

LAYERS OF A LANDFILL

Grade Levels:

1 - 2

Time Allotments:

Teacher Preparation: 20 minutes

Lesson and Activity: 60 minutes

Integrated Curricular Areas and Corresponding Core Curriculum Content Standards:

Science: **5.10:** (G6) B1

Social Studies: **6.2:** (G8) A3-5

Language Arts: **3.3:** (G5) A1-3&5, C1-4 (G6) A1-3&5, C1-3

Vocabulary:

Groundwater

Landfill

Content Objectives: Students will be able to –

1. Describe why landfills are a common method for disposing of solid waste;
2. Describe the basic structure of a landfill; and
3. Identify steps needed to develop a landfill.

Process Objectives: Students will –

1. Draw or illustrate basic information and design elements of a landfill; and
2. Demonstrate how landfills are designed to protect the environment.

Materials:

For teacher's presentation:

- Blackboard and chalk or chart paper and markers
- Copies of "Layers of a Landfill" worksheet – one copy per student
- Crayons, colored markers or colored pencils
- One one-gallon milk jug cut in half with tape around the edges to protect from sharp edges and with blue construction paper on the bottom to symbolize groundwater
- Six cups of garden soil (not potting soil) placed into the gallon jug
- Six small, or one large, sealable clear plastic bag to use for a plastic lining
- Small shovel
- Bucket to hold soil
- Mix of small items that represent "garbage" – 1 piece of trash for each student

For each student or groups of students:

- Copy of "Layers of a Landfill" worksheet
- Writing paper, newsprint or flipchart paper
- Crayons, colored pencils or markers

Preparation:

- Obtain a copy of the following book and read it as preparation for this lesson as well as during the anticipatory set: *Where Does the Garbage Go?* by Paul Showers.

Anticipatory Set:

- Discuss this question with the students:
 - *Where is trash taken when trash is picked up from where you live?* Write their ideas on the chalkboard or chart paper. One of the possibilities should be a landfill
- Read the book *Where Does the Garbage Go?*, by Paul Showers, to the class. When finished ask the same question then review and modify their ideas about disposal
- Explain that this lesson will focus on how a landfill is constructed and that they will make a landfill model in the classroom

Teacher's Presentation or Modeling:

- The teacher should divide students into small groups. Have them discuss (and document their ideas for) the following question: *What considerations would you have if you were asked to develop a landfill for a specific town? How would you go about handling this project?*
- Come together as a class to have the students share and discuss their ideas
- Distribute copies of the "Layers Of A Landfill" worksheet to each student. Point to each part of the landfill in the diagram and ask students what they think each part does. Include references to the lining and explain that garbage is put into the hole, then dirt is put on top of it, then more garbage added, and then more dirt, etc.

Guided and Independent Practice:

- Show them the prepared empty gallon jug and explain that the blue part on the bottom represents groundwater. The groundwater must be used for drinking water for townspeople so it must remain clean. Students must be sure that garbage or pollution from the garbage (that will go into the landfill) does not leak into the groundwater. Fill the jug with the soil
- Ask: *What should be done first?* Dig a hole
- Ask: *What can be done with soil that is dug up?* Save it for later to cover the garbage

- Dig out the soil from the gallon jug and place in the bucket to save for later use
- Ask: *Does anyone have an idea about what we can use to protect the groundwater?* Explain that the class will use a sealable plastic bag or medium-size plastic trash bag for the lining. In real landfills thick plastic liners are used to protect the water from garbage that might leak into it. Place the plastic on top of the blue construction paper and around the edges of the gallon jug
- Ask: *What do you think should go into the landfill next?* Garbage
- Ask: *How does the garbage get to the landfill?* Garbage trucks
- Explain to students that each of them will represent a garbage truck. Have half of the children each put one small piece of garbage into the landfill on top of the plastic bag

- Ask: *What usually lots of garbage is dumped into the landfill?* Bulldozers spread the waste and compactors drive over the waste to smash it down. Use the shovel to spread out the garbage and press the pieces down
- Ask: *What goes on next?* A layer of soil
- Ask: *Why do we put soil on top of the garbage?* To keep animals out of the garbage and to reduce odors. Put soil on top of the garbage – add a layer that is about 1-2 inches thick
- Ask: *What happens next?* Add another layer of garbage. Have the rest of the students each add a piece of garbage to the landfill. Compact the soil with the shovel
- Ask: *Now that the landfill is full what goes on top?* Soil. Add the remaining soil. This layer should be thick.
- Ask: *Why is this layer so thick?* To keep animals away and reduce odors
- Have the students discuss ways that the closed landfill can be used, such as for a public park or a playground

Closure:

- Ask: *What options does the town have for its garbage now that the landfill is closed?* Explain that students will need to create a new landfill to receive the town's garbage
- Ask: *Can building a landfill cause any problems to the environment?* Yes. It takes up more land and can potentially harm certain animals or people that live near the new landfill
- Have students work together again in small groups to illustrate the design of the new landfill. (Ask them to put the handouts into their desks or turn them upside-down.)
- Have groups present their illustrations and explanations to the entire class

Assessment:

- Responses to questions from the teacher;
- Ability to work in small groups;
- Comprehensiveness of the group's landfill illustration and explanation; and
- Explanations for how a landfill protects and can potentially harm the environment.

Extensions:

- Ask students to write or illustrate ideas for reducing the amounts and/or types of garbage that are typically disposed of in a landfill. Examples can include giving away toys/clothes, recycling, reducing packaging, reducing use of disposable "one-use" items, or composting
- Take students on a field trip to visit the community's local landfill or transfer station. Or, invite a representative from one of these facilities to come speak to the class.

Safety/Clean Up:

- Students should wash their hands after they handle the pieces of garbage. When finished with the landfill, throw away the plastic bag with the soil and garbage and recycle the plastic jug