



Utah Core Objectives

Sixth Grade Science
Std. 5 Obj. 3 Identify positive and negative effects of microorganisms and how science has developed positive uses for some microorganisms and overcome the negative effects of others.

Objectives

Students will be able to:

- Examine the underside of kitchen scraps and identify mold
- Examine fresh composting samples and identify characteristics
- Describe how the process of composting produces humus

Materials Needed:

- Four Ziploc bags of compost with visible items in them
- One bowl of kitchen scraps that have been sitting for 4 days
- 1-2 Ziploc bags of spinach that has been sitting for 5-7 days
- Magnifying glasses
- 1 pair latex gloves for ea. group
- Handout for each student
- Lab report for each group
- Recycling 101 DVD

Time

- 50 minutes

For more information contact:

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THE SECRET LIFE IN A COMPOSTER

How does composting work?

Who and what lives in a compost pile?

Why should my family compost?

Prior to the class

Copy each handout double sided and distribute to each student.
Test the DVD player with Recycling 101.

Instructions

Opening remarks.

Customize your introduction for the group. Possible points:

- The world is changing.
- Resources are getting scarce. Eg. Gasoline.
- Need to change habits.
- Need to recycle, conserve, use different kinds of energy.
- Transition to composting — they will learn Nature's method of recycling.

How does composting work?

Some of the students in the class may have composters in their backyards; others may have heard of composting. Use the handout to explain the steps of composting. Emphasize that the process is based on the positive effects of micro-organisms:

- Composting process requires micro-organisms, earth worms, small insects and small soil organisms to work.
- These organisms eat organic yard waste.
- Worm castings make especially rich compost.
- The composting process requires carbon, nitrogen, water and oxygen because organisms need carbon for energy and nitrogen for body structure.

Review the organism chart on the back of the handout. You can make it interactive by having each student call out the names of the organisms. Suggest that students should look for some of these creatures in their compost samples.

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THE SECRET LIFE IN A COMPOSTER

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Who/what lives in a compost pile?

Explain that the students will be given samples of compost/ kitchen scraps to work with. Each group should examine their sample and record their observations on a lab report.

- Color
- Texture
- Smell
- Components—what do they see in their sample?
- Living things
- Moisture content

Try to have students work in pairs if you can. Give one student in each pair/group gloves to wear — that person is the handler. Tell each group to select a reporter—someone who will write observations on the lab report. Supply scrap paper or a dish so that students can pull portions of their samples out of the bag to look at them. Distribute magnifying glasses. When students find organisms have them use the magnifying glasses and chart for identification.

Circulate to each group. Suggest that the group with the spinach, place a few of the spinach leaves in a cup or bowl of water. What happens to the water? A: It turns green. Little bits break down and float or seem to dissolve. What do you think happens to leaves in Nature when it rains or when snow melts on a compost pile? Why does it help to water a compost pile?

After 10-15 minutes make sure each group has answered all the questions at the bottom of the lab report. Have each group clean up before they report out.

Report Out

Start with the group that has the bowl or the spinach — the “youngest” samples. Help students compare and contrast the samples. Hold up each sample as the group reports out. Make sure the entire class understands the differences between the oldest and youngest samples when they answer the last three questions. There will probably be bugs, mold and creatures in the older samples. Re-emphasize that their activities turn recognizable components into the rich brown, earthy soil in mature compost.

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This lesson plan made possible by a grant from The National Resources Conservation Service



THE SECRET LIFE IN A COMPOSTER

- Continued -

Why should my family compost?

Sum up the activity with the following learning points:

- Our landfill is filling up. Estimated 5-7 years lifespan left.
- We dispose of our visitors' trash. So we throw away three times as much as the national average.
- We need to recycle more. 55% of our trash is fiber—paper and cardboard — and food waste.
- The goals are important: *divert 30% by 2010; 50% by 2020; 70% by 2030*
- Your family can help by recycling including Nature's way of recycling: composting
- Composting returns nutrients to the soil so they can be used again by living things.

Show Recycling 101 if there is time.

Debrief the video by talking about each of the 3Rs—Reduce, Re-use, Recycle and students' observations of what they saw in the film and what they do themselves.

Extension

Start a compost pile and garden at your school.

This lesson plan made possible by a grant from Wells Fargo

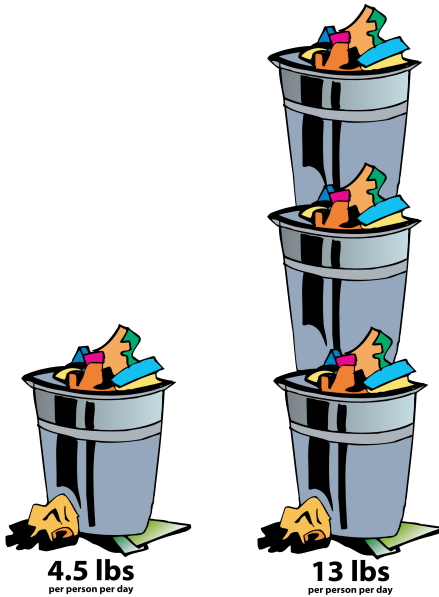
BACKGROUND

Summit County Recycling Goals

30% by 2010

50% by 2020

70% by 2030



| Material | National Composition | Estimated Summit County Composition* |
|--------------------|----------------------|--------------------------------------|
| Fiber | 33.9% | 35% |
| Food Scraps | 12.4% | 20% |
| Plastic | 11.7% | 11% |
| Yard Trimmings | 12.9% | 10% |
| Metals | 7.6% | 8% |
| Textiles | 4.8% | 5% |
| Glass | 5.3% | 4% |
| Wood | 5.5% | 3% |
| Rubber and Leather | 2.6% | 2% |
| Others | 3.3% | 2% |
| Total | 100% | 100% |

NOTE:
*Includes waste from residential, commercial, and institutional sources

Across the nation, Americans throw away an average of 4.5 lbs of trash and recyclables every day. Summit County's rate is three times the national average. Why? We have a tourist industry and we dispose of our visitor's 4.5 lbs a day in our landfills. That's why our landfill is reaching capacity.

Lab Report

Observations: Examine your sample. Take notes on color, texture, smell, components, moisture content. Identify the creatures you see. Draw pictures of the creatures.

Hypothesis:

How long do you think your sample has been sitting?

What will happen over time?

What will happen if you use this sample as fertilizer in a flower bed?



IT'S EASY TO START COMPOSTING

Composting is the ultimate, responsible way to recycle. Compost is a mix of carbon-rich (brown) and nitrogen-rich (green) materials. It's Nature's way of improving the soil in your garden.

1. Choose a sunny to partly sunny site near a source of water.
2. Add a 6 to 12-inch layer of brown materials to a commercial or home-made bin, then add a comparable layer of green materials.
3. Add a shovel of earth—soil from your garden. This contains the micro-organisms and worms that will help decomposition.
4. Continue layering until the pile is at least 3 feet high and 3 feet wide.
5. Add water to moisten the mixture—compost should always be as damp as a wrung-out sponge.
6. Turn the pile with a garden fork, mixing the greens and browns together and aerating them.
7. If you aren't strong enough to turn the pile, use a poker to create a series of aeration holes.
8. As they accumulate, continue adding green and brown materials in roughly equal parts.
9. Turn the compost with each new addition and add water as necessary. A well-aerated pile of mixed greens and browns should not smell.

Brown Materials

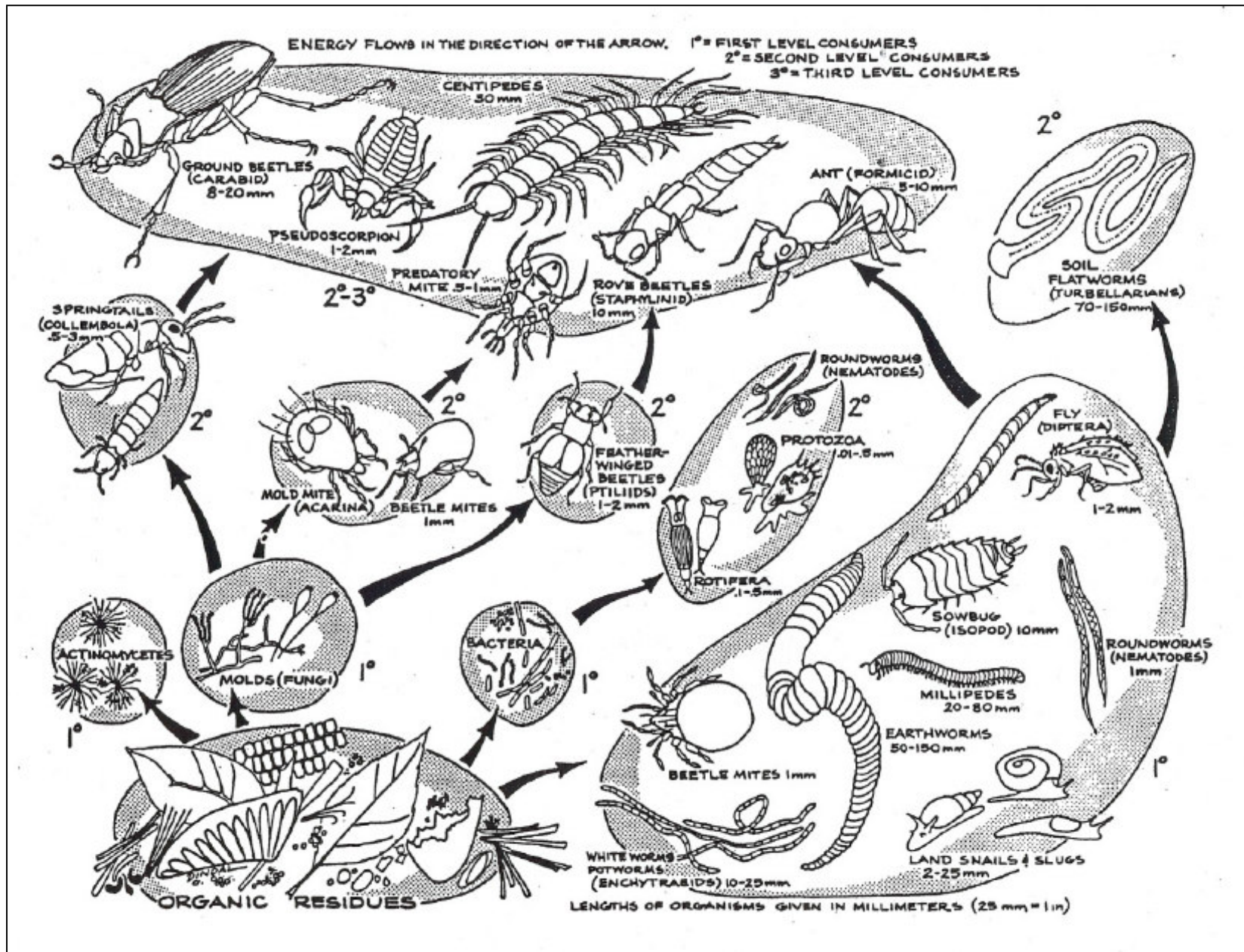
Fallen leaves
Sawdust
Shredded newspaper
Branches
Small twigs

Green Materials

Grass clippings (free of pesticides)
Fruit & vegetable scraps
Houseplant trimmings
Soft prunings from the garden
Egg shells
Spent flowers & plants
Coffee grounds & tea bags



NO Animal products (meat, bones, fats, dairy) anything treated with herbicides or pesticides, stones, metal, cardboard, glass, diseased plants, large branches or wood chips, pieces of eucalyptus, red cedar or black walnut trees, animal manure.



From the *Bicycle Guide to the Art and Science of Composting*