Managing the CCS Compost Shed and Beyond: Year 3

Student Goals: By helping to manage the CCS compost operation, you will all…

- Learn about the benefits of composting
- Learn about how to compost
- Be able to share this information with others (education + advocacy)

Why compost “organics”?

- Food (and other organics) are too good to waste by throwing into a landfill where they can’t decompose (it creates methane and leachate).
- In Vermont, Act 148 is a phased-in law banning all food waste from our landfills (by 2020), so that it can be turned into compost (an aerobic process) or used to make energy (an anaerobic process).
- Our school produces enough “organic” waste that it must follow the law now. All of our food scraps are banned from the landfill!!!!
- We choose to compost our organic waste onsite and at Green Mountain Compost.

Benefits of Compost

- Improves soil and plant health
- Conserves water in soils, reduces run-off and erosion
- Reduces need for chemical fertilizers, pesticides and fungicides
- Has ability to remediate contaminated soil
- Keeps organic materials out of landfills
- Raises awareness of sustainable recycling and waste reduction practices
- Onsite composting saves money by reducing hauling costs

Overarching Composting Vision:

Food scraps are a resource to be re-used in our community

Goal 1: Resource recovery at school

- Divert organics (food and more) from landfill as part of solid waste best practice (Act 148)
- Improve school waste reduction, and send organics to Green Mountain Compost (change hauling contract), become a “greener” school

HOW? Retrain everyone at school to sort into 3 waste streams; make infrastructure changes, adopt standard signs and bins to support habits leading to desired outcome.

Goal 2: Promote Local Composting

- Build local soil health; compost onsite
- Demonstrate and engage people in “closed loop” food systems at school, library and senior center
- Model different bin management systems

How? Study compost management and ecology, write grants to build a variety of compost bins, nurture volunteer collaborations, identify dedicated core group to manage various sites. Train student stewards. Communicate and educate via media/articles/signs/presentations.

People, tools, training

School

- 6th graders are onsite compost shed stewards
- Master composter manager: teaches about and monitors onsite operation
- Custodians, para-educators and students oversee classroom compost collection for hauling to GMC

wn d ar

- Master composter manager, along with Transition Town Charlotte volunteers

Composting Defined

The return of organic wastes to a rich, stable, humus-like material, through a managed oxidative* decomposition process that is mediated by <u>microbe metabolism</u>. **

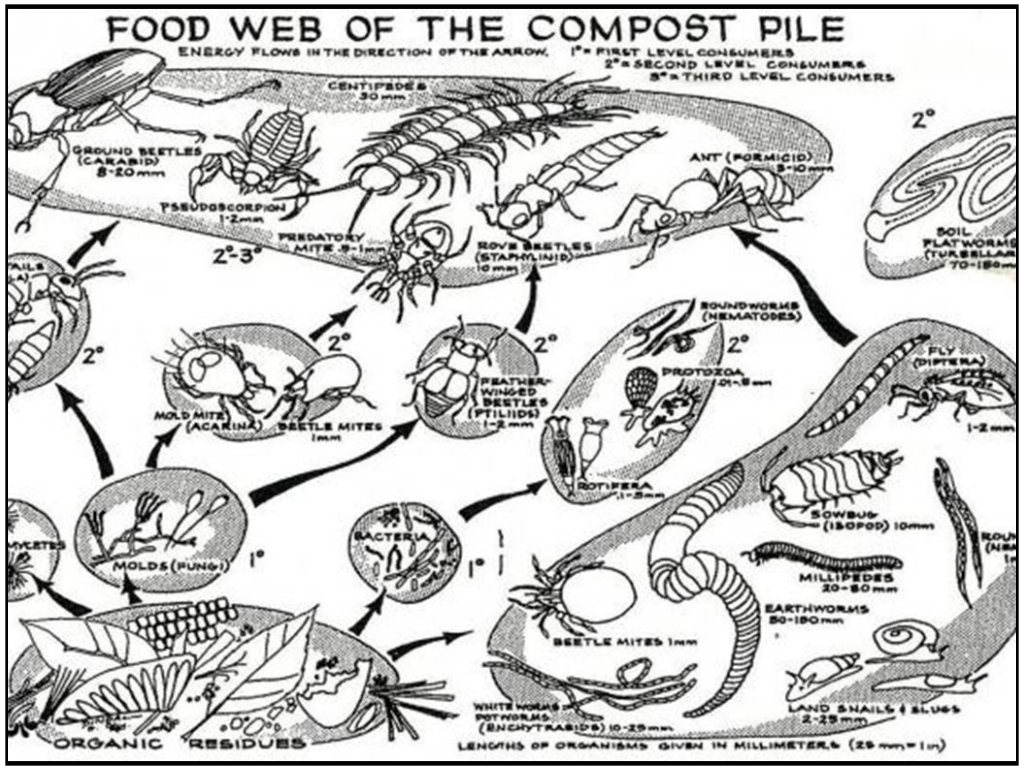


* (taking place in the presence of oxygen)

** (the means by which a microbe obtains the energy and nutrients it needs to live and reproduce.)

Meet the organic wastes: our cafeteria food scraps, combined with leaves and horse manure bedding (straw and wood shavings). We call these the "feedstock" of our layering recipe.

Meet the organisms involved with decomposing the organic waste:



The micro-organisms (microbes) on our food scraps and in our environment do the major work of “decomposing” food scraps. They make compost piles hot or “thermophilic” (~122-150 degrees). The hot temperatures kill the bad bacteria.

The microorganisms consist of bacteria, fungi and actinomycetes. Different kinds of microorganisms thrive in different conditions- relating to temperature, moisture, oxygen levels and chemical composition of the pile. They ALL need:

- Air: to support aerobic decomposition.
- Water: 50-60% moisture content. Measured by a probe or the “squeeze test”.
- Food/energy: a “balanced diet” of compounds built from carbon (carbohydrates) and nitrogen (proteins).

Here are 5 recipes for achieving the conditions necessary for proper composting; a balance of Carbon and Nitrogen, Moisture, Density, and Porosity in any size compost pile. Exactly what's needed for the health of the micro-organisms.

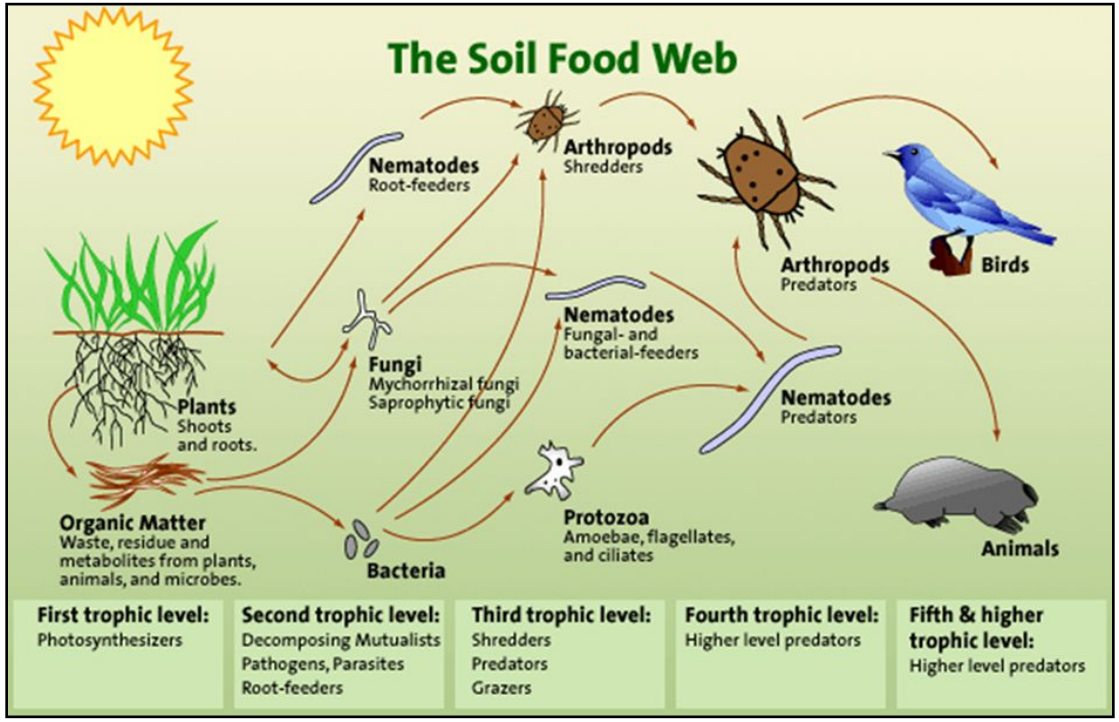
These recipes work for any scale of composting. Use a common volume unit such as a 1 five gallon bucket.

Material	Recipe 1	Recipe 2	Recipe 3	Recipe 4	Recipe 5
Food scraps					
Horse manure	 				
Leaves		 			
Wood shavings					
Mulch hay				 	
Shredded paper					

Taking Care of the Decomposers:

Basically, it's our job to maintain ideal conditions in the compost bin for the fungi and bacteria, so they can thrive and do their work.

You learn to judge the health of the pile (and therefore the micro-organisms), by smell, appearance, wetness or dryness. And data collection!



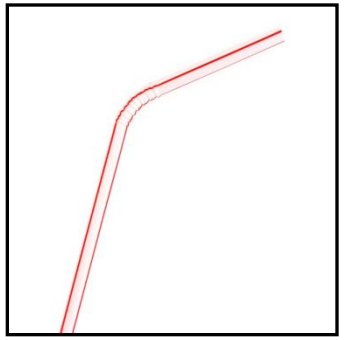
Weekly Compost Shed Work-Flow

Collect and store the food scraps

Our food scraps need to be “clean”

Yes to food only

No to plastic, paper, foil, PLU stickers



Weigh and Convey

Layering

The first layer in each bin is about 12”of horse manure bedding. Then we add food scraps. Food scraps vary in carbon, nitrogen, moisture content.

The second layer is dry leaves. Notice that adequate feedstock are stored in a dry space or procured weekly.

The third and final layer is horse manure bedding. The food scraps must be totally covered to keep in moisture and reduce smells.

Data Collection

We collect data every week; we weigh all the food scraps, we measure the height of the pile before and after adding food scraps, we take the temperature, do a smell and squeeze test.

What do these data tell us and why is it important?

2016/17

CCS Compost Pile Monitoring Log (Bins)

Pile Name: BIN 2

Pile Start Date: 12/9/16

Pile Recipe: 5

Pile End Date:

Student Initials	Date	Pile Temperature Front 18" depth	Pile Temperature Front 36" depth	Pile Temperature Back 18" depth	Pile Temperature Back 36" depth	Moisture	Pile Height	Food Weight Added			Notes (Turning, weather, smells, visual, other):
HS AC	1/5/17	112	6 in 133	100°F	6 in. 135°	55%	22½" / 29"	16.9 18	21.9 13.8 15.2	25	Dry and very dehydrated 110.9 lbs food
DM JM	1/13	132°F 12	6 in 142°F	113°F	6 in 138°F	50%	26½" / 33½"	12.4 21.0	30.9 21.2 21.5		107 lbs slight ammonia smell lots of water on boards
JJ MH	1/20	140°F 126	6 in 130°F	128°F	6 in 142°F	50%	30" / 37"	19.9 19.4 10.7 20.8	11.2 22.4 20.9		moist & mites? molasses smell 124.3 lbs food

Summary of results: 2014-present

School :

Food pound total diverted from landfill and composted on site: 4.5 tons of school lunch (pre and post consumer food scraps) to date. ~ 64 tons additional organics were sent to Green Mountain Compost (cafeteria and event compostable food ware, classroom compost)

Amount of compost produced: 11 cubic yards produced so far

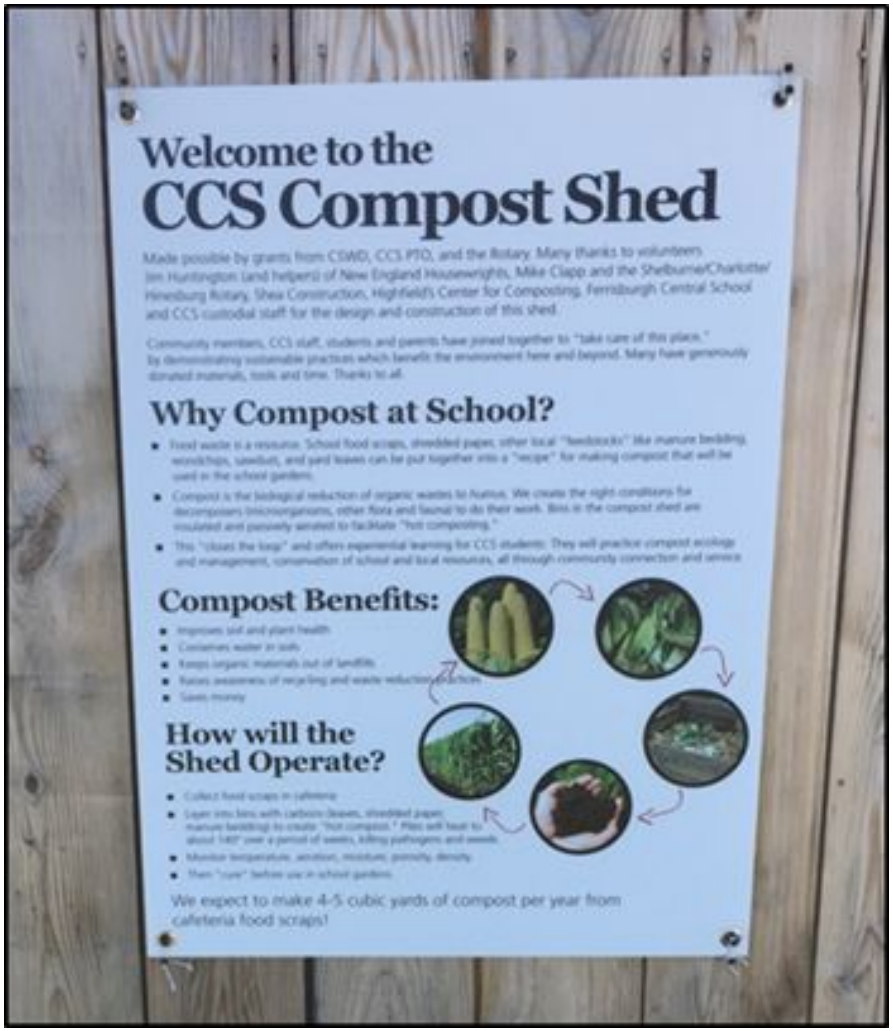
Reduced school hauling fees

Heightened awareness of compost through annual bulk sale (Champlain Valley Compost), local articles and CCS Compost shed stewardship

Community:

Maintained demonstration sites at library, Town Hall, Senior Center

Communicate and educate



CCS students have:

- Trained other students
- Given shed tours
- Presented at Town Meeting, NOFA, State Farm-to-School conference
- Met with Charlotte Selectboard
- Written articles for local news

Future Goals

- The school shed can process more food scraps than we've been adding. More from kitchen? "Source separate" food scraps at school events? Summer compost cooperative?

- CCS student "change-makers" support townspeople to divert food scraps by teaching them to compost at home or at small-scale community compost operations (yet to be identified or developed).

- CCS student "change-makers" work with Town of Charlotte to create consolidated hauling of organics, drop-off collection sites, or local compost operations, to uphold vision of Act 148.

Demonstrated results