COMMUNITY FOOD SCRAP COMPOSTING

Central Vermont Solid Waste Management District

Composting Association of Vermont

Vermont Community Garden Network

What is Compost?

Compost is a value-added product.

Composting converts residue material into an easy-to-handle, humus-like product, rich in organic matter and organisms.

Community Composting

- Often volunteer run; some operated by nonprofit organizations or farms
- Produces compost for local use
- Promotes community connections
- Provides an essential role in the evolution of food scrap diversion
- Range of sizes: 10 sq. ft. – 20,000 sq. ft.

Vermont Regulations

- Exemptions:
  - ✓ < 100 yds^3/year feedstocks
  - ✓ < 1000 yds^3/year food processing residuals on farms
  - ✓ < 3000 yds^3/year leaf and yard debris
- Larger amounts: small, medium and large operations

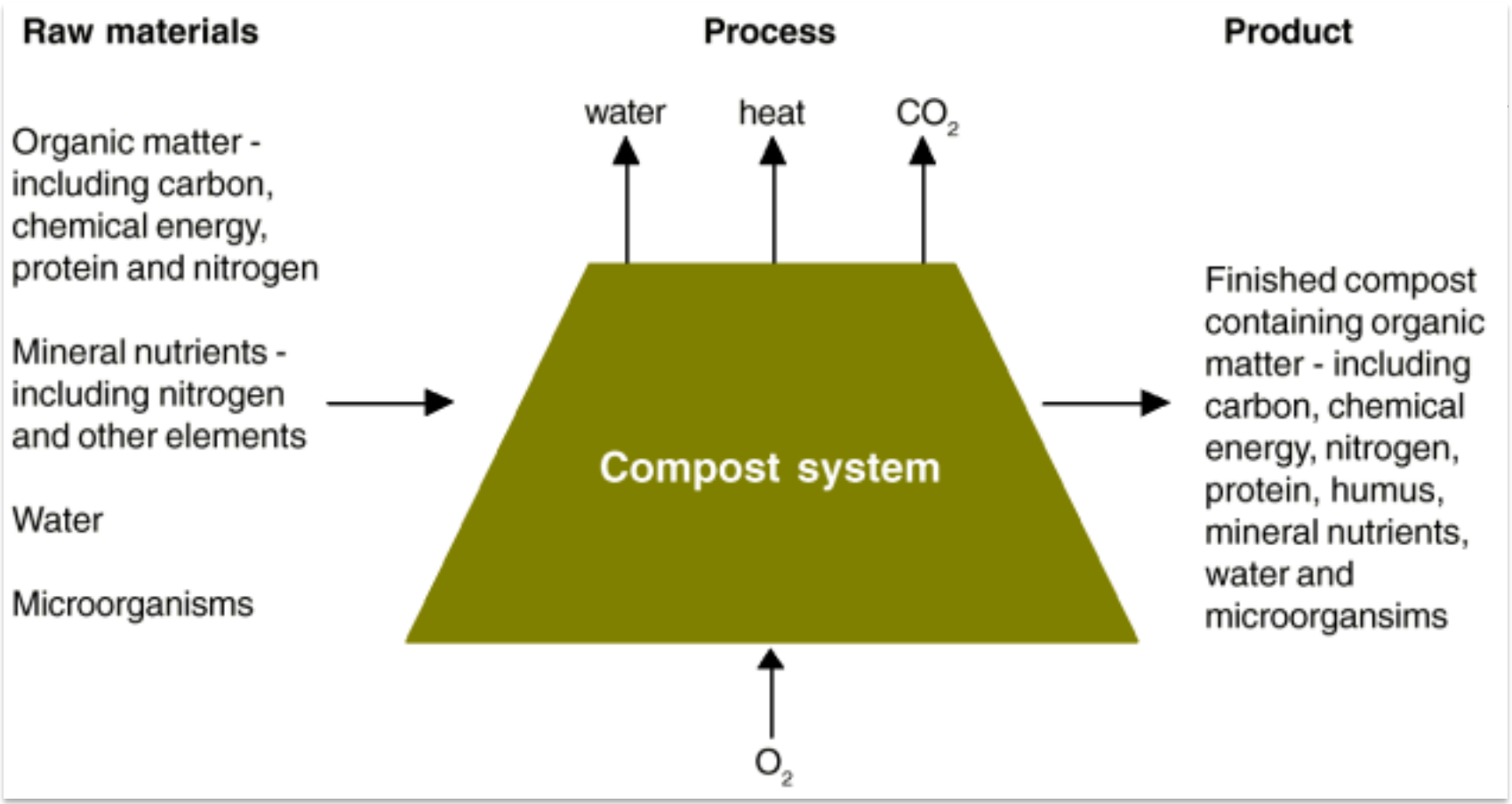
Science of Composting

The Science of Composting

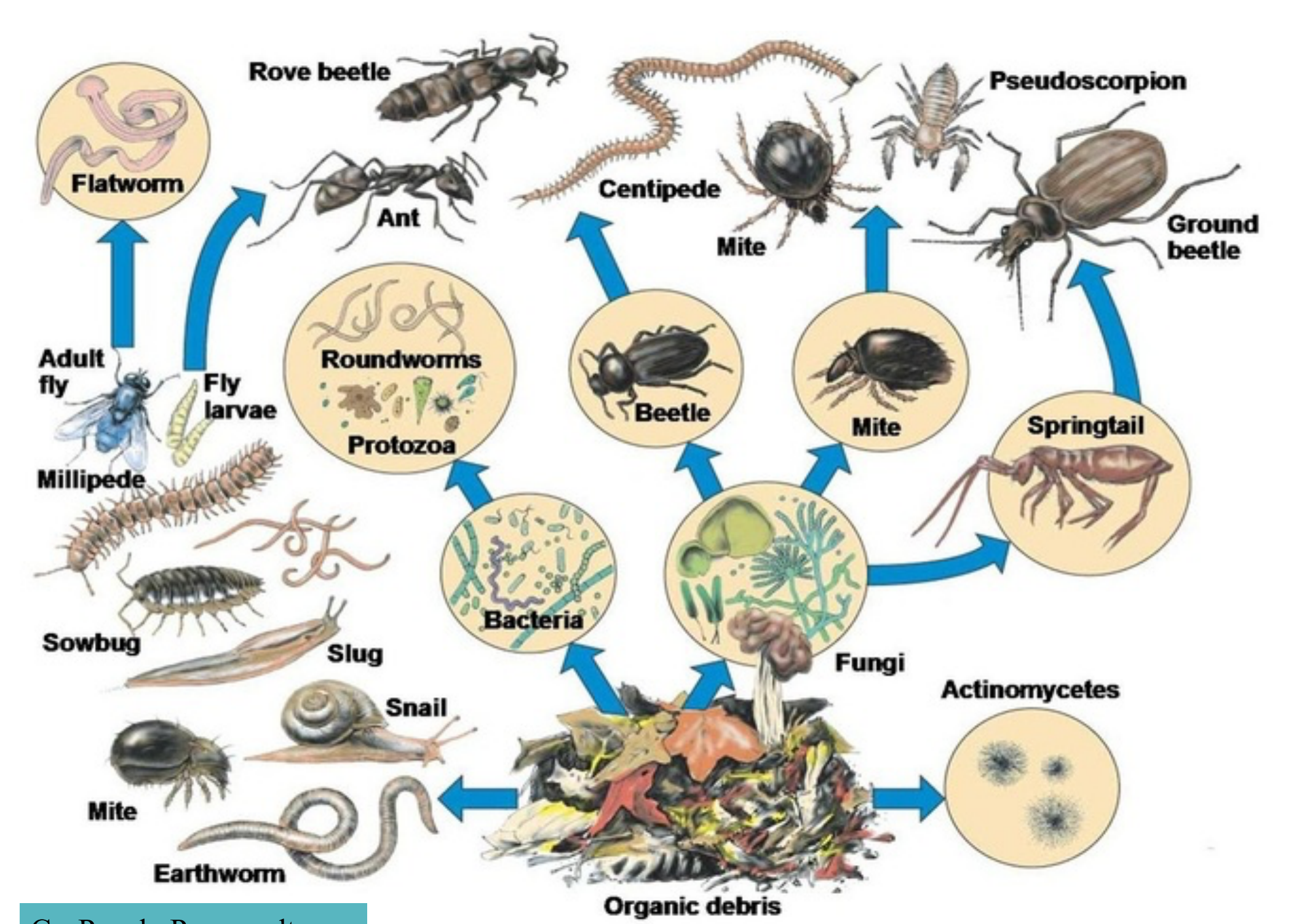
- Controlled, aerobic biological process
  - ✓ Results in the decomposition of organics
- Microorganisms are the key
  - ✓ Digest organic residues for food & energy
  - ✓ Speeds up the process by creating heat

Composting Science Basics

- **Aeration:** O_2 concentrations: 10-14+%.
- **Carbon to Nitrogen (C:N) Ratio:**
  - ✓ 20:1 – 60:1 (preferred 30:1-50:1)
- **Moisture**: 40 to 65 percent (damp sponge)
- **Optimum pH range:** 5.5 to 8
- **Temperature**: 120°-160° F
  - ✓ *Process to Further Reduce Pathogens:* **131°F for 3-15 days (*f* of system)**



Recycled Organics University www.recycledorganics.com



Cr. Puzzle Permaculture

Healthy biological activity is essential to successful composting.

Setting up the right environment & conditions is fundamental to the process.

Feedstock & Recipe Development

Acceptable Materials

- ✓ Vegetable food scraps, peels
- ✓ Fruit food scraps, peels
- ✓ Nuts & nut shells
- ✓ Dairy, cheese
- ✓ Coffee grounds/filters & tea bags
- ✓ Leaves, garden trimmings
- ✓ Napkins, paper towels
- ✓ Sawdust
- ✓ Livestock bedding/manure
- ✓ Straw

Food Scraps Sourcing

- Community gardeners
- Schools
- Businesses
- Nonprofits
- Churches
- Community

✓ Start collecting small volumes & grow it!

✓ Year-round, consistent supply of feedstocks!

Carbon Sourcing

- Wood workers, town, utility crews, landscapers – sawdust, chips
- Neighborhood, landscapers – leaves
- Farmers – livestock bedding

- ✓ **Year-round, consistent supply of feedstocks!**
- ✓ **2-3 times volume than food scraps**

Quality Begins With The Generator

Image Cr.: Permies.com

Image Cr.: David Hurd

Basic Recipe

2-3 Parts Carbon - "Brown" materials

- Woody, dry materials: wood shavings, leaves, soiled/shredded paper, straw, animal bedding
- Bulky materials, including branches should be chopped or shredded

1 Part Nitrogen - "Green" materials

- Fresh, "wet" materials, such as kitchen scraps, grass clippings, garden trimmings (no weeds), manures

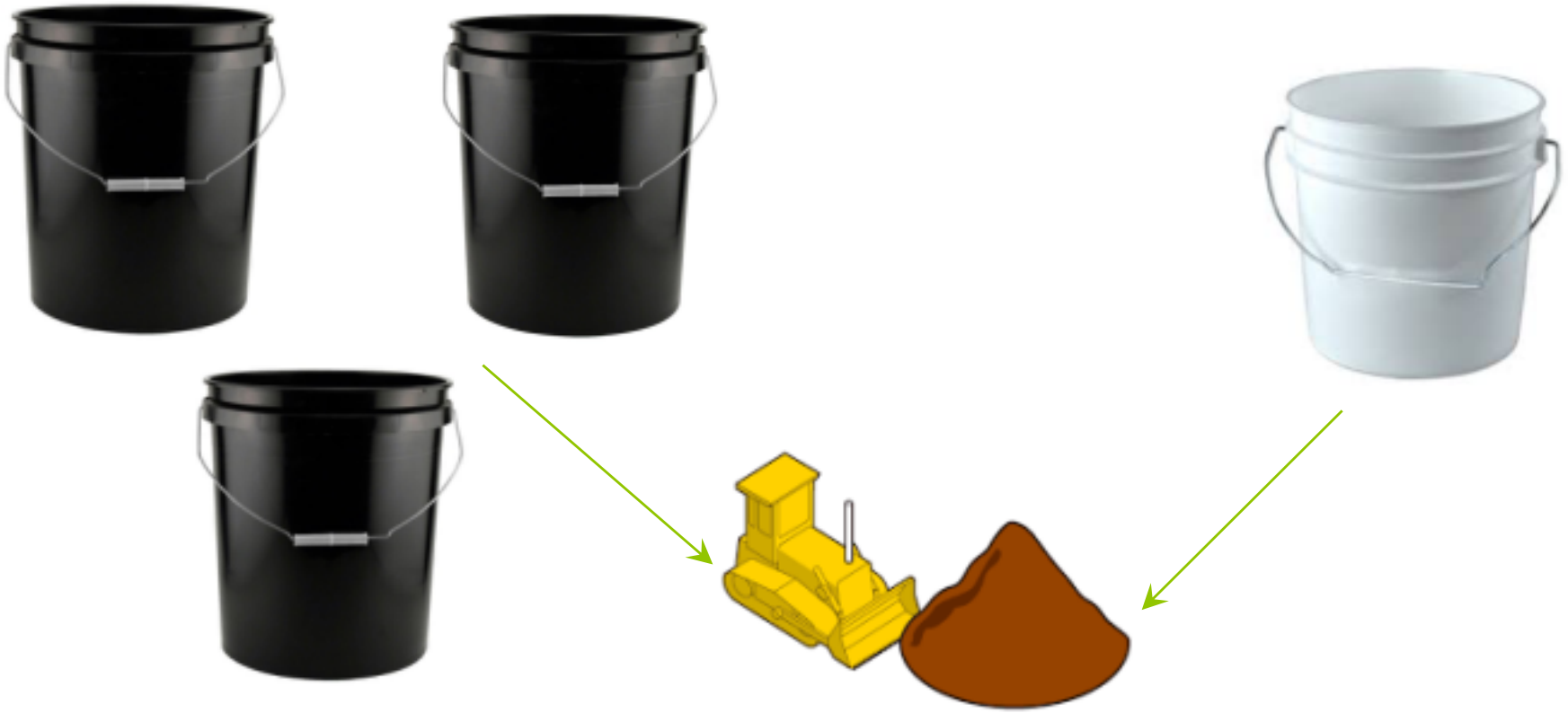
Keep it small!

✓ Mowing, grinding, chipping, or shredding

???
Does your site have enough of the right mix?

High Carbon
2-3 volumes

High Nitrogen
1 volume



Sample Carbon and Nitrogen Ratios of Various Organics

Carbon Sources	**C:N Ratio**
Yard wastes	50 - 90:1
Straw/hay	50 - 80:1
Wood chips/sawdust/wood shavings	250 - 500:1
Nitrogen Sources	**C:N Ratio**
Vegetable scraps	10 – 30:1
Fruit scraps	10 – 30:1
Grass & garden gleanings	10 – 20:1
Chicken manure	10 – 25:1
Cow manure	20 – 30:1
Horse manure	25 – 30:1

Adapted from Robert Rynk, *On-Farm Composting Handbook*, Natural Resource, Agriculture, and Engineering Service, 1992.

Recipe Tips for Jora/Tumblers

- Start with 1:1 or 2:1 (by volume) C to N
- Adjust to speed decomposition
  - ✓ Temperature
  - ✓ Moisture level
  - ✓ Active decomposition

Recipe Tips for bins/piles

- Carbon: 3:1 (by volume) C to N
- Bulking agents: wood shavings, chips
  - ✓ Provide porosity
  - ✓ Pile stabilization
  - ✓ Aid air flow

What else to think about?

- A little soil, finished compost, or horse manure
- Moisture
  - ✓ Required to keep microorganisms alive & active
  - ✓ Just a little, like a damp sponge
  - ✓ Leave lid or cover off during rain

General tips

- Mix ingredients together to create a better balance
- Adding food scraps
  - ✓ No more than 20%, more okay in tumblers
  - ✓ Balance C:N ratio, moisture, bulk density
- Observation, temperature, look & feel of compost, trial & error

Hot Compost

- Temperature: at least 120° F
  - ✓ 130°F for PFRP
  - ✓ Turn/rotate materials (1-2 times/week)
- Enclosed containers
  - ✓ Insulate in winter
  - ✓ Use larger containers or tumblers
- Covered piles – insulate
- Proper “mix” of feedstocks

Compost Systems & Operations

System Considerations

What's Right for your Site?

Photos: upper left: Bakersfield Elementary Middle School, Bakersfield, VT; lower left: Red Hook Community Farm, Brooklyn, NY (photo credit NYC Master Composter Manual, DSNY); upper right: Charlotte Central School, Charlotte, VT; lower left: La Plaza Cultural, Manhattan, NY

System Considerations: Materials

Photos: upper left: La Plaza Cultural, Manhattan, NY; upper right: Cornwall School, Cornwall, VT; lower right: Thetford Elementary School, Thetford, VT

Assess Volume of Materials:

Community need

People power

Site capacity

Resources available

Permit limits > 100cy/yr. feedstock

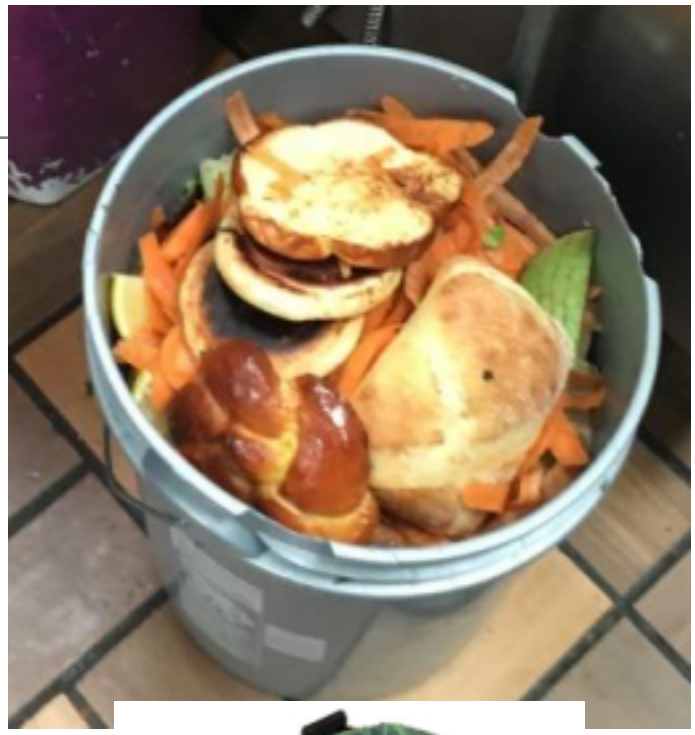
Site Plan

- Composting method
- Safety & fire emergency plan
  - ✓ Security & vandalism concerns
- Monitoring techniques & record keeping
- Provisions for controlling odors
- Contingency plan

Going with the Flow

1. Feedstock collection
2. Feedstock preparation
3. Active composting
4. Curing
5. Harvesting & sifting
6. Distribution

Collection From the Generators



Feedstock Collection at the Site

Ludlow Area
Community Garden

Images Cr.: BioCycle.net

Image Cr.: Elements Mountain Compost

Feedstock Collection at the Site

The Garden at
485 Elm Street

Carbon Storage

Image Cr.: Philadelphia Orchard Project

Image Cr.: Cedar Circle Farm

Ludlow Area Community Garden

Ludlow Community Compost Site

Compostville at 485 Elm St.

Bins Within Fencing

Down to Earth Community Garden

Fort Ethan Allen Community Compost

Signage is Important


KITCHEN
WASTE
Put food scraps into the plastic buckets in bin.
BIN 2

Feedstock Preparation: Mixing

Image Cr.: Dreamkeeper Garden

Mixing food scraps in bins & windrows

Nola Greens – New Orleans

Food Land Opportunity - Chicago

Turning Active Compost

Hands in Heart Community Garden

Windrows

Images Cr.: David Hurd, GrowNYC

The Dirt Factory Community Composting Facility In University City

Chapel Hill Community Compost

Image Cr.: Chapel Hill Spring Garden Tour

Curing

- Necessary part of the compost process
  - ✓ Should be cured for a minimum of 45 days
  - ✓ Ensures compost is completely done & ready for use
- Cured compost becomes stable & mature
  - ✓ Ammonia nitrogen converts to nitrate nitrogen
  - ✓ Large woody particles continue to break down
- Compost ingredients not recognizable
  - ✓ Wood chips may not entirely decompose & will require screening

Finished Compost - Screening

Image Cr.: University of Florida/IFAS Extension Sarasota County

Image Cr.: EcoCity Farms

Process Management & Monitoring

BMPS

- Operated so as to minimize odors, prevent run-off, & not harbor rodents & pests
- Screened from view from public & adjacent neighbors using plants, trellis or fencing.

BMPs

- A neat site appearance is important
  - ✓ Don't let weeds grow on finished product
  - ✓ Deal effectively with leachate or ponding
  - ✓ Consider the view from the road

Monitoring the Process: Smell

- *Oxygen*: Smell is the best measure of properly aerated composting
- Unpleasant odor: indicative of anaerobic conditions
  - ✓ Pile needs to be turned

Monitoring the Process: Observation

- Are the bins or piles steaming?
- Are materials looking different?
  - ✓ Is decomposition occurring?
  - ✓ Materials slowing looking like soil?
  - ✓ Is the pile uniformly composting?
- Are strong odors present?

Monitoring the Process: Temperature

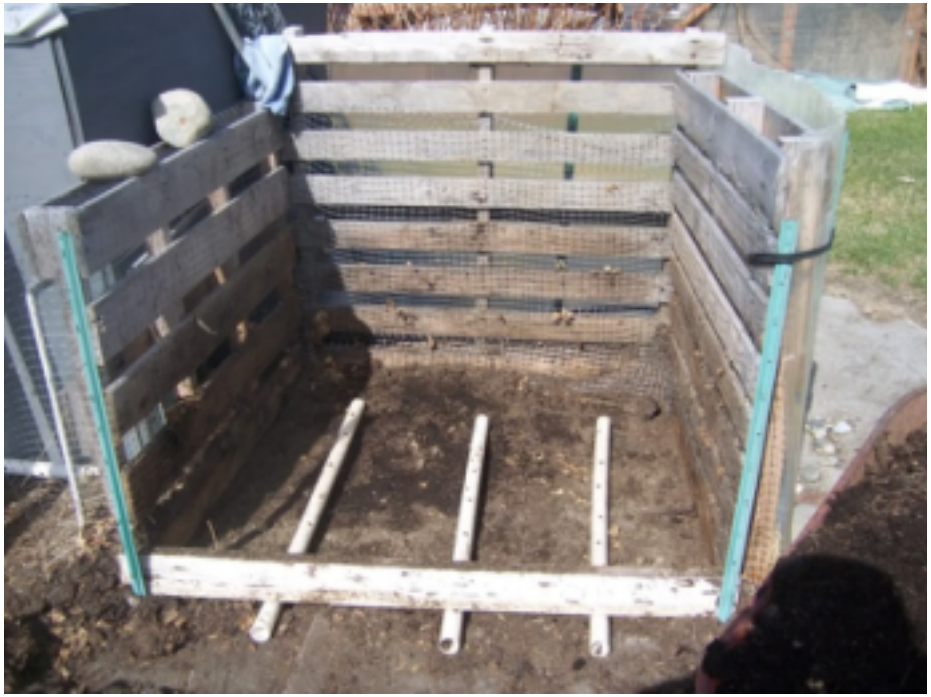
- Is the temperature rising appropriately for rapid compost?
- Does it reach 120°F
  - ✓ Maintain for PFRP (131°F…ideal)

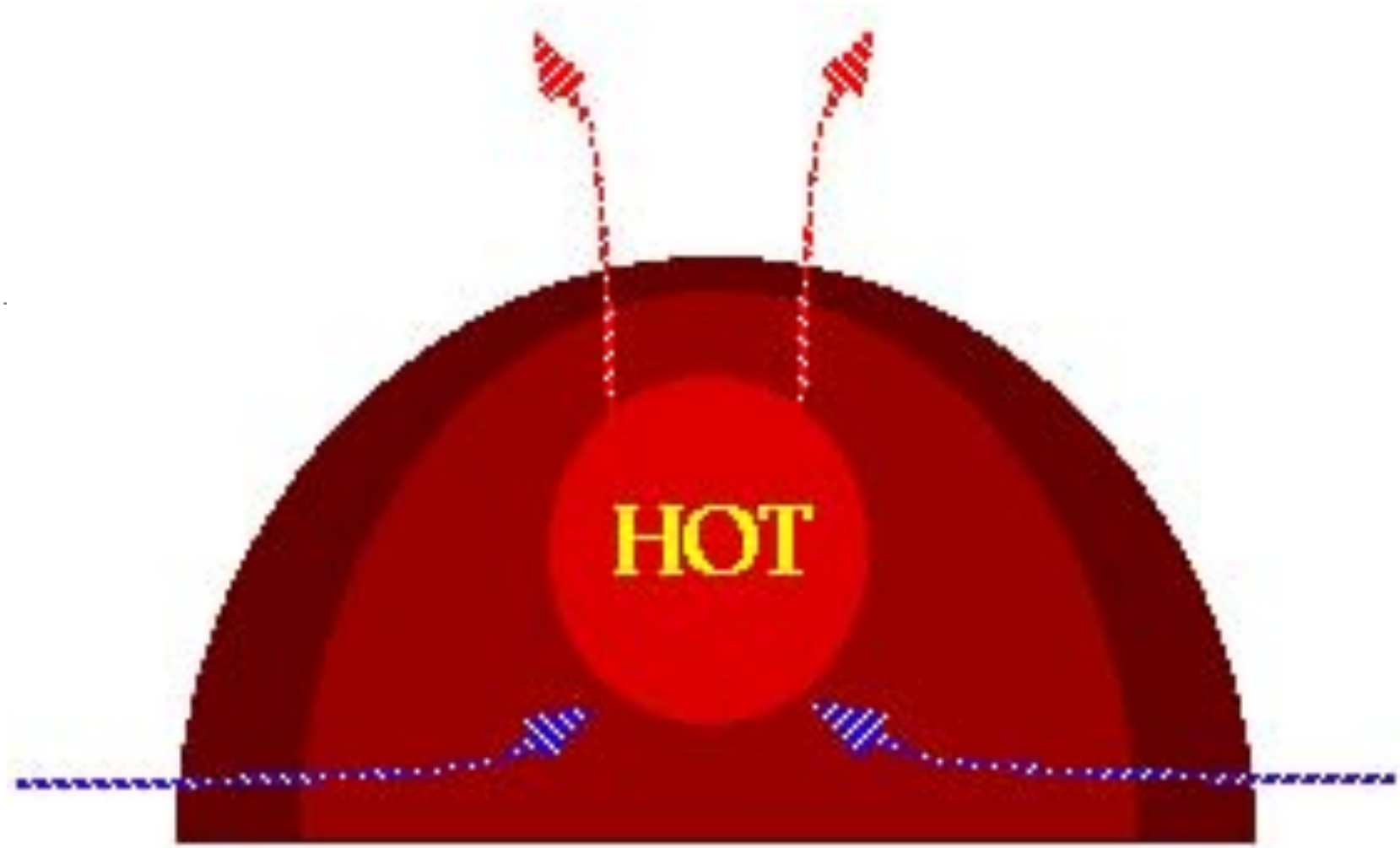
Monitoring the Process: Touch

- Does the squeeze test indicate that there is moisture in the material?
- Does it feels like a damp sponge & stick together?

Aeration Techniques

- Tumblers: close lid & rotate
- Piles, bins: move materials with pitchfork
  - ✓ Move materials from outside to inside
  - ✓ Place materials on perforated pipes or pipe through middle





Natural Air Circulation in a Compost Windrow

Cornell University

Example: My compost stinks…

- Locate where the odors are coming from (collection area, active compost)
- Determine the cause (based on smell, location, moisture, etc.)
- Take action

LOG BOOK

Date	Time	Composter Name(s)	Moisture Rating	Odor Rating	Temp 1	Temp 2	Turned (Y/N)	Other Actions Taken

LOG BOOK

Compost Monitoring Log									
Pile Identification: Pile Location:									Date Pile Built:
Feedstocks and Mix Proportions:									
Date	Pile Temperature					Air Temp	MC	Odor	Visual	Notes (management, weather, vectors):
	1 1'/3'	2 1'/3'	3 1'/3'	4 1'/3'	5 1'/3'					

Quality Assurance

- Observe, monitor, sample, analyze, test
- *Keep accurate compost records*
  - ✓ Track feedstock sources & materials
  - ✓ Track turning frequency, temperature
  - ✓ Track compost phases (Active, Curing)
  - ✓ Odor issues & other problems
- Train the Team!

Compost Testing

- Maturity
- At a minimum: analyze the basic nutrient content (N:P:K:)
- Bioassay testing

More Tips

- Use vinegar to wash collection containers
- Adequate amount of carbon
- **Always** cover food scraps with C or soil
- Cover with lime to deter fruit flies & vermin (rodents, bears)
- Line bottoms of compost bins with wire mesh (detours vermin)

If Critters Become An Issue

- Use Jora, Tumblers for full decomposition
- Eliminate any meat, sauces, cheese
- Discontinue adding food scraps, especially in early spring
- Build an enclosure around the compost area

Who You Gonna Call?

- Solid Waste Management Districts
- Composting Association of Vermont
- Northeast Recycling Council
- Vermont Community Gardens Network
- UVM Extension Master Composters
- Community Composter Seminars

Special Appreciation

- CVSWMD
- Northeast Recycling Council

Questions?