

EDIBLE LANDFILLS

Grade Levels:

3 - 4

Time Allotments:

Teacher Preparation: 60 minutes

Lesson and Activity: 60 minutes

Integrated Curricular Areas and Corresponding Core Curriculum Content Standards:

Science:

Social Studies:

Language Arts:

Vocabulary:

Landfill

Content Objectives: Students will be able to –

1. Describe basic parts of a landfill; and
2. Relate the features and materials used in the model with features and materials used in the construction of a real landfill.

Process Objective: Students will –

1. Create a landfill using edible materials to represent different landfill components.

Materials:**For Students:**

- Two tablecloths or large pieces of bulletin board paper
- Clear, plastic cups (one for each student)
- Plastic spoons (one for each student)
- Paper or plastic bowls or plates to hold materials – six per group
- One box graham cracker crumbs
- One or two boxes of Fruit Roll-ups
- One bag of thin red licorice
- One bag of thin black licorice
- One box vanilla wafer crumbs or any other kind of cookie crumbs
- Vanilla pudding (one serving container for each student)
- One box of Oreo cookie crumbs
- One bag of shredded coconut
- Green food coloring

For teacher's presentation:

- Overhead projector/transparency
- Chalkboard and chalk

For each student:

- White construction paper
- Crayons or colored pencils

Preparations:

- Review background information about landfills and landfill construction
- Investigate in advance any student allergies to food items used for this lesson
- Two work areas must be created on the floor for this activity. Place tablecloths, bed sheets or large sheets of bulletin board paper down to protect the classroom floor and make cleanup easier
- Divide the food ingredients into two equal portions in containers and set each grouping of containers in the centers of each of the work areas

Anticipatory Set:

- Ask the students: *Where can trash be taken to once it leaves home or school?* Discuss responses and make sure that one method mentioned is a landfill

Teacher's Presentation or Modeling:

- Provide students with background information on landfills. Discuss with them the general concerns that exist about garbage decomposing in a landfill - how liquids from it can potentially cause water pollution and that odors can attract pests and local wildlife
- Explain that they are each going to create a landfill while working in small groups. Explain that they are going to be able to eat this landfill when it is completed!

Guided and Independent Practice:

- Have students wash their hands well before using the edible materials
- Divide the class into two groups. Explain that this activity will be conducted on the tablecloth or paper and that all materials are expected to remain on these materials
- Have the students in each group sit down on the floor in circles around their work area, which would be the empty floor in the center of each circle
- Give each student one clear plastic cup. Tell them the cup represents the hole in the ground that was made for the landfill. Have the students place a small layer of graham cracker crumbs in the bottom of the cup to represent the **hole in the soil** that will become the landfill
- Ask: *What is used to contain water and prevent it from leaking into the ground from a man-made pond or swimming pool?* Explain that a liner is used and that a **plastic liner** is used in a landfill to prevent seepage or leaks. Give each group 3 to 4 fruit roll-ups. The students must tear a piece of fruit roll-up and place it over the graham cracker crumbs in their cups. One fruit roll-up should be enough for 4 students. The fruit roll-ups represent the plastic liner used to line the hole to be used as a landfill
- Explain that **leachate pipes** are used to collect liquids that flow to the bottom of the landfill. These pipes collect liquids and send them to a treatment facility. Instruct students to break apart two 1-inch pieces of the thin red licorice to be used as leachate pipes. Have them lay the licorice pieces over the plastic liner (fruit roll-up)

- Next, ask the students to sprinkle a thin layer of vanilla wafer cookie crumbs over the leachate pipes. The cookie crumbs represent **gravel** that is used in a landfill to aid in filtration and to protect the pipes and liner from punctures
- Next, have students add a layer of **garbage** to their landfills by spreading half of their vanilla pudding container on top of the gravel
- Next, explain that a layer of **soil** is added on top of the garbage to decrease the smell and keep out pests. Tell students to add a thin layer of Oreo cookie crumbs on top of the pudding (layer of garbage)
- Have them follow with **another layer of garbage** (remaining vanilla pudding) and **another layer of soil** (Oreo cookie crumbs)
- Put the shredded coconut in a plastic bag and add green food coloring. Make sure the bag is sealed and shake it until the shredded coconut turns green. Ask the students what they think the green coconut represents (**grass**). Ask them why grass is grown on top of a landfill? (To prevent erosion and help keep away pests)
- Finally, have the students break up a piece of black, thin licorice into 2 – 3” pieces. Give each student two pieces of licorice and have them poke the pieces down through the mixture. These pieces represent **methane gas pipes**

Closure:

- Review the basic parts of the landfill they just created and use an illustration on the chalkboard during this discussion to point out various layers and components
- Discuss with them what might happen if various toxic chemicals or materials were put into the landfill along with the garbage
- Give each student a blank piece of white paper. Have them draw a diagram of a landfill on the paper and label the layers and components
- On the other side of the paper ask them to describe in their own words how the landfill is constructed and how it basically functions
- Allow the students to eat their landfills!

Assessment:

- Student participation in smaller group during the landfill creation activity;
- Responses to questions from the teacher; and
- Landfill diagram and narrative.

Extension:

- Arrange for a class field trip to visit a local landfill

Safety/Clean Up:

- Be sure to check in advance (prior to doing the lesson) for student food allergies. Most of the lesson materials will be disposed of – wash, re-use or recycle any appropriate materials