School-wide Composting & Curricular Tie-ins

Wednesday, December 18, 2019

MASSACHUSETTS FARM TO SCHOOL

But first, a bit of housekeeping:

Webinar is being recorded – will be available on the Mass. Farm to School website

New to Zoom! Please excuse any tech glitches throughout (and feel free to chat me about persistent issues)

Q&A will be available through the chat function only. You can submit questions at any time throughout the webinar. I'll read them off during Q&A after all three presenters have finished.

Please do not turn on your microphone or video!

What Mass. Farm to School Does

- Professional Learning Opportunities for Schools
- Networking
- Communications
- Policy/Advocacy
- Research

MASSACHUSETTS FARM TO SCHOOL

Learn more at

www.MassFarmToSchool.org

MASSACHUSETTS FARM TO SCHOOL

By the end of this hour participants will learn:

- The basics of composting in school classroom environments including infrastructure needs, associated potential costs and savings, & the difference between on-site & haul away composting options.
- Strategies for collaboration between cafeteria & classroom environments, teaching compost concepts through classroom activities & standards-aligned lessons, & reinforcing positive habits in the cafeteria.
- Real-world models for composting in schools & through school gardens programs.

Introducing our Presenters

- Morgan Laner, *Program Specialist for RecyclingWorks in MA*
- Mary Stucklen, *Program Manager for Berkshire Zero-Waste Initiative*
- Janice McPhillips, *Farm Educator and Outreach Coordinator for Holly Hill Farm*

COMPOSTING IN SCHOOLS 101

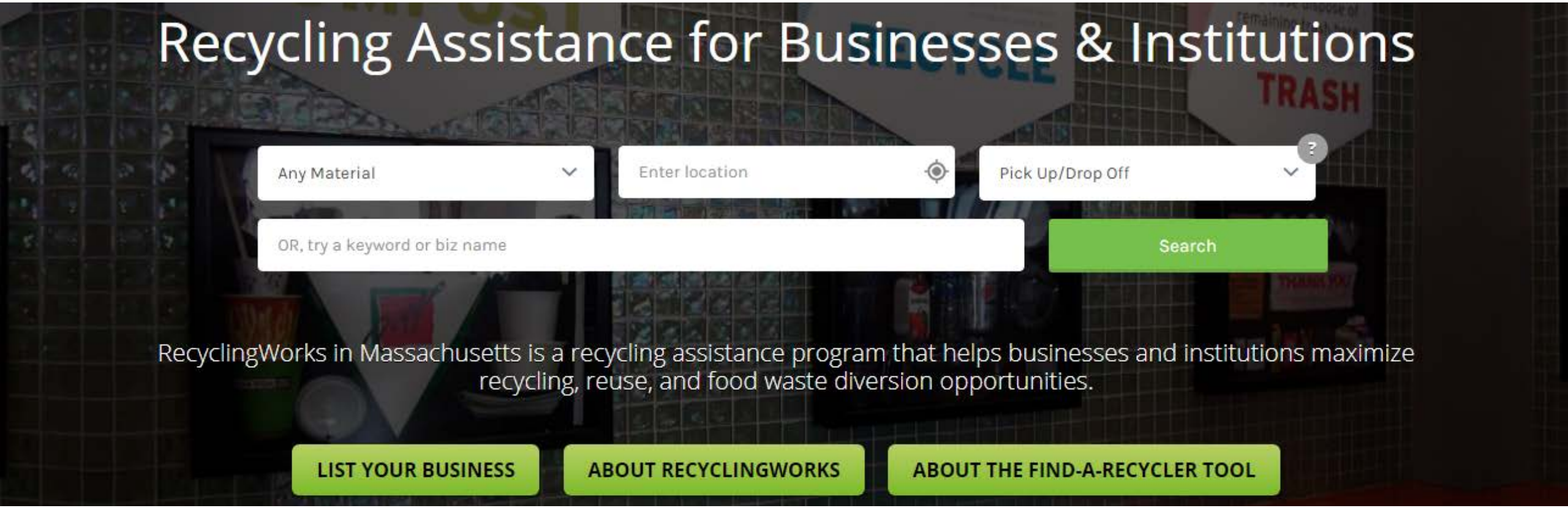
FREE ASSISTANCE FOR BUSINESSES & INSTITUTIONS

RECYCLINGWORKS MASSACHUSETTS

RecyclingWorks MA is funded by MassDEP, delivered under contract by the Center for EcoTechnology

recyclingworksma.com

FIND-A-RECYCLER TOOL



RECYCLINGWORKS MASSACHUSETTS

MassDEP

FOOD WASTE ESTIMATION GUIDE

Elementary and Secondary Schools

Click here for a printable, fill-in version of this Commercial Food Waste Disposal Ban threshold estimation guide for elementary and secondary schools.

	Average Measurement		Material
Students [Elementary School]	1.13	lbs/student/week	Food waste
Students [Middle School]	0.73	lbs/student/week	Food waste
Students [High School]	0.35	lbs/student/week	Food waste
Disposed Waste [1]	45	% of disposed waste by weight	Food waste

RECYCLINGWORKS MASSACHUSETTS

www.recyclingworksma.com/food-waste-estimation-guide/

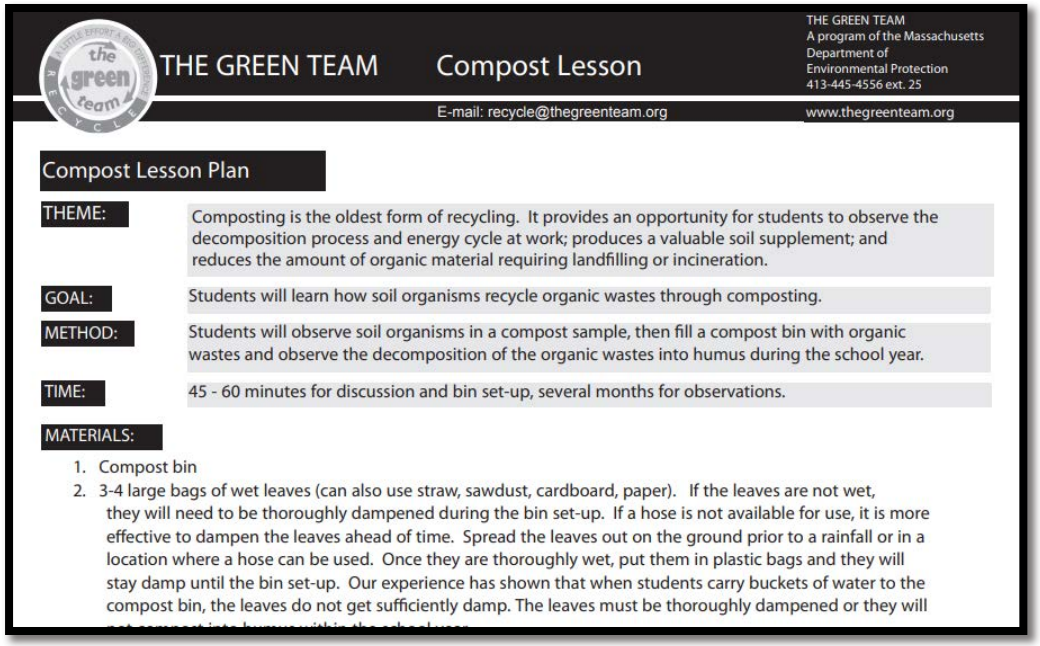
MassDEP

THE GREEN TEAM

- K-12 schools in Massachusetts
- Lesson plans & curriculum resources
- Free recycling & composting equipment available

The GREEN TEAM is funded by the Massachusetts Department of Environmental Protection and administered by CET.

FOOD WASTE RESOURCES



THE GREEN TEAM Compost Lesson

THE GREEN TEAM
A program of the Massachusetts Department of Environmental Protection
413-445-4556 ext. 25
E-mail: recycle@thegreenteam.org
www.thegreenteam.org

Compost Lesson Plan

THEME: Composting is the oldest form of recycling. It provides an opportunity for students to observe the decomposition process and energy cycle at work; produces a valuable soil supplement; and reduces the amount of organic material requiring landfilling or incineration.

GOAL: Students will learn how soil organisms recycle organic wastes through composting.

METHOD: Students will observe soil organisms in a compost sample, then fill a compost bin with organic wastes and observe the decomposition of the organic wastes into humus during the school year.

TIME: 45 - 60 minutes for discussion and bin set-up, several months for observations.

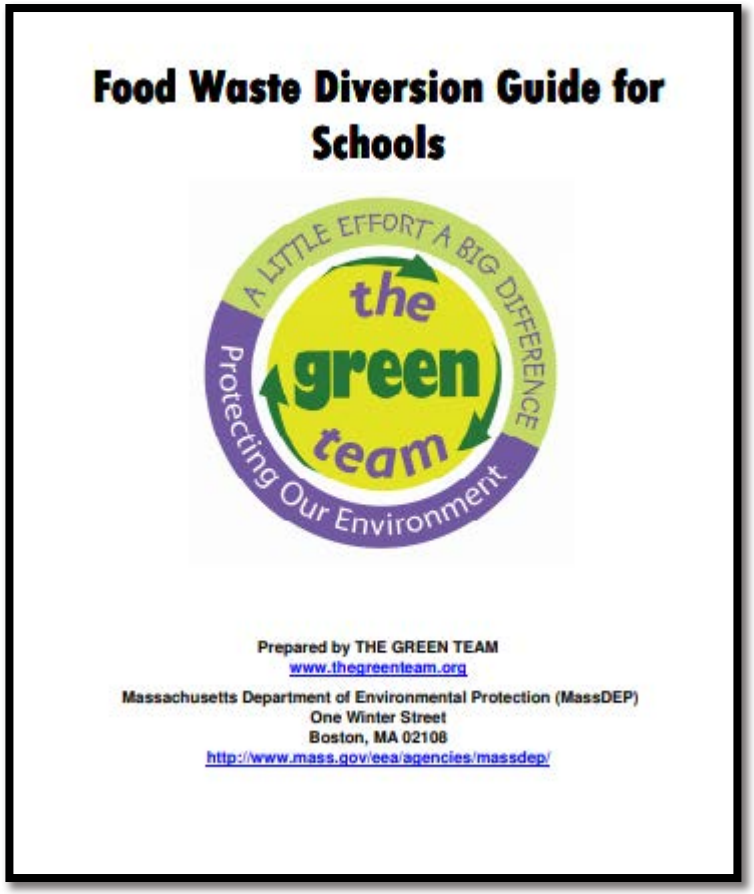
MATERIALS:

1. Compost bin
2. 3-4 large bags of wet leaves (can also use straw, sawdust, cardboard, paper). If the leaves are not wet, they will need to be thoroughly dampened during the bin set-up. If a hose is not available for use, it is more effective to dampen the leaves ahead of time. Spread the leaves out on the ground prior to a rainfall or in a location where a hose can be used. Once they are thoroughly wet, put them in plastic bags and they will stay damp until the bin set-up. Our experience has shown that when students carry buckets of water to the compost bin, the leaves do not get sufficiently damp. The leaves must be thoroughly dampened or they will

www.thegreenteam.org/recycling-facts/food-waste-reduction/

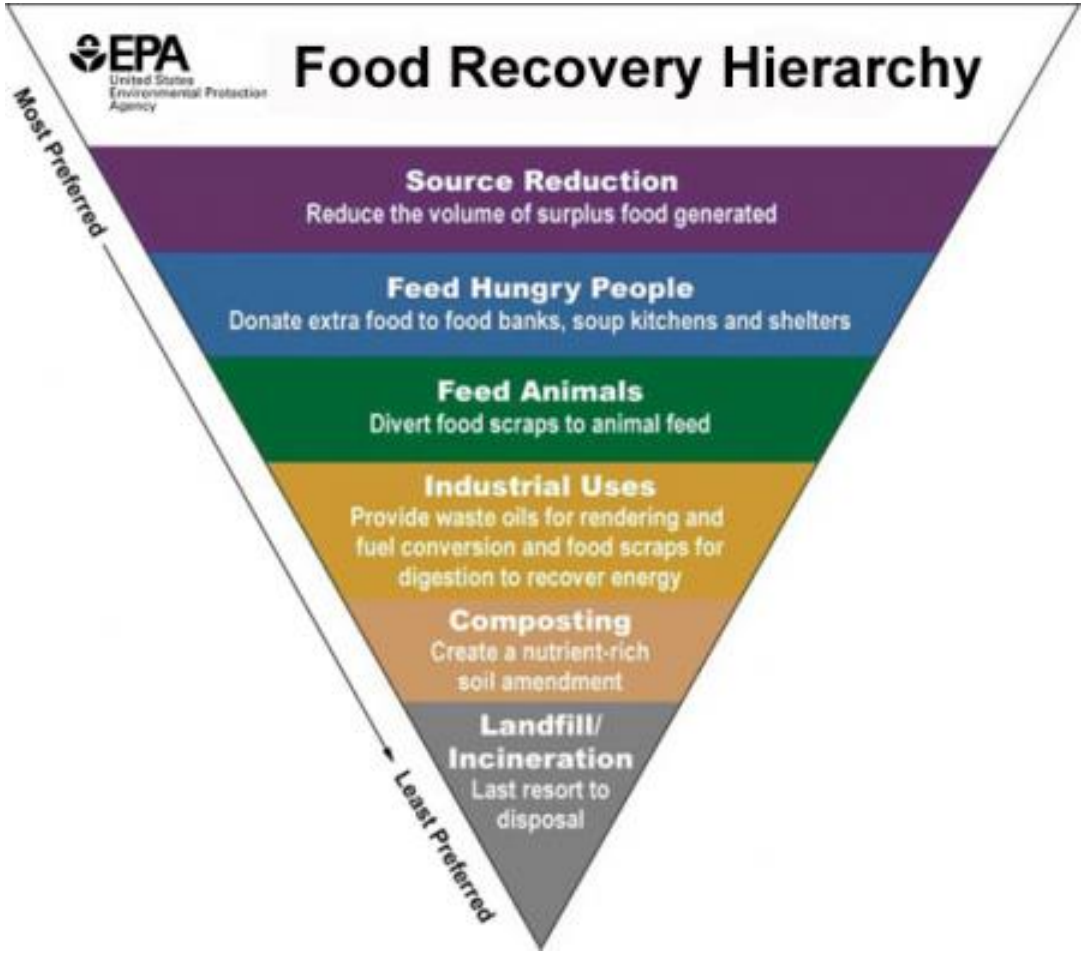
FOOD WASTE RESOURCES

- Build support for the program
- Evaluate current waste operations & options
- Plan the program
- Implement the program
- Analyze and maintain the program
- Promote the program



www.thegreenteam.org/recycling-facts/food-waste-reduction/

FOOD WASTE ACROSS THE HIERARCHY



RECYCLINGWORKS MASSACHUSETTS

MassDEP

WHY COMPOST?

- 40% of food is wasted
- Environmental benefits
- Social benefits
- Educational benefits

RECYCLINGWORKS MASSACHUSETTS

MassDEP

THE FINANCIAL CASE

RECYCLINGWORKS MASSACHUSETTS

www.recyclingworksma.com/hauler-contracting-bmp/

MassDEP

SOURCE SEPARATION GUIDANCE

www.recyclingworksma.com/source-separation-guidance

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Food Scraps

COMPOST

All Food Scraps
Napkins & Paper Towels

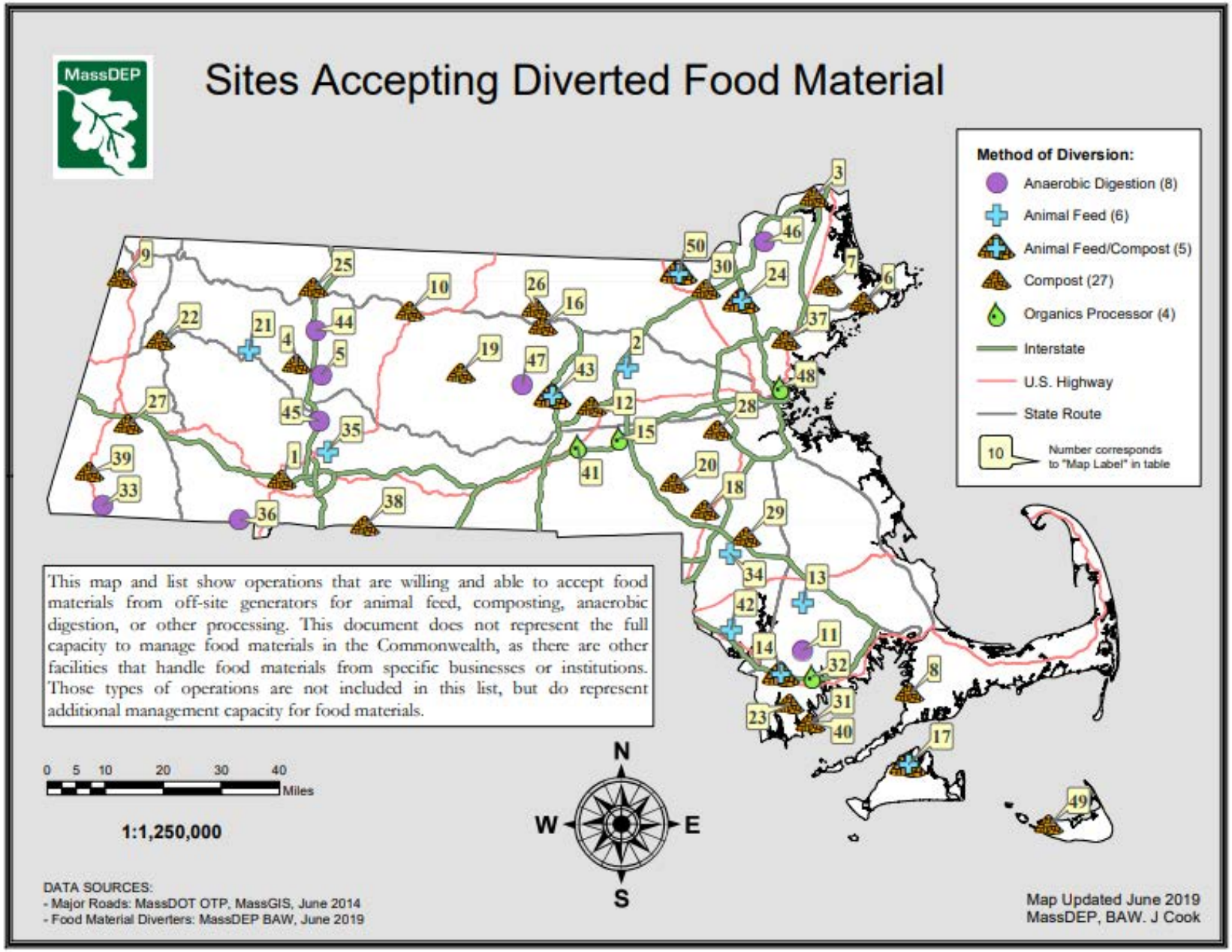
Fruits, vegetables, dairy, bread, grains, meat & fish, bones & shells, eggs

NO

No gloves, plastic, wrappers Stryrofoam, or any other trash

RECYCLINGWORKS MASSACHUSETTS

MassDEP



www.mass.gov/doc/map-list-of-massachusetts-sites-accepting-diverted-food-material-june-2019/download

QUESTIONS?

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413-586-7350 x389

www.recyclingworksma.com

RECYCLINGWORKS
MASSACHUSETTS

BERKSHIRE ZERO-WASTE INITIATIVE

PROUD TO BE A PROGRAM OF

BEAT
Berkshire Environmental ACTION TEAM

HOW DO YOU CONNECT COMPOST TO THE CLASSROOM AND TO THE SCHOOL CULTURE?

Teaching Compost & Associated STEAM Curriculum

Classroom Lessons

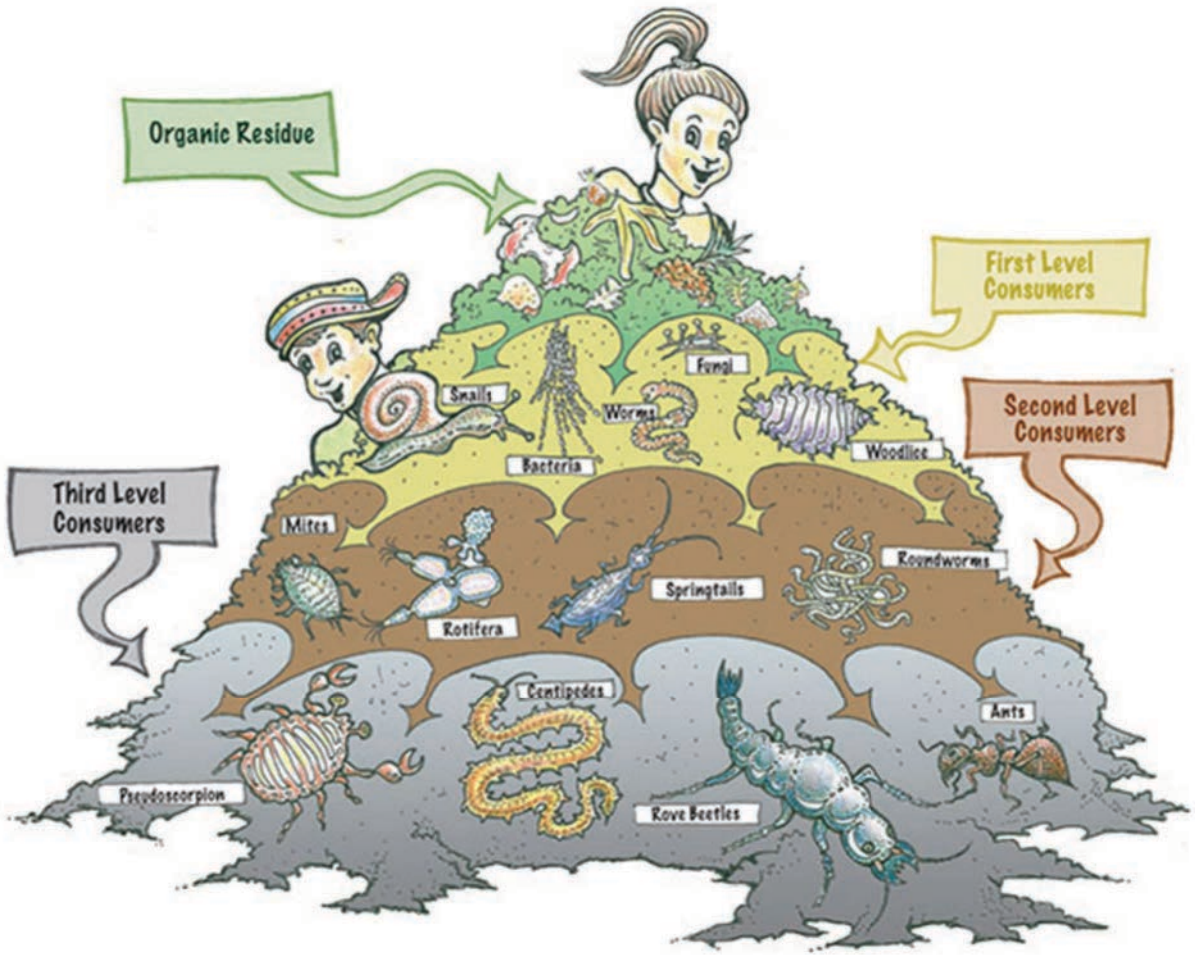
Transitioning to the Cafeteria

Engaging Faculty & Staff

Ensuring Success in your Composting Program

Going Further

TEACHING ABOUT COMPOST & ASSOCIATED STEM CURRICULUM



- Engages students in concepts around waste, climate change, and natural life processes
- Satisfies multiple STEAM curriculum standards
- Nurtures a school culture around healthy & sustainable living
- Hands-on and highly adaptable to any school size and demographic

TEACHING ABOUT COMPOST & ASSOCIATED STEM CURRICULUM

K-ESS3-3. Communicate solutions to reduce the amount of natural resources an individual uses.

K-LS1-1. Observe and communicate that animals (including humans) and plants need food, water, and air to survive.

2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.

3.3-5-ETS1-1. Define a simple design problem that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost that a potential solution must meet.

4.3-5-ETS1-3. Plan and carry out tests of one or more design features of a given model or prototype in which variables are controlled and failure points are considered to identify which features need to be improved. Apply the results of tests to redesign a model or prototype.

TEACHING ABOUT COMPOST & ASSOCIATED STEM CURRICULUM

5-LS2-1. Develop a model to describe the movement of matter among producers, consumers, decomposers, and the air, water, and soil in the environment

5 - LS2-2(MA). Compare at least two designs for a composter to determine which is most likely to encourage decomposition of materials

7.MS-LS2-3. Cycling of matter should include the role of photosynthesis, cellular respiration, and decomposition, as well as transfer among producers, consumers (primary, secondary, and tertiary), and decomposers

HS-LS2-5. Use a model that illustrates the roles of photosynthesis, cellular respiration, decomposition, and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere, and geosphere.

CLASSROOM LESSONS

CLASSROOM LESSONS

thegreenteam.org

www.lifelab.org

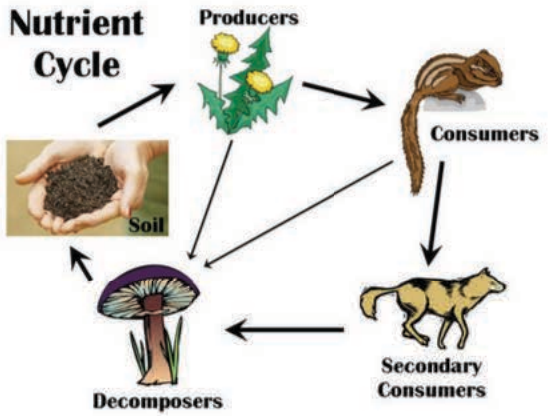
www.educationworld.com

http://www.siddals.com/compost-stew.html

https://www.teachengineering.org

TeachEngineering
STEM curriculum for k-12

STUDENTS CAN DESIGN THE SOLUTION



OPTIONS FOR CAFETERIA SET-UP

OPTIONS FOR CAFETERIA SET-UP

TRANSITIONING TO THE CAFETERIA

© WWF-US / Rebecca Drobis

- *Prepare & Pre-teach in the classroom*
- *Assign students to be "Compost Monitors"*
- *Engage staff and faculty*
- *Engage students in the entire process*
- *"It's a bump in the road, not the road."*

GETTING YOUR FOOD WASTE TO THE COMPOST BIN

GETTING YOUR FOOD WASTE TO THE COMPOST BIN

New Age Composter
Available through
GreenTeam

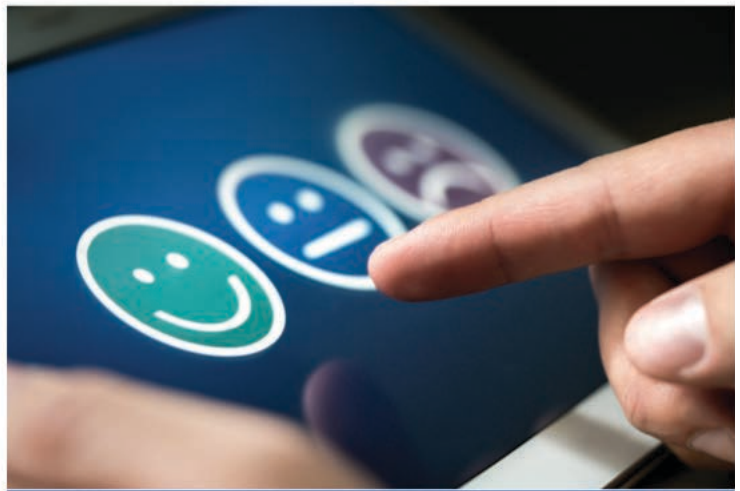
DIY Your Own!

EarthCube
By Green Mountain Technologies

ENGAGING FACULTY & STAFF

INCLUDE EVERYONE

KEEP INFORMED & AWARE



REFLECT & IMPROVE

APPROACHES THAT ENSURE SUCCESS

ADOPT A POSITIVE & FLEXIBLE ATTITUDE

MAKE MISTAKES & COLLABORATE TO OVERCOME THEM

THE END GOAL IS NOT PERFECTION

APPROACHES THAT ENSURE SUCCESS

REDUCE SINGLE-USE PLASTIC

KEEP THE BINS IN THE SAME PLACE, WITH DIFFERENT COLORS

STAFF SUPPORT IS ESSENTIAL

GOING BEYOND

1. **Sharing Table**
2. **Offer vs. Serve**
3. **Food Donations**
4. **Table to Farm**
5. ***Reusables - As much as possible!***

Thank you!

Mary Stucklen

(413) - 684 - 8144

Mary@BerkshireZeroWaste.org

Find Berkshire Zero-Waste Initiative on:

Friends of Holly Hill Farm

A Farm for Teaching & Learning

Hingham High School
Cafeteria Food Waste Diversion Program

- 1,200 students
- Green Committee started by Assistant Principal, 2007
- Mass Recycle “Best High School Recycler” 2013
- Department of Education “Green Ribbon School”
- Dedicated administrators, teachers, custodians, student involvement, Student Council, sports teams & clubs, supportive community, donations, partnership with *Friends of Holly Hill Farm*
- “Slash the Trash” Fridays – about 50 lbs compost
- “Teach In” – America Recycles Day, Green Week
- Prizes for “Random Acts of Greenness”
- The “Friday Show”

Hingham High School
Cafeteria Food Waste Diversion Program

America Recycles Day - November 15th

Dedicated Custodian – Matt Conway

Hingham High School
Cafeteria Food Waste Diversion Program

Active Asst. Principal, prizes, sports teams & clubs involved, FUN!

Hingham High School
Cafeteria Food Waste Diversion Program

"Slash the Trash" Friday

Hingham High School
Cafeteria Food Waste Diversion Program

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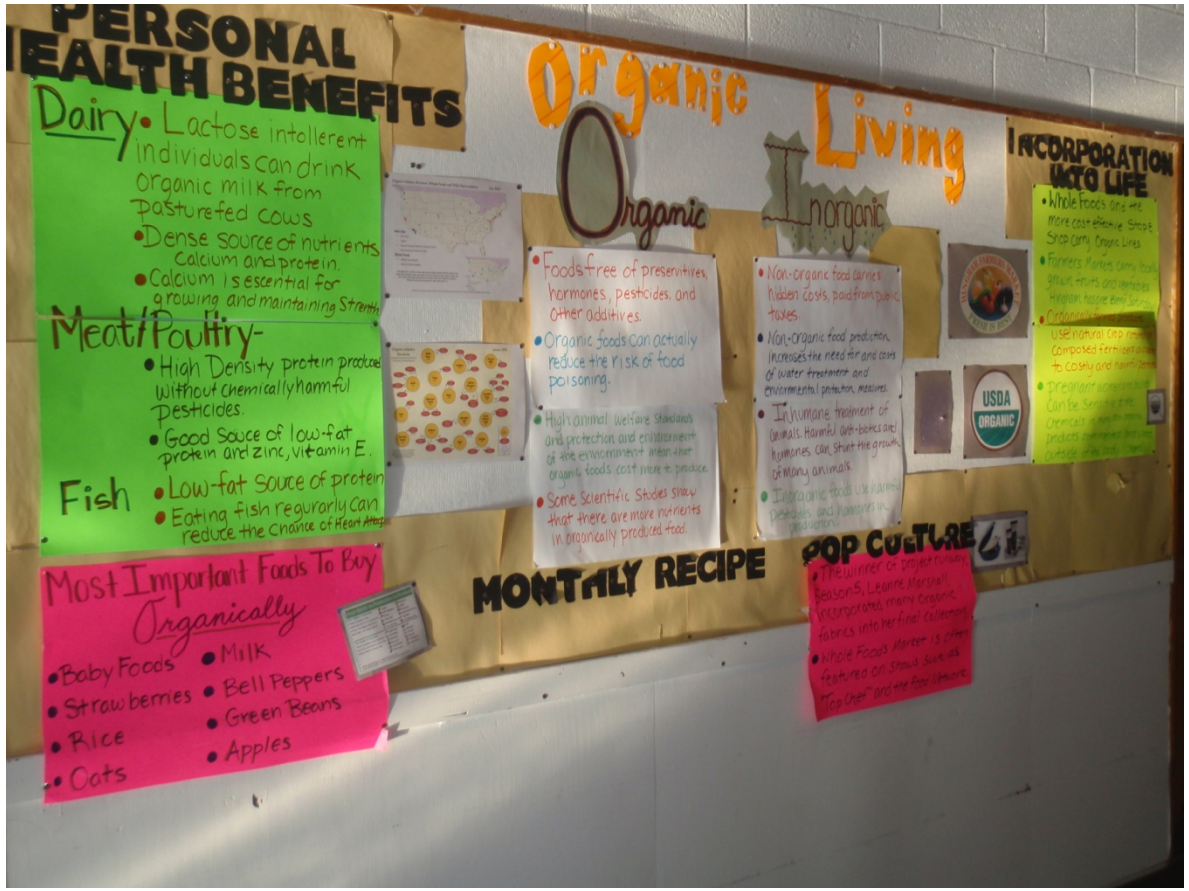
Cafeteria Food Waste Diversion Program

America Recycles Day, November 15th

Composting, Recycling and Healthy Eating Can Galvanize the Entire School Community



Composting, Recycling and Healthy Eating Can Galvanize the Entire School Community

Composting, Recycling and Healthy Eating Can Galvanize the Entire School Community

Hingham High School
Cafeteria Food Waste Diversion Program

Students do the work!

Hingham High School
Cafeteria Food Waste Diversion Program

Teaching Sustainability, Math & Science by Composting and Gardening

Finished compost is screened and used to create or amend new gardens beds

Teaching Sustainability, Math & Science by Composting and Gardening

Close the loop:

Fill a new bed with compost & soil, plant garlic on America Recycles Day

Teaching Sustainability, Math & Science by Composting and Gardening

More garden beds added during “Green Week” in March

Teaching Sustainability, Math & Science by Composting and Gardening

Close the loop: Garden & Greenhouse meal

Teaching Sustainability, Math & Science by Composting and Gardening

STEM Curriculum Connections:
#1 Define Sustainability: Where is “Away” ???

HS-ESS3-3. Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity

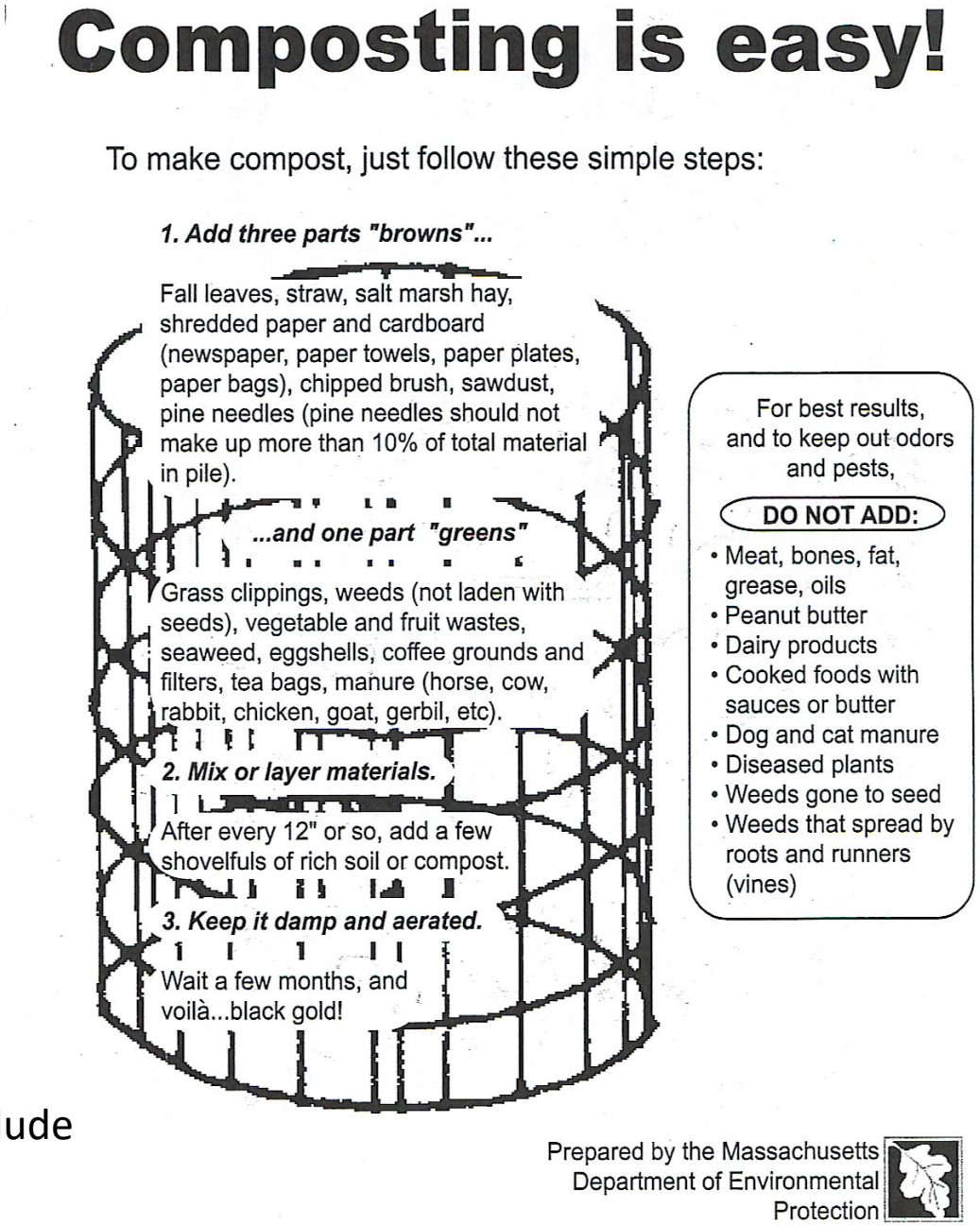
STEM Curriculum Connections:

#2 What is compost? How do you make a compost pile?

Fool proof recipe:

- 3 parts “brown”
- 1 part “greens”
- water
- soil microbes
- stir
- wait 2 months = BLACK GOLD!

STB-3.M.3 Composting is the process of organic matter such as food scraps, paper, and yard waste decomposing. The product of this decomposition can be used as fertilizer. Drawbacks to composting include odor and rodents.

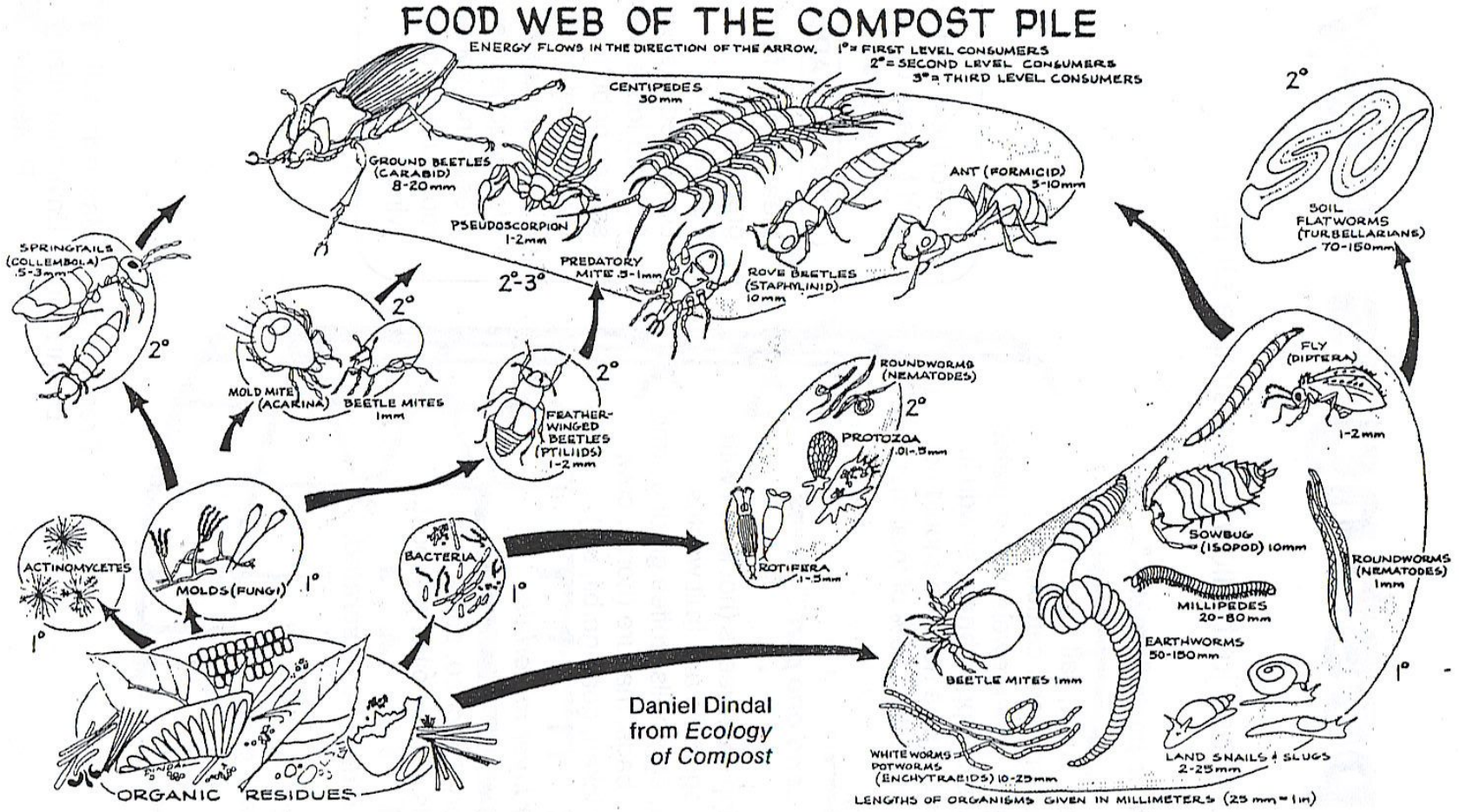


STEM Curriculum Connections:
#2 Continued - What is compost? How do you make a pile?

STB-3.M.3 Composting is the process of organic matter such as food scraps, paper, and yard waste decomposing. The product of this decomposition can be used as fertilizer. Drawbacks to composting include odor and rodents.

Free compost bins from Mass DEP - www.thegreenteam.org

STEM Curriculum Connections:
#3 A Compost Pile is a Diverse Ecosystem



Organisms commonly found in compost. Energy flows from organism to organism as one is eaten by the other in a natural recycling system.

ERT-1.A.2 Symbiosis is a close and long-term interaction between two species in an ecosystem. Types of symbiosis include mutualism, commensalism, and parasitism.

STEM Curriculum Connections:
#3 The Compost Pile is a Diverse Ecosystem

ERT-1.A.2 Symbiosis is a close and long-term interaction between two species in an ecosystem. Types of symbiosis include mutualism, commensalism, and parasitism.

STEM Curriculum Connections:
#4 Decomposition is HOT Because …

HS-LS1-7. Use a model to illustrate the aerobic cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and new bonds form, resulting in new compounds and a net transfer of energy.

STEM Curriculum Connections:

#4 Continued … Because Decomposition is the Reverse of Photosynthesis

Photosynthesis:

$$6CO_2 + 6H_2O \xrightarrow{\text{sunlight energy}} C_6H_{12}O_6 + 6O_2$$

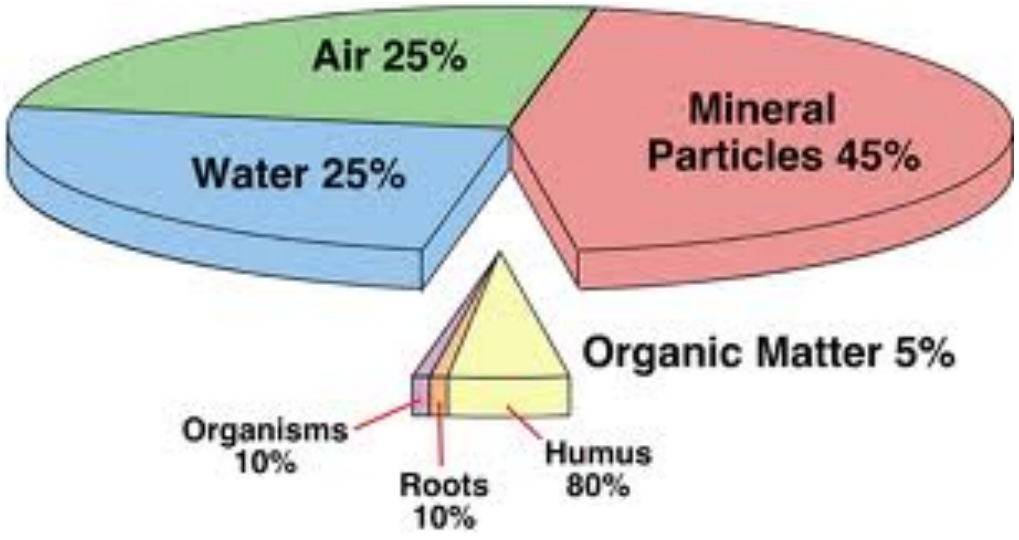
Aerobic Decomposition:

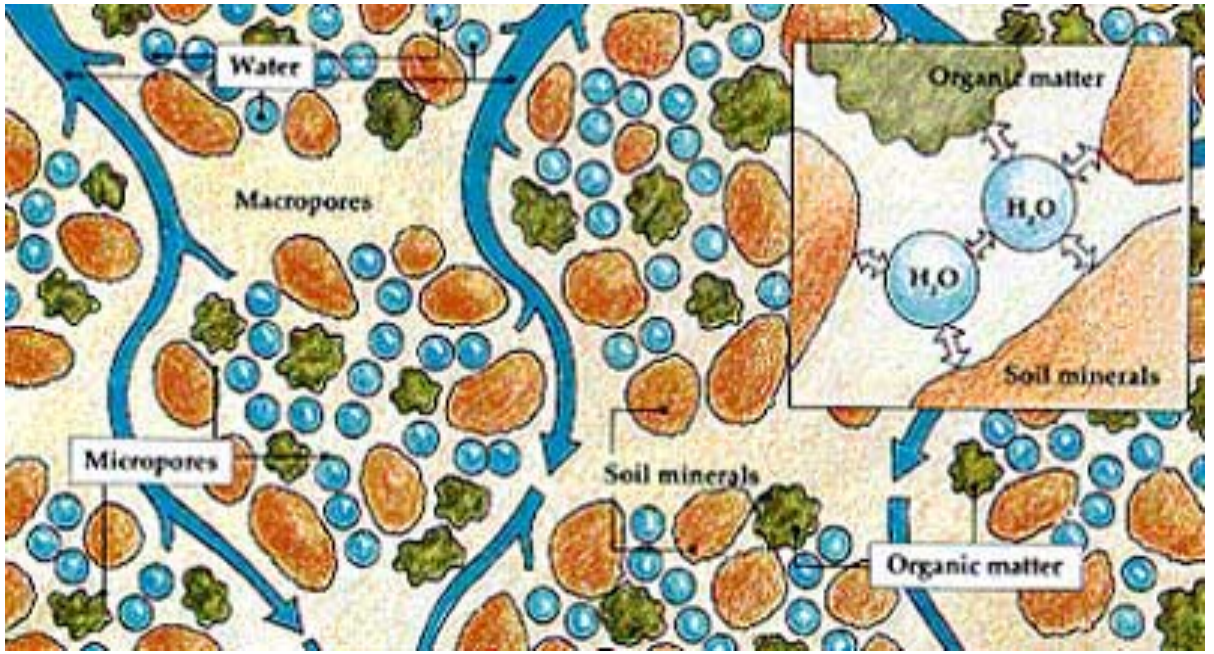
$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{Heat}$$

HS-LS1-7. Use a model to illustrate the aerobic cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and new bonds form, resulting in new compounds and a net transfer of energy.

STEM Curriculum Connections:

#5 Soil is Made of Minerals and Decomposed Living Material (humus)





HS-LS2-1. Analyze data sets to support explanations that biotic and abiotic factors affect ecosystem carrying capacity.

STEM Curriculum Connections:
#6 Collecting Food Scraps & Plates Saves Money

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, aesthetics, and maintenance, a well as social, cultural, and environmental impacts.

STEM Curriculum Connections:
#7 Making Compost Generates Income!

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, aesthetics, and maintenance, a well as social, cultural, and environmental impacts.

STEM Curriculum Connections:
#8 Growing & Eating Local Food = Low Carbon Footprint

HS-ESS2-6. Use a model to describe cycling of carbon through the ocean, atmosphere, soil and biosphere and how increases in carbon dioxide concentrations due to human activity have resulted in atmospheric and climate changes.

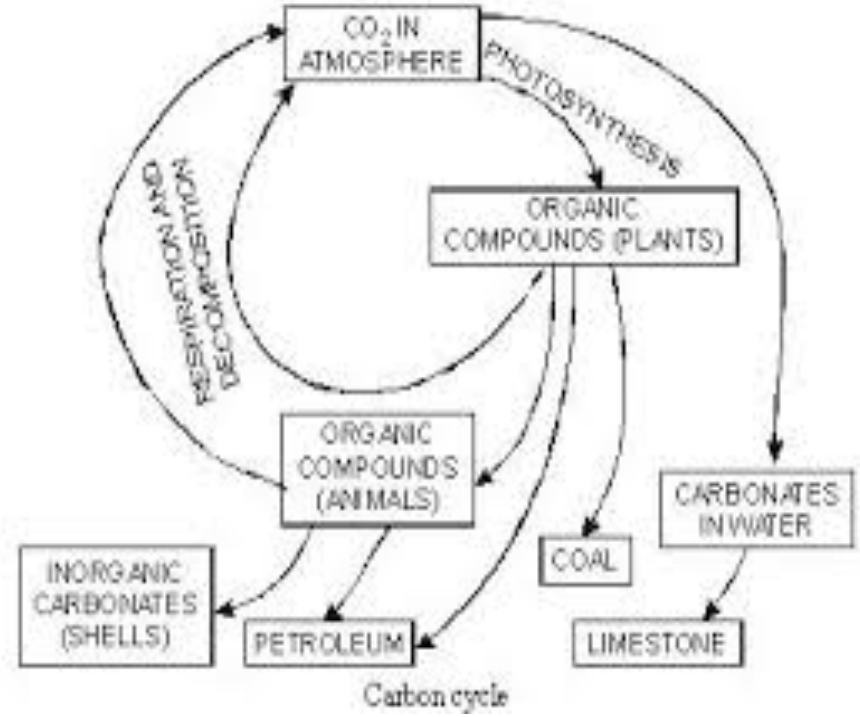
STEM Curriculum Connections:
#9 Study Plant Life Cycles … Get Food to Eat!

HS-LS1-5. Use a model to illustrate how photosynthesis uses light energy to transform water and carbon dioxide into oxygen and chemical energy stored in the bonds of sugars and other carbohydrates.

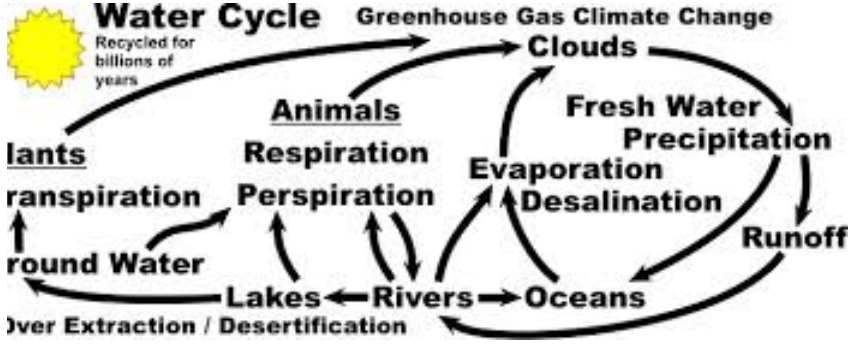
STEM Curriculum Connections:
#9 Adding Compost to Soil Increases its Water Holding Capacity

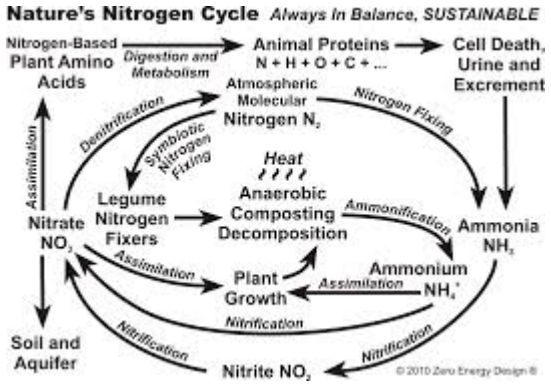
ERT-4.C.1 Water holding capacity—the total amount of water soil can hold—varies with different soil types. Water retention contributes to land productivity and fertility of soils.

STEM Curriculum Connections:
#10 Carbon, Nitrogen & Water Cycles



Carbon cycle





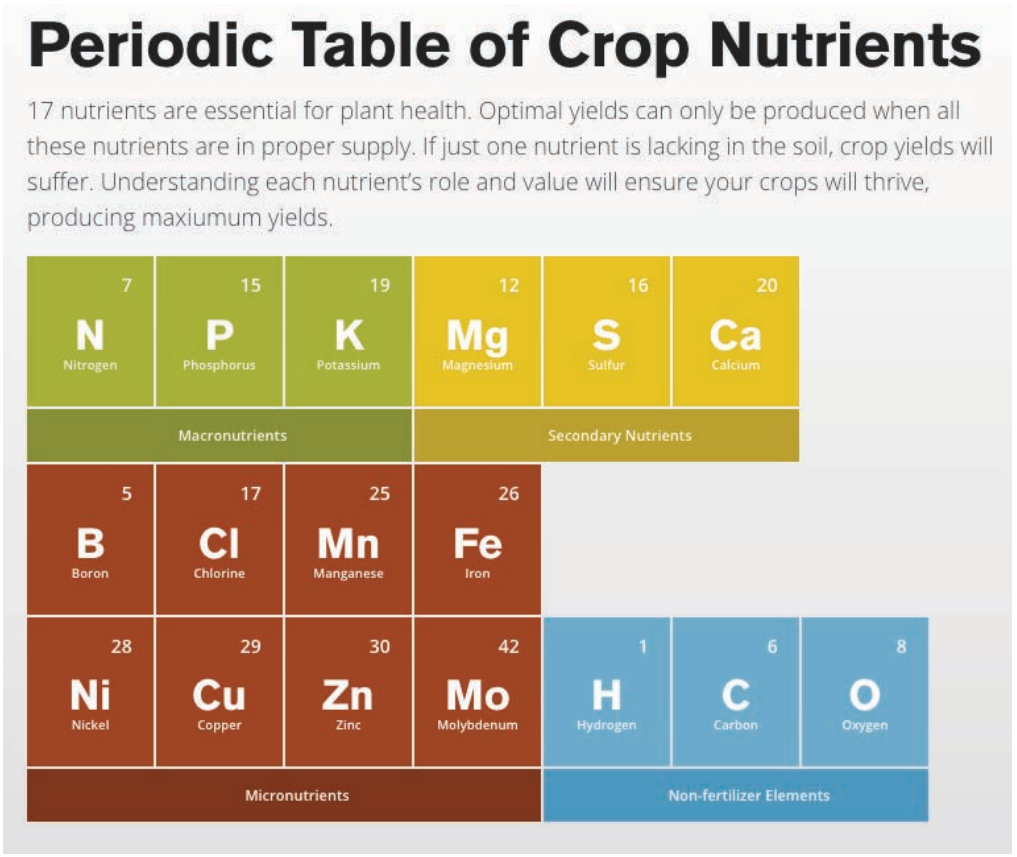
HS.LS2-5. Use a model that illustrates the roles of photosynthesis, cellular respiration, decomposition, and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere, and geosphere.

STEM Curriculum Connections:
#11 Farmers & Gardeners Need to Calculate Volume, Area, etc.

3.OA.3. Represent and solve problems involving multiplication and division.

STEM Curriculum Connections:

#12 Soil is a Complex System Made of Living & Non-living Components



HS-LS1-6. Construct an explanation based on evidence that organic molecules are primarily composed of six elements, where carbon, hydrogen, and oxygen atoms may combine with nitrogen, sulfur, and phosphorous to form monomers that can further combine to form large carbon-based macromolecules.

Don’t Expect Perfection! Problems include contamination, rodents, smells, limited capacity, snow, poorly mixed piles, etc.

Don’t Expect Perfection! Problems include contamination, rodents, smells, limited capacity, snow, poorly mixed piles, etc.

Hingham High School
Cafeteria Food Waste Diversion Program

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Q&A

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MASSACHUSETTS FARM TO SCHOOL

BERKSHIRE ZERO-WASTE INITIATIVE

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