safeguards as are appropriate to further the purposes of this ordinance. The decision of the Waiver Committee shall be in writing, with copies provided to the applicant, PMAC, Sustainability Coordinator and City Clerk.~~

~~(E) A person aggrieved by a decision of the Waiver Committee shall have five business days to appeal the decision of the Waiver Committee to the City Manager. The appeal shall be in writing and shall state the basis for the appeal. The City Manager shall act upon the appeal within three business days of receipt of the appeal. The decision of the City Manager shall be in writing, with copies provided to the appellant, PMAC, Sustainability Coordinator and City Clerk.~~

Sec. 32-67. Public Notifications and Signage.

If prohibited pesticides are to be used/applied through an exemption pursuant to Sec. 32-45(B)(ii) or through an approved waiver application pursuant to Sec. 32-56, the following posting requirements shall be complied with by the property owner or applicator.

(A) The owner or applicator shall post warning signs in compliance with this ordinance. These signs must be posted before application activities commence and left in place for at least 48 hours after actual application or until expiration of the restricted entry interval or reentry time indicated by the pesticide label, whichever is longer.

(B) All signs shall be at least five inches high and four inches wide in size. Signs shall be attached to the upper portion of a dowel or other supporting device so that the bottom of the sign is not less than 12" and the top of the sign is not more than 48" above the ground. The signs shall be of rigid, weather resistant material substantial enough to be easily read for at least 48 hours when placed outdoors.

(C) All notification signs must be light colored (white, beige, yellow or pink) with dark, bold letters (black, blue or green). They shall have lettering that is conspicuous and clearly legible.

(D) The sign must include the following:

(i) The word “CAUTION” in 72 point type;
(ii) The words “PESTICIDE APPLICATION” in 30 point type or larger;
(iii) The Maine Board of Pesticides Control designated symbol;
(iv) Any reentry precautions from the pesticide labeling;
(v) The name and telephone number of the entity making the pesticide application;
(vi) The date and time of the application; and
(vii) A date and/or time to remove the sign.

(E) All notification signs shall state the chemical and trade name of the pesticide, the date to be applied, the length of time to remain off the treated area as indicated by the pesticide label, and a phone number of the responsible party for more information.

These requirements are in addition to any requirements that may also apply to State of Maine licensed applicators subject to the Maine Board of Pesticides Control rules regarding public notification.

Sec. 32-78. Reporting by State of Maine Licensed Applicators.

In addition to complying with the Maine Board of Pesticides Control rules regarding record keeping and reporting requirements outlined in Chapter 50 of the Code of Maine Rules, all State of Maine licensed applicators are required to submit to the City Clerk an annual summary report on or before February 1 relating to the preceding calendar year. The report shall contain the following information for applications performed in the City in the prior calendar year: target site, pesticide brand name, EPA registration number, total undiluted formulation (in pounds or gallons), and total area treated as listed and as amended on the Commercial Applicator Annual Summary Report required by the Maine Board of Pesticides Control.

Sec. 32-8. Other Applicable Provisions.

The generally applicable landcare management provisions of Article V of this Chapter are incorporated into this ordinance by reference.

Secs. 32-9--32-19. [RESERVED]

ARTICLE II. FERTILIZER USE

Sec. 32-20. Title.

This Article shall be known as the "City of South Portland Fertilizer Ordinance."

Sec. 32-21. Purpose.

The purpose of this ordinance is to safeguard and protect the environmental health of the City's soils and waterways by curtailing nutrient run-off from the excessive use and/or misapplication of fertilizers on turf.

Sec. 32-22. Definitions.

The following words, terms and phrases, when used in this ordinance, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Compost: A soil amendment made from decomposing organic matter used to improve soil structure and nutrient holding capacity. For the purposes of this ordinance, compost is not considered a fertilizer.

Environmentally sensitive areas: Areas that are particularly vulnerable to

fertilizer nutrient loss and/or where direct transmission of fertilizer nutrients to surface water or ground water is likely. This includes coastal and freshwater wetlands, beaches and sand dunes, streams and tributary streams as those terms are defined in Chapter 27 of the Code of Ordinances (especially those impaired for nutrients), areas within the Shoreland Area Overlay District pursuant to Chapter 27 of the Code of Ordinances, areas with steep topography, and areas with exposed bedrock.

Fertilizer: A substance containing one or more recognized plant nutrients and used for its plant nutrient content. State law requires that all fertilizer products be registered with its department of agriculture prior to distribution.

Heavy rain event: A rain event producing 0.5 inch or more of precipitation in an one hour period.

Hydro-seeding: The process of seeding by pumping seed in a mixture of water through a nozzle that sprays the mixture onto a seedbed. The water mixture may also contain add-ins such as fertilizer and certain mulches.

Landcare Management Advisory Committee (LMAC): The Landcare Management Advisory Committee as described in this Chapter.

New development: Any alteration of land for the purposes of construction or reconstruction that results in soil disturbance and/or compaction, vegetation removal, and/or regrading.

Organic fertilizer: Fertilizer derived from either plant or animal products that contain nutrients for plant growth. It is acceptable for the materials in these fertilizers to have been subjected to biological degradation processes under normal conditions of aging, rainfall, suncuring, air drying, composting, rotting, enzymatic, or anaerobic/aerobic bacterial action, or any combination of these. In order to qualify as organic fertilizer, the materials in these fertilizers may not be mixed with synthetic materials or changed in any physical or chemical manner from their initial state except by manipulations such as drying, cooking, chopping, grinding, shredding, hydrolysis, or pelleting in order to qualify as organic fertilizer. Organic fertilizers are broken down by, and feed, the microbial life in the soil.

Organic landcare: A landcare management technique that integrates cultural, biological, and mechanical practices to build soil health, including practices such as mowing at higher levels, aeration, top dressing with compost, over-seeding, and watering deeply but infrequently, and technique can reduce, if not eliminate, the need for toxic pesticides and synthetic fertilizers.

Over-seeding: The application of additional turfgrass seeding to existing turf.

Performance turf: Grounds devoted to athletic fields and golf courses.

Prills: A small aggregate or globule of a material, most often a dry sphere or pellet. Fertilizers and some detergent powders are commonly manufactured as prills.

Re-establishment: A procedure involving complete turf removal and seeding or laying sod to establish new turf. Does not encompass renovation.

Renovation: Improvement of turf involving replanting into existing live and/or dead vegetation. Does not encompass re-establishment.

Slope: The ratio of elevation change to horizontal distance, expressed as a percentage. Slope is computed by dividing the vertical distance by the horizontal distance, and multiplying the ratio by 100. For purposes of this Chapter, a slope shall include only those areas with a horizontal distance of at least 50 feet.

Soil: The outer, weathered layer of the Earth's crust which can potentially support plant life and made up of inorganic particles, organic matter, organisms, water and air.

Soil amendment: A soil amendment is material added to soil to improve its physical properties, including, but not limited to, the substances listed on the National List of Allowed and Prohibited Substances, 7 C.F.R § 205.601, as the same may be amended from time to time. For the purposes of this ordinance, a soil amendment is not considered fertilizer.

Soil microbes: Living organisms in soil (such as bacteria and fungi), which feed on organic matter and decompose rapidly.

Soil test: A test designed to analyze soil acidity, organic matter, and essential nutrients available for plant growth. A "standard soil test" indicates soil pH, levels of essential nutrients such as potassium, phosphorus, calcium, magnesium, and sulfur, level of organic matter, whether there is lead contamination, and it will provide recommendations for corrective amendments to address deficiencies. A "comprehensive soil test" includes all the elements of a standard soil test, plus an analysis of the available nitrogen in the soil.

Starter fertilizer: A fertilizer formulated for a one-time application at planting or near that time to encourage root growth and to enhance the initial establishment of turf. This is typically a water-soluble product that contains high levels of

phosphorus to allow for robust root growth.

Steep topography: Slope lengths exceeding 50 feet (horizontal distance) on slopes greater than 15%.

Summer dormancy: The period during mid-summer most commonly observed in un-irrigated lawns when turf growth ceases. Dormancy is characterized by brittle texture and a loss of green color.

Synthetic fertilizer: Any fertilizer manufactured from one or more synthetic materials containing no animal parts, animal byproducts, manures or renderings. Synthetic fertilizer bypasses the microbial life in the soil and is taken up by the plant directly.

Total nitrogen: The sum of all fertilizer nitrogen species, including water soluble nitrogen forms, slow release nitrogen forms, and water insoluble nitrogen forms. The percentage of total nitrogen appears as the leftmost number of the grade on fertilizer labels.

Turf: A community of herbaceous plants that can be mowed, including grass and sod; a surface layer of the earth with grass growing on it, usually mowed, including lawns, grass covered medians, athletic fields, golf courses, outdoor event spaces, and the like.

Waiver Committee: The Waiver Committee as described in this Chapter.

Sec. 32-23. Applicability of Ordinance.

The following provisions shall apply to the use of fertilizer on turf within the territorial limits of the City, on both public and private property.

Sec. 32-24. Prohibitions & Allowed Applications

(A) The following prohibitions apply for all fertilizer applications on all turf types:

(i) Applications within 75' of a water body or wetland or other environmentally sensitive area are prohibited.
(ii) Applications on frozen ground or saturated surfaces are prohibited.
(iii) Applications when a heavy rain event is forecast or is occurring are prohibited.
(iv) Applications during summer dormancy or when the ground is partially or wholly frozen are prohibited.

(v) Applications on impervious surfaces are prohibited; if spills occur on impervious surfaces, they must be swept up immediately.

(vi) Applications with phosphorus are prohibited except where a soil test conducted within the last three years indicates a need for phosphorus, or phosphorous is being used for new development/re-establishment, as specified in subsection (B) below.

(vii) Applications of synthetic fertilizer are prohibited except where a waiver has been granted pursuant to Sec. 32-25 below.

(viii) Applications of organic fertilizer not in compliance with subsection (B) below are prohibited.

(B) The following applications of organic fertilizer are allowed within the limits for the specific application as set forth below:

(i) Except as specified in subsections (ii), (iii), and (iv) below, applications of organic fertilizer on turf, including residential lawns, are allowed only when a comprehensive soil test conducted within the same calendar year indicates a need for nitrogen. Applications of organic fertilizer may not contain nutrients in excess of the amount recommended by the completed soil test. Only phosphorus-free, organic fertilizer is allowed for these applications, unless the soil test indicates a need for phosphorus.

(ii) Applications of organic fertilizer on performance turf are allowed as necessary provided that total nitrogen does not exceed 4 lbs per 1,000 square feet per year.

(iii) Applications of organic starter fertilizer for new development may contain phosphorus without a soil test. The fertilizer must be incorporated into top soil 2-3 inches deep. Two fertilizer applications are permitted for one calendar year from the date of first application only. For each application, total nitrogen and phosphorus may not exceed 1 lb. per 1,000 square feet. In addition, sub-soil compaction at the site must be broken up to a depth of at least 10 inches below the surface. The site must have at least 6 inches of topsoil containing a minimum of 5% organic material and a pH level between six (6) and six and a half (6.5) for turf, vegetation, and/or plantings.

(iv) Applications of organic fertilizer for re-establishment of turf may contain phosphorus without a soil test. Unless the application is through hydro-seeding or overseeding, the organic fertilizer must be incorporated into the soil 2-3 inches deep. Fertilizer applications may not exceed 1 lb. of nitrogen and phosphorus per 1,000 square feet per application. Total nitrogen and phosphorus may not exceed 2 lbs. per 1,000 square feet per calendar year from the date of last application.

Sec. 32-25. Waivers.

(A) Persons may apply to the Waiver Committee for a waiver in order to use a synthetic fertilizer on performance turf or for new development, prior to the actual use of the synthetic fertilizer, if one or more the following conditions exists:

(i) The soil temperature is less than 55 degrees Fahrenheit and reasonable grounds exist to justify fertilizer use at that location and at that time;
(ii) The turf is experiencing high stress due to high use and must be ready for high performance play when the sports season(s) begin; or
(iii) A suitable organic product that meets the nutrient needs of the soil as specified in a soil test is unavailable.

(B) The waiver application shall be filed with the Waiver Committee, on a form prescribed by the LMAC, and shall include the following: the proposed location(s), preferably in map format; photo of proposed location(s); type(s) and amounts of synthetic fertilizer to be applied; date(s) of application; management plan; and reason for requesting the use/application of synthetic fertilizer. The management plan shall identify the soil testing results, and, if applicable, organic landcare practices and implementation schedule; fertility practices and implementation schedule; and application of other inputs (*e.g.*, pesticides, soil supplements) and application schedule.

(C) In order to approve a waiver application, the Waiver Committee must first find that all of the following criteria are met:

(i) The application submitted is complete;
(ii) The applicant has demonstrated that at least one of the conditions that would necessitate the use of synthetic fertilizers on performance turf or new development as set forth in subsection (A) above exists;
(iii) The applicant has demonstrated that reasonable grounds exist to justify use of synthetic fertilizer on performance turf or for new development at the proposed location and time; and
(iv) The applicant has demonstrated a commitment to the organic landcare practices detailed in their management plan.

(D) Any person granted a waiver for synthetic fertilizer use shall include the synthetic fertilizer use applications within the total allowable limits for nitrogen and phosphorus set forth in Sec. 32-24(B) above.

Sec. 32-26. Other Applicable Provisions.

The generally applicable landcare management provisions of Article V of this Chapter are incorporated into this ordinance by reference.

Secs. 32-27--32-49. [RESERVED]

ARTICLE III. [RESERVED]

ARTICLE IV. [RESERVED]

ARTICLE V. LANDCARE MANAGEMENT GENERALLY

Sec. 32-504. LandcarePest Management Advisory Committee (LPMAC).

(A) Composition; appointment; terms of office.

The LandcarePest Management Advisory Committee (LPMAC) is hereby established. The LPMAC shall consist of seven members as follows:

(i) The City's Stormwater Program Coordinator or a City employee with experience in landcare management, as determined by the City Manager and Sustainability Director;
(ii) One practicing agronomist appointed by the City Council;
(iii) Two Maine Board of Pesticides Control-licensed landscape professionals, at least one of whom has experience in organic land care management and is accredited by the Northeast Organic Farming Association in Organic Land Care, each appointed by the City Council; and
(iv) Three resident or taxpayer representatives appointed by the City Council.

The terms of office of the six LPMAC members appointed by the City Council shall be three year terms, except that the initial appointments after the establishment of the LPMAC shall be such that the terms of office of no more than two members shall expire in any single year. The terms of office for the City employee LPMAC member shall be for as long as the employee holds said employment position.

(B) Duties.

The duties of the LPMAC include serving in an advisory capacity to the City Council and the Sustainability DirectorCoordinator to oversee this ordinance through the following:

(i) Advising the City Council and the Sustainability DirectorCoordinator of any problems encountered or amendments that may be required to achieve the full and successful implementation of this Chapterordinance;
(ii) Reviewing and acting upon waiver applications when applicable;

(iii) In coordination with the Sustainability Director~~Coordinator~~, developing and implementing outreach and education as specified in this Chapter~~ordinance~~;

(iv) Seeking the participation, advice and counsel of experts in the fields of organic turf and landscape management, maintenance of trees and shrubs, and organic pest protocol;

(v) Encouraging broad community participation, from parents, schools, advocates, and local arboriculture and landscaping businesses, in the activities of the L~~P~~MAC;

(vi) Reviewing annual data and issuing a summary report annually to the City Council;

(vii) On or before May 1, 2019, and every three years thereafter, conducting an evaluation of this Chapter~~ordinance~~, including a review of pilot project results and reporting data, and providing recommendations to the City Council and the Sustainability Director~~Coordinator~~ for any Chapter~~ordinance~~ amendments it deems appropriate; and

(viii) Additional responsibilities as may be deemed necessary by the City Council.

(C) Officers, meetings and records.

(i) The members shall annually elect a chair from their membership. If not provided to the L~~P~~MAC by the City Manager, the members shall also annually elect a secretary for the purpose of taking minutes and related duties.

(ii) All meetings of the L~~P~~MAC shall be open to the public. Notice of each meeting shall comply with the City's notice policies and Maine's Freedom of Access Act.

(iii) A quorum shall consist of four members.

(iv) The L~~P~~MAC shall meet regularly.

(v) Minutes shall be kept of all meetings with a copy filed with the City Clerk. An annual report of the L~~P~~MAC's activities shall be submitted to the City Council in March of each year.

(vi) The chair and one other member, at least one of whom must be a Maine Board of Pesticides Control-licensed landscape professional, shall serve as the Waiver Committee, authorized to review and decide waiver applications. The L~~P~~MAC shall annually designate the two members who shall serve as the Waiver Committee for the ensuing year.

Sec. 32-51. Process for Consideration of Waiver Applications.

(A) Waiver applications must be filed with the Waiver Committee, with a copy provided to the Sustainability Director. The Waiver Committee shall act upon a waiver application within five business days of receipt of a completed application. Both members of the Waiver Committee must agree that approval of the

application is appropriate in order for the application to be approved; otherwise, the application is deemed denied.

(B) In approving any waiver application, the Waiver Committee may prescribe conditions and safeguards as are appropriate to further the purposes of this ordinance. The decision of the Waiver Committee shall be in writing, with copies provided to the applicant, LMAC, Sustainability Director and City Clerk.

(C) A person aggrieved by a decision of the Waiver Committee shall have five business days to appeal the decision of the Waiver Committee to the full LMAC. The appeal shall be in writing and shall state the basis for the appeal. The LMAC shall act upon the appeal within ten business days of receipt of the appeal. The appellant shall be given an opportunity to provide oral and documentary evidence to the LMAC without regard to whether it was presented to the Waiver Committee. Waiver Committee members may participate in any appeal to the LMAC. A decision to grant an appeal shall be by majority vote of those LMAC members present and voting. The decision of the LMAC shall be in writing, with copies provided to the appellant, City Manager, Sustainability Director and City Clerk. Decisions of the LMAC may be appealed to Superior Court within thirty (30) days of the LMAC's written decision.

Sec. 32-529. Outreach and Education.

(A) The Sustainability DirectorCoordinator or his/her designee shall publish notice of this Chapterordinance in a newspaper of general circulation in the City upon adoption of this Chapterordinance or any amendments thereto and shall provide periodic notice of this Chapterordinance to identified retailers and lawn, garden, and tree-care providers serving South Portland as well as to churches, schools, and other institutions in South Portland.

(B) The LPMAC shall work with the Sustainability Director to prepare and publish materials designed to educate the community about the role of fertilizers and pesticides in the local environment and best practices regarding pesticide and fertilizer use as well as organic landcare practicesthe benefits of organic pest management. This oOutreach methods mayshall include:

- Development of a recognition or certification program for organic properties;
- Healthy soils campaign (wrapping together pesticides and fertilizers);
- Website and social media;
- Press releases and newspaper articles;
- Posters and brochures made available at City events and applicable locations that serve the public;
- Workshops, trainings, and demonstration projects;
- A toolkit for retailers consisting of educational materials and signage that can be customized, printed, and placed in stores, and training for

all retail employees who recommend and sell pesticides and fertilizers highlighting the following:

a) South Portland's local pesticide and fertilizer regulations;
b) principles of organic landcare; and
c) proper use/application of pesticides and fertilizers;

and

- Any additional methods deemed appropriate by the LMAC.

~~a community-based social marketing campaign targeting City households and businesses; promotion of professional education and training for State of Maine licensed applicators; distribution of information and news about City practices through South Portland internet and web-based resources; SPC-TV public service announcements; news releases and news events; tax bill inserts; posters and brochures made available at City events and applicable locations that serve the public; workshops, trainings, and demonstration projects; targeted outreach to schools; and any additional methods deemed appropriate by the PMAC.~~

~~(C) The PMAC shall also develop a program to work directly with retailers that sell pesticides in South Portland to:~~

~~(i) Provide educational training for all retail store employees who recommend and sell pesticides for use in the home and garden, highlighting the following:~~

~~(a) federal, state, and local pesticide regulations;~~
~~(b) principles of organic pest management;~~
~~(c) pesticide toxicity and health and environmental concerns;~~
~~(d) proper pesticide display and storage; and~~
~~(e) the role of personal protective equipment, pesticide poisoning symptoms, and emergency procedures in case of spills.~~

~~(ii) Implement a toolkit consisting of educational materials and signage (*i.e.*, posters, signs, stickers) that can be customized, printed, and placed in stores to help consumers understand this ordinance and alternatives to prohibited pesticides.~~

Sec. 32-53~~10~~. Violations.

Any person violating any of the provisions of this Chapter~~ordinance~~ or failing or neglecting or refusing to obey any order or notice of the Sustainability Director~~Coordinator~~ and/or the L~~P~~MAC issued hereunder shall be subject to enforcement action as provided herein.

Sec. 32-54~~11~~. Enforcement.

It shall be the duty of the Code Enforcement Officer, for whom the Sustainability Director shall provide investigative assistance, to enforce the provisions of this Chapter ~~to provide investigative assistance and to enforce the provisions of this ordinance in collaboration with the City's Sustainability Coordinator~~. The Sustainability Director~~Coordinator~~ shall work with alleged violators of this Chapter~~ordinance~~ to bring them into compliance by providing the individual(s) with educational materials and advice on the use of organic landcare practices~~less toxic chemicals~~ to achieve their desired results. Any person who is found to be in violation of any provision of this Chapter shall be initially subject to a letter of warning. A second violation shall be punishable by a civil penalty of two hundred dollars ($200); a third violation shall be punishable by a civil penalty of five hundred dollars ($500); and any subsequent violation shall be punishable by a civil penalty of one thousand dollars ($1,000). Each violation of a separate provision of this ordinance, and each day of violation, shall constitute separate offenses. Violators may be subject to legal action brought by the City seeking any and all remedies to which it is entitled pursuant to State and local laws, including, without limitation, declaratory and injunctive relief and reasonable attorney's fees pursuant to 30 A M.R.S. § 4452, as the same may be amended from time to time. All civil penalties shall inure to the benefit of the City of South Portland.~~The Sustainability Coordinator will maintain a listing of complaints of alleged violations of this ordinance and how they were resolved. The listing will include the nature of the complaint, a summary of the situation and a brief description of how each complaint was resolved. This information will be reported on the City's website in aggregate by Assessor's tax map number and not by specific property address or Assessor's lot number.~~

Sec. 32-55~~12~~. Severability.

Should any section or provision of this Chapter~~ordinance~~ be declared by the courts to be invalid, such decision shall not invalidate any other section or provision of this Chapter~~ordinance~~.

Sec. 32-56~~13~~. Conflicts with Other Ordinances.

Whenever a provision of this Chapter~~ordinance~~ conflicts with or is inconsistent with another provision of this Chapter~~ordinance~~ or of any other ordinance, regulation or statute, the more restrictive provision shall control.

Sec. 32-57~~14~~. Effective date~~; Applicability dates~~.

This Chapter~~ordinance~~ first became effective as of September 27, 2016. Amendments to this Chapter as evidenced by Ordinance #8-20/21 shall become effective pursuant to Section 225 of the City Charter. ~~In order to allow time for residents and businesses to become familiar with the requirements of this ordinance, the~~

~~prohibitions on the use of certain products and/or applications (and the related public notification, signage and reporting requirements) shall be phased in as follows:~~

~~**Phase One:** Commencing May 1, 2017, the provisions set forth in Sec. 32-5 on the use or application of certain pesticides for turf, landscape and outdoor pest management activities shall apply to City-owned property (but not to any golf course).~~

~~**Phase Two**: Commencing May 1, 2018, the provisions set forth in Sec. 32-5 on the use or application of certain pesticides for turf, landscape and outdoor pest management activities shall apply to private property (but not to any golf course).~~

~~**Phase Three**: Commencing May 1, 2019, the provisions set forth in Sec. 32-5 on the use or application of certain pesticides on certain portions of golf courses for turf, landscape and outdoor pest management activities shall apply to all golf courses.~~

Fiscal Note: Less than $1,000

Date: November 5, 2020

Attachment ii.

Soil Test

Test your soil to know what your lawn needs!

What is a soil test?

An easy and inexpensive way to determine your soil's level of nutrients, pH, and organic matter.

Why should I test my soil?

Healthy soil is the key to a great looking lawn, but it is impossible to know what your soil needs without doing a soil test. Levels of pH, nutrients, and organic matter all impact plant growth. For example, nutrient levels that are too low will slow plant growth, and levels that are too high can pollute our waterways and may inhibit plant growth. A soil test will save you time and money by telling you to **add only what your soil needs**.

What will my soil test tell me?

- Soil pH
- Levels of the nutrients phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg) and sulfur (S)
- Amount of organic matter
- If there is lead contamination
- Fertilizer and lime needs

When & how should I test my soil?

A soil test should be done at least every three years and before you decide to add any fertilizer or lime to your lawn. The ideal time of year to test your soil is mid to late spring or early fall. Free soil test kits are available from county extension offices or your local Soil and Water Conservation District.

How do I collect my soil sample?

1. Using a clean spade or trowel, take several samples in different locations on your lawn. Try to remove any large leaves, roots, and sticks from your sample.
2. Mix the samples in a clean container.
3. Label the sample box with your name, address, and sample identification (e.g. front lawn) and fill with soil. If you are sending multiple samples, each must be placed in a separate sample box.
4. Complete the accompanying form (Note: the crop code for existing lawns is 201; the crop code for new lawns in 211). The form will accommodate up to 10 samples. Remove the top copy and send to the lab with your sample; keep the remaining copies for your records.
5. Place the sample box(es), form, and payment in a mailing container and send it to the soil testing service at the address on the form.
   Your results should arrive in two to three weeks.

Information contained in this fact sheet adapted from University of Maine Cooperative Extension Bulletin #2286, Testing Your Soil.