

LEAKY LANDFILLS

Grade Levels:

3 – 4

Time Allotment:

Lesson and Activity: 45 – 60 minutes plus an ongoing log

Integrated Curricular Areas and Corresponding Core Curriculum Content Standards:

Science: **5.1:** (G4) A1-3, C1-2

5.10: (G4) B1

Social Studies: **6.5:** (G2) A1-2, B1 (G4) B1

Vocabulary:

Landfill

Content Objectives: Students will be able to –

1. Describe differences between a dump and a landfill by identifying certain parts of a landfill and describing why such parts are necessary in order to protect the environment

Process Objectives: Students will –

1. Create mini-dumps and mini-landfills and observe and compare what happens to trash that is stored over time in each of these “mini” sites; and
2. Document their observations, ideas and conclusions, through writing and illustrations, in journals.

Materials:**For teacher’s presentation and for each group of students:**

- Two pans
- Soil
- Sand
- Sheets of plastic – could be large plastic trash bags or a roll of plastic
- Small trash items – packaging, wrappings, food scraps, fabric pieces, various forms of plastic and paper, aluminum foil, steel wool, wire, rubber bands, glass, etc.
- Chalkboard and chalk
- flipchart paper and markers
- Divide the materials up between the pairs of mini-dumps and mini-landfills
- Boxes lined with plastic – two for each pair of mini-dumps and mini-landfills
- Rubber gloves – 1 pair for each student
- Plastic atomizer bottles (new or used)

For each student or group of students:

- Log or journal

Anticipatory Set:

- Ask students to describe what a landfill is – what one looks like, smells like and its size. Ask them what landfills are used for – list their input on flipchart paper
- Encourage discussion regarding how they think landfills are managed or taken care of. List these ideas on the same piece of flipchart paper
- Ask the same questions about a dump and write down their ideas in different piece of flipchart paper
- Put the two lists together and ask them to identify what these two places have in common as well as how they appear to be different
- Explain that they will be making, observing and comparing mini-landfills and mini-dumps in the classroom

Teacher's Presentation or Modeling:

- Make a list on the board or flipchart paper of the trash items that will go into the mini-landfills and mini-dumps. Number each of the pieces. Have students copy the numbers and items into their journals and, for each, predict what will happen to that item over time if it were disposed of in A) a dump; or B) a landfill
- Determine (in advance) the number of mini-dumps and mini-landfills that will be created (either one demonstration pair for the class or many sets, one per group of students). Set up work stations for the groups around the classroom
- **Construction of mini-dump:** Demonstrate steps in front of the students then have them perform each step at their own work station:
 - Fill one of the pans halfway with soil and make the soil as level as possible
 - Put various pieces of waste material into the soil
 - Place the pan in an area where it will not be disturbed
- **Construction of mini-landfill:** Again, demonstrate the steps then have the students perform each step at their own work station:
 - Place some soil in the bottom of the pan (1 cup) and even it out into a layer
 - Place a plastic sheet or bag over the soil (the plastic cannot have holes in it)
 - Place various pieces of waste material onto the piece of plastic
 - Cover the plastic with sand, spread it out evenly and press it down
 - Cover the sand with another layer of plastic
 - Cover the plastic with another layer of soil and press the soil down firmly
 - Place the pan in an area will it will not be disturbed

Guided and Independent Practice:

- Have students spray the mini-dumps and mini-landfills with the same amounts of water at the same time each week. Ask them what the spraying represents (rainfall)
- Encourage students to visit and observe the sites twice weekly and to write down in their journals any noticeable changes or observations for each site regarding visual changes, odors, etc. Do not allow them to touch the pans or materials in them
- The activity is completed after one month. Distribute rubber gloves to students

- Demonstrate how to empty the contents of the mini-landfill into a box lined with plastic. After students have done the same encourage them to examine the waste materials to see how they have changed
- Next, have them empty the contents of the mini-dumps into different boxes lined with plastic. Have students make observations about these waste materials as well
- Discuss how materials changed (or didn't change) that were in each site and compare changes that occurred (or didn't occur) to similar materials in each of the sites. Have the students document their final observations and conclusions in their journals

Closure:

- Gather students together for closure. Review how each of the sites were constructed and summarize what transpired at each site regarding changes to various waste items
- Ask students why they thought the landfill was constructed the way it was (to protect human health, the environment and the contents of the landfill – the plastic lining prevents the leakage of any chemical or liquid into the soil or groundwater supply; the added layers of plastic and sand help reduce odors, minimize erosion, maintain some moisture and keep away pests)

Assessment:

- Responses to questions from the teacher;
- Contents of their journals; and
- Participation in a group (optional).

Extensions:

- Schedule a class field trip to a local landfill
- Have students research any of the following topics:
 - How many active landfills exist in New Jersey? How many inactive or closed landfills exist?
 - When does a landfill become full and what happens when this occurs?
 - Are there variations to landfill construction? If so, what are they?

Safety/Clean Up:

- Make sure each trash item used in this lesson is clean and free of sharp edges. When cleaning up, most of the materials and trash items used should be disposed of in the trash, though the pans and some of the soil and sand can be re-used