

## Overview:

In this lesson, students explore soil layers through observation, then enact a story that describes how layers are deposited over time. Finally, students sequence events represented in stratified layers.

## Targeted Alaska Grade Level Expectations:

### *Science*

- [3-4] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [3] SB1.1 The student demonstrates an understanding of the structure and properties of matter by classifying matter according to physical properties (i.e., color, size, shape, weight, texture, flexibility).
- [4] SD2.2 The student demonstrates an understanding of the forces that shape Earth by identifying causes (i.e., earthquakes, tsunamis, volcanoes, landslides, and avalanches) of rapid changes on the surface.

### *Reading*

- [K] 1.4.1 The student restates/summarizes information by retelling or dramatizing a familiar story (not necessarily in sequence) with or without the use of props.
- [1-3] 1.4.1 The student restates/summarizes information by retelling or dramatizing a story after reading it. (L)
- [4] 2.4.1 The student restate/summarizes information retelling a story in correct sequence or identifying the correct sequence of events in a story. (L)

## Objectives:

The student will:

- observe soil samples;
- retell a story by creating layers caused by change to Earth's surface; and
- summarize information about layers of soil to tell the history of a place.

## Materials:

- Sand
- Soil
- Ash or cat litter (optional)
- Containers for samples
- Magnifying glasses
- Paper cups (for each group member)
- Clear container, like a large jar or plastic shoebox
- Scissors
- Glue sticks
- Paper or science journals (optional)
- Colored pencils (optional)
- STUDENT WORKSHEET: "Stories in the Soil"

## Whole Picture:

Paleoseismologists are scientists who study geologic clues to understand past events. One way they study the past is through examining soil stratigraphy - the layers of soil. Changes to Earth's surface

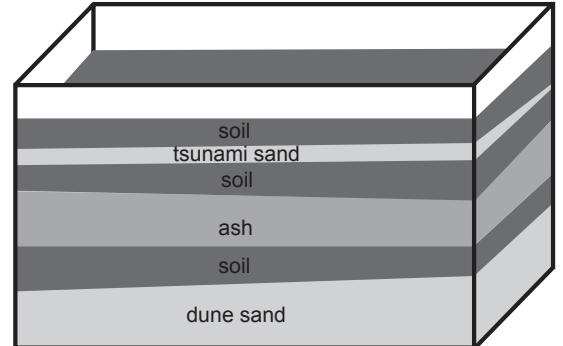
are reflected in the stratified layers. Some of the basic layers that may be found consist of soil (decomposed organic matter mixed with small rock particles), ash from volcanic eruptions, and layers of sand or mud stirred up and deposited by tsunamis. Determining the geologic history of a place helps in understanding potential hazards.

## Activity Preparation:

1. Prepare sand, soil and ash samples for students to observe either individually or in groups.
2. Prepare layers for groups to pour into a clear container. During the activity procedure, the wind group will pour in a layer of sand, the plant group will pour in three layers of soil, the volcano group will pour in a layer of ash or cat litter to represent ash, and the tsunami group will pour in a layer of sand.

## Activity Procedure:

1. Explain students will see how scientists can tell the history of an area by looking at layers in the ground. For younger students, explain what a layer is and give examples. First students need to observe the prepared samples of some of the kinds of layers they may find in the ground using magnifying glasses. If using cat litter, explain that it is being used in the place of ash. Students should touch and look closely at the color, size, and shape of the small parts of each sample. As an option, have students record what they see and feel using words and pictures on paper or in a science journal. If necessary, guide students in looking at a sample, model writing words to describe, and demonstrate sketching. Distribute magnifying glasses, optional colored pencils, and paper or science journals for student observations.
2. Divide students into groups (wind, plants, volcano, and tsunami). Explain as the story is told, and as each group is described, members from that group will pour their layer into a clear container (see diagram). Tell this story:
  - a. The first layer is a layer of sand. The wind blew this sand around on the beach. (Wind group pours in a layer of sand.)
  - b. Plants begin growing. Small pieces of plants mix with rocks creating a dark layer of soil. (Plant group pours in a layer of soil.)
  - c. A volcano erupts. This creates a layer of ash. (Volcano group pours in a layer of ash/cat litter.)
  - d. Over time another layer of soil forms as plants grow in the area. (Plant group pours in a layer of soil.)
  - e. A strong earthquake shakes Earth, and a tsunami stirs up sand in the ocean and deposits, or dumps, a layer of sand. (Tsunami group pours in a layer of sand.)
  - f. Time passes and another layer of soil forms as plants grow. (Plant group pours in a layer of soil.)
3. To review the story, ask the following questions and allow students to refer to the layers in the clear container.



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**Critical Thinking: Think-Pair-Share.** Pose a question. Allow time for thinking. Ask students to share their ideas with a partner. Call on individuals to share their ideas. Repeat this process for each of the following questions.

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- What layer did the wind (plants, tsunami, volcano) leave behind?
- Which layer is the oldest layer? ...newest layer?
- Which happened first, the volcano or the tsunami? How do you know?

4. Distribute scissors, glue sticks, and the STUDENT WORKSHEET: “Stories in the Soil” for each student to complete. After completion, students may take worksheets home to tell the story to their families.

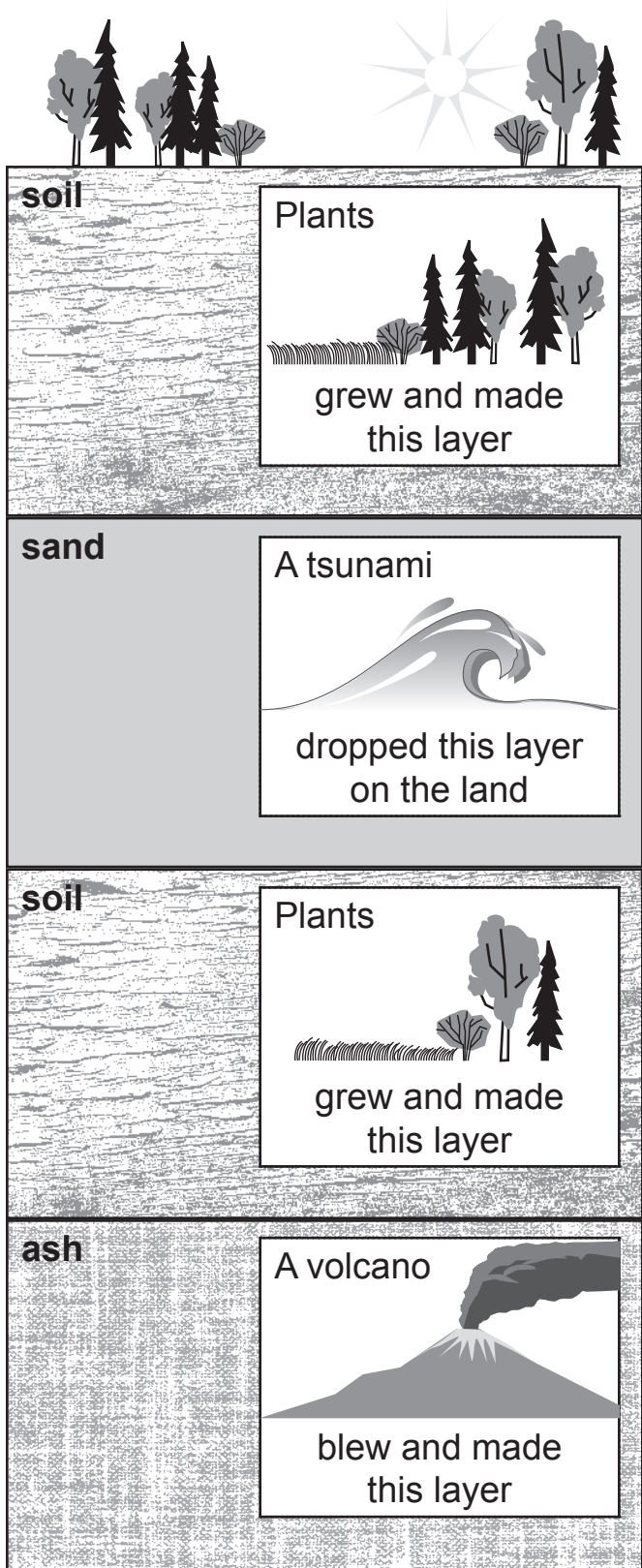
### Extension Idea:

- Dig a hole or find an exposed area to see layers in your area.
- Ask students to bring in their own small jars and create layers, then interpret those layers in a story.

### Lesson Information Sources:

Carver, G. (n.d.) *Some things about Kodiak tsunamis: 1964 tsunami deposits and the people of Afognak River* [PowerPoint presentation].

Answers:

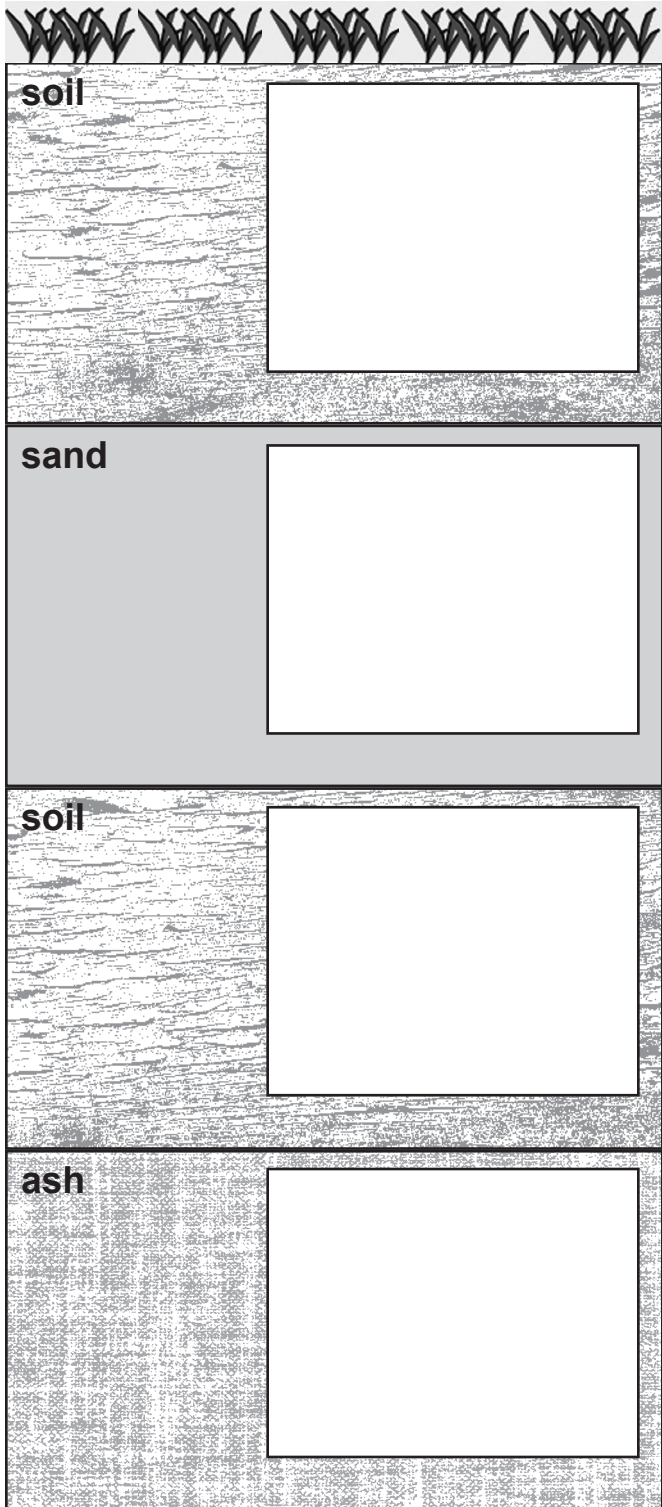


Name: \_\_\_\_\_

# Stories in the Soil

## Student Worksheet

**Directions:** 1. Cut out the squares on the right and glue them in the correct boxes on the left. 2. Label the oldest layer and the newest layer.




soil

sand

soil


ash

A tsunami




dropped this layer  
on the land

A volcano




blew and made  
this layer

Plants



grew and made  
this layer

Plants



grew and made  
this layer