Activity name: Comparative Landfills

This activity is meant to provide a real-world application of the ATEEC Recommended Core Curriculum's math, science, technical, communications, or critical thinking knowledge and skill concepts, which have been identified by the ATEEC Fellows as necessary preparation for environmental technology occupations.

Appropriate for which course(s)? Technology Studies or High School Science

Concept/skill learned (i.e. from K/S Tables): Principles of waste site operation

Math Skills: Construct, read, and interpret graphs and graph temperatures.

Science Skills: Reading thermometers. Identify and follow lab and field procedures. Maintain accurate lab log books.

Technology Education Skills: Use computers, peripherals and software programs (spreadsheet). Complete written data form.

Resources: Math teachers at Mosley High School, Lynn Haven, FL.

Approximate time to complete activity: 1 hour on first day, a few minutes a day for several weeks, 1 hour wrap-up at end of decomposition time

Source of idea or activity (for published source, please include author, title, publisher, date): Brainstorming session with other teachers at school and waste site operator

Materials/resources needed (equipment, print media, electronic media, videos, supplies, etc.):

- 2 two-liter bottles
- soil
- small amounts of garbage typical of waste in your area, including food scraps, paper, yard waste, plastic
- 2 thermometers
- plastic wrap & rubber bands
- sandwich size resealable bag
- gloves
- camera and film (optional)
- soil test kit (optional)

Description of activity:

The purpose of this activity is to demonstrate what actually happens to garbage in landfills, and compare it to simply burying the trash. Prepare the bottles by cutting off the tops of each. Fill each bottle approximately one-third full with clean soil. Optionally perform a soil test to acquire baseline data for the soil. Students should divide the garbage into two equal piles and accurately measure what is in each pile. The data should include weight and physical characteristics. Optional photographs are helpful here. Carefully place one pile of garbage in one bottle, place the other pile in the resealable bag. The first bottle simulates garbage that is simply buried, the garbage in the bag simulates garbage buried in a modern landfill with liners. Place the resealable bag in the second container. It helps to control this activity by placing the piles in similar order in both containers. Place the thermometer as close to the garbage as possible and fill both containers with soil to the same level, making sure you can still read the thermometer.

Add equal amounts of water to both containers, just enough to moisten the soil in each. Cover each container with plastic wrap and seal with the rubber bands. Set the containers aside for 4-8 weeks, checking and recording the temperature in each container everyday. At the end of the specified time period dig up the garbage from each container. Carefully observe the garbage from each container and collect data to show the changes from the data collected before it was buried. If a soil test kit is available, test the soil from immediately below the garbage in each container. Students should be able to determine distinct differences in the two piles, as well as similarities. Changes from the original description of the garbage to the current state of decomposition should also be apparent.

Extension activities could include:

- each group of students should be able to create a poster or display to show their results
- create a graph to show the rise in temperature as the garbage decomposes differently in the two containers
- have the students visit the local landfill to learn things are different today from older landfills
- students can research how toxic chemicals would leak from older landfills, or use the Internet to learn more about landfills problem sites such as Love Canal.

Activity submitted by: Ray Wishart

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