

Let's Make a Landfill

Materials:

For each group of 2 students: a shoe box, aluminum foil, a bag of soil and 2 of each of the following - food scraps, newspaper, cardboard, glass, marble, cotton cloth, polyester cloth, copper wire, steel nail, piece of plastic, masking tape, water and a "Mini-landfill" worksheet for each student.

Grade Level: Intermediate

Content Objectives:

Students will be able to:

1. Differentiate between materials that decay from those that won't.
2. Explain how to construct a landfill.
3. Identify factors that help materials to decompose.

Assessment Strategies:

1. Construct a landfill.
2. Have the appropriate materials in their landfill.
3. Complete their worksheet.

Background:

Benefits of composting - Composting is one effective way to limit the amount of organic waste that is sent to landfills or waste combustion facilities. Yard waste, such as branches and woody material, is bulky and does not compact much, so it takes up a large amount of space in landfills. Organic waste decomposition within landfills is a main source of both methane and leachate. Additionally, food wastes are normally wet, so they do not burn well in waste combustion facilities. These organic wastes generally account for 20-30% of municipal solid waste. Composting not only removes organic waste from the waste stream, but also produces an end-product - mulch or compost - that is useful.

Benefits of recycling - Many products contain natural resources. For example, paper and cardboard come from trees, food comes from crops and livestock, cans come from various metals and minerals, plastics are petroleum-based products and glass comes from minerals. Many of those materials are in limited supply or need to be managed carefully for sustainability. How we choose to use and dispose of such materials can affect their availability in the future. The decision to recycle, compost or use waste prevention techniques can conserve resources and reduce the amount of waste and pollution associated with consumption.

Products that end up as waste are made from a variety of resources. Because of composition and biodegradability, much of what we now throw away could be composted or recycled. Students will view how time affects biodegradation of various materials.

Procedures:

Getting Ready:

A week prior to doing this lesson, ask students to bring in an old shoe box.

Activity:

Discuss with students what does biodegradation mean? Explain that we are talking about decomposition. After the discussion, make a list of products on the chalkboard that the students suggest. Try to include some man-made items.

Explain to the class that they are going to construct a mini-landfill to see how and when materials decompose. Then divide the class into groups of 2. Show the students how they are to line the shoe boxes with aluminum foil and give each group a box and some foil. After they have lined their box, have them put their names on the outside of the box. Then show them the materials they are to bury in their landfill. Explain that they will bury one of each item in one half of the shoe box and the other one of each item in the other half of the shoe box.

Have the students bury their items of trash under soil. Then have them water (not soak) their landfill and put it in the sun (on the window sill if they will fit).

Tell students they should keep their landfills damp, but not wet. In 10 days, they will dig up the trash buried in one-half of the shoe box to examine the items and record the results.

After the first 10 days, hand out the worksheets to students and ask them to fill in questions 1, 2, and 3 on the Mini-landfill worksheet.

For 10 additional days, have students keep their landfills damp. Then, direct the students to dig up the rest of the trash they buried and upon examination, answer questions 4, 5 and 6 on the worksheet.

Make a list on the chalkboard of the answers to the first 6 questions on the worksheets. Then, discuss the results of the students' work.

Extension:

Have each student write a paragraph explaining how one buried item did not biodegrade as expected.

Please note - if results are not evident after 20 days, double the time allotted for decomposition.

This lesson adapted from
"Conserving the Future" - Renewable and Nonrenewable
Standards Based K-12 Activity Guide,
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