



## Lesson: Now You See It, Now You Don't

**Grade:** 4-5

**Subject:** Science, Math, English (extension)

**Objectives:**

Students will:

- classify organic and inorganic objects
- perform a mini-compost experiment
- record observations
- compare and contrast decomposition rates for organic and inorganic materials

**Teaching Time:** two 45 minute periods (weeks 1 and 5); four 10 minute weekly observations (weeks 2-5)

**Materials:** Large clear plastic or glass jars (one jar for each group of 4 students); Collect from home or school: samples of organic materials (pieces of paper, egg shells, potato and fruit peels, apple cores, bread, leaves, grass clippings); samples of inorganic materials (rock, bottle caps, glass, small plastic comb, aluminum foil); garden soil (not potting soil); labels to identify jars;

(Continued...)

### Background:

When we mention recycling, we often think of recycling glass bottles, aluminum cans and newspapers. But almost another 30% of the household garbage we throw out also can be recycled. These recyclables are food scraps, leaves, grass clippings and other biodegradable organic wastes. Organic wastes can be recycled through a process called composting. Simply stated, composting creates optimal conditions for decomposition to occur. Decomposition is the biochemical process by which bacteria, fungi and other microscopic organisms break organic "wastes" into nutrients that can be used by plants and animals. Decomposition occurs in nature whenever a leaf falls to the ground or an animal dies. This is the end of nature's cycle and it is essential for the continuation of life on earth. The result of decomposition in a compost pile is a nutrient-rich humus that is excellent for improving soil quality and plant growth.

*\*Do not use potting soil for this experiment because it does not contain any microbes that will aid the decomposition process.*

### Procedures:

- **I would like you to name some kind of item and watch as I write it in a certain category. See if you can figure out the categories I am using.** As each item is named, place it in the group of organic (living or once living) or inorganic (not living or once living) things.
- After this short activity, make sure students understand the difference between organic and inorganic. By knowing this difference in objects, we can do something that is very good for the earth.
- Distribute "Now You See It, Now You Don't" worksheets to each team of three to four students. Discuss with students and lead them to recognize that organic materials are more likely to decompose easily, whereas inorganic material tend to take a very long time to break down, if ever.
- Give each team a jar, samples of organic and inorganic materials, soil, water and label. Have teams label their jars with their names. **Now, put several inches of soil into the jar, followed by the organic and inorganic materials. Cover the soil and add enough water to moisten the soil without making it soggy. Don't cover your jar, but place it by a window or somewhere that it will receive sunlight. You will have to moisten the soil regularly to keep it damp, but NOT soggy.**

(Weeks 2-5)

- Choose one day of each succeeding week to record observations. Students will need to spread contents onto newspaper for viewing. Students use observation sheet, "Now You See It, Now You Don't" to record what they find.

**REDUCE**  
**REUSE**  
**RECYCLE**

## **Reflection/Response:**

- On the last day of the experiment, have each group present its findings to the class. Encourage students to compare their observations for similar and different findings.
- Discuss with students why they think some materials decomposed rather quickly, while others didn't decompose at all.
- Have students write a description of their experiment including a summary of their findings.
- Ask students if they believe things placed in a landfill will decompose or compost. (NO!) Why not? Because you need air, water and light to help decomposition, all things which are limited because of landfill construction. In fact, landfills have so little air, it causes anaerobic conditions (without oxygen at all)! When you place food or other organic materials under anaerobic conditions, you get a by-product called methane gas which is foul smelling and bad for the environment in large quantities. These are all good reasons why we should compost in our backyards and schools whenever possible.
- Share with the class the information on the transparency "When Will These Things Decompose?" NOTE: Some items, such as plastic derived from petroleum (an organic origin), are classified as inorganic because: (1) technology synthetically changes the composition during the manufacturing process, and (2) the length of time needed for plastic to decompose is unknown.

## **Extensions:**

- Perform the Extension: "The Benefits of Composting". You will investigate the following: plant flowers in compost only; plant identical flowers in potting soil only; plant identical flowers in a 2/3 potting soil, 1/3 compost mixture and chart the three growth patterns; have students form conclusions about which mixture is the healthiest for plants. (A 2/3 to 1/3 ration is considered ideal for supplementing soil with compost. If the experiment yields no noticeable difference among the groups, discuss with students how scientists use many replicates of samples to control for errors).
- Read Gary Larson's *There's a HAIR in my dirt! : A worm's story*. Harper Collins, 1998.

### **Oregon Common Curriculum Goal:**

#### **Mathematics:** Statistics and Probability

- Collect, organize, display, interpret, and analyze facts, figures, and other data.

#### **Science:** Unifying Concepts and Processes

- Apply foundation concepts of change, cycle, cause and effect, energy and matter, evolution, perception, and fundamental entities.

### **Grade 5 Benchmarks:**

- Collect, organize, display, and analyze data, using number lines, bar graphs, line graphs, circle graphs, stem and leaf plots and histograms.
- Observe and record a change over time, sort data and display in a logical sequence, explain the experiment in terms of cause and effect.

worksheet and observation sheet (one per student) Now You See It , Now You Don't; newspaper; transparency, When Will These Things Decompose?

(Optional extension:) worksheet, The Benefits of Composting Experiment and a small amount of compost, potting soil, three pots, and identical seeds.

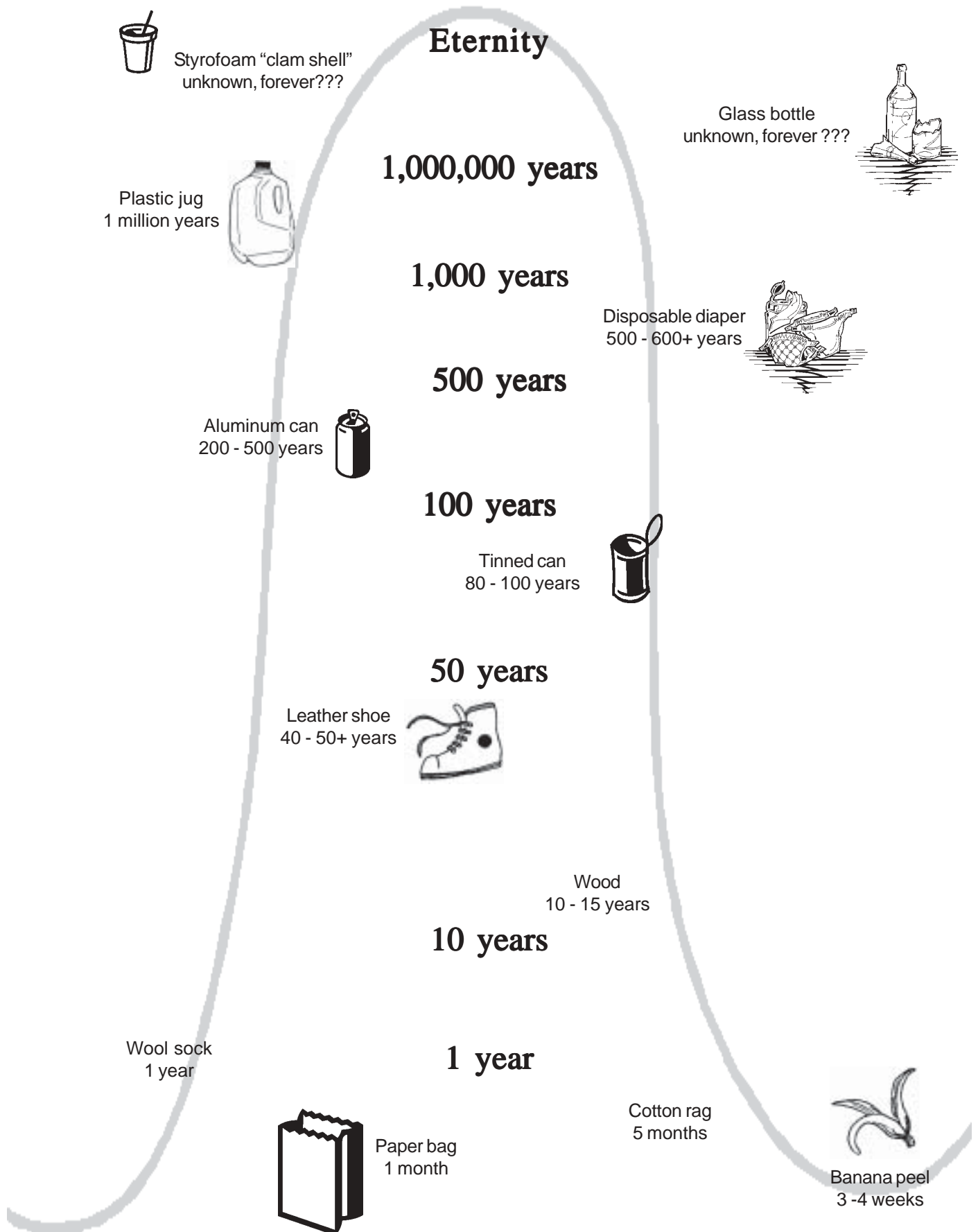
Video: "Worm Bin Creatures Alive Through a Microscope", see Resource section for availability

### **Vocabulary:**

organic  
inorganic  
composting  
decomposition



# Overhead: When Will These Things Decompose?







# Worksheet: Now You See It, Now You Don't

**Group Name:** \_\_\_\_\_

List the items that you are placing into your jar. \_\_\_\_\_

\_\_\_\_\_

Hypothesize which items will break down over the five week period (from fastest to slowest).

\_\_\_\_\_

\_\_\_\_\_

## **Week One:** Observations

Which items do you notice any changes in? Describe and record findings here.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## **Week Two:** Observations

Which items do you notice any changes in? Describe and record findings here.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## **Week Three:** Observations

Which items do you notice any changes in? Describe and record findings here.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_





## Extension: The Benefits of Composting Scientific Experiment

The purpose of this experiment is to try to demonstrate the beneficial use of compost in the garden. Scientists have tested compost and found that it contains many nutrients that plants need, helps the soil hold in water that plants need, and can be used instead of fertilizers which, when used improperly, can be harmful to the environment. Composting also means that we don't have to send our leaves, grass, and food waste to the landfill which is also good for the environment! This experiment will use three types of potting mixtures to see which one has the best effect on growing a plant.

**Step 1:** Write a your hypothesis about which pot will grow the most healthy plant:

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**Step 2:** Plant all of the pots.

Pot 1 will contain potting soil only.

Pot 2 will contain compost only.

Pot 3 will contain 2/3 potting soil to 1/3 compost, evenly mixed together before placing it into the pot.

Follow the instructions for the type of seed you are planting and be sure that each seed in all three pots is planted at the proper depth (and that all three seeds are planted at the same depth).

**Step 3:** Water each pot with enough water to entirely run through the pot and out of the bottom. Give each pot the same amount of water (about 1/2 cup). Continue water each pot on the same day, at the same time, with the same amount of water for the duration of the experiment. Water every time the soil begins to feel dry just under the surface.

**Step 4:** Using a calendar, mark the first day that each seed breaks the surface of the soil.

**Step 5:** Measure the height, number of leaves, and flowers (if it is a blooming plant), every fifth day after the plant breaks the surface of the soil. (If the fifth day is going to fall on a weekend, the class may want to try measuring every fourth or third day instead).

**Step 6:** Once you have reached the end of the designated growing time--as determined by your teacher, answer the following questions:

1. Was your hypothesis correct? \_\_\_\_\_

2. Which potting method was the best for the plant? \_\_\_\_\_

3. If you could not determine which method worked best from this experiment, discuss with your teacher some possible reasons for this and write them here. \_\_\_\_\_

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4. List the ways in which composting helps the environment. (There are at least four, can you think of more?)

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Artwork by Evan Green, Grade 12, Sam Barlow High, Gresham-Barlow SD 10J, submitted for the Metro Regional Services Earth Day Bill Board Contest, 2001.