LESSON 1:
VOLCANIC SOIL

GRADE LEVEL K-2

VOLCANOES EDUCATOR GUIDE

An SK Films Release

DIGITAL CROSSING FILMS

Volcanoes Educator Guide

LESSON 1: VOLCANIC SOIL

GRADE LEVEL K-2
(1) 15 MINUTE PREP LESSON
(3) 45 MINUTE LESSONS

LESSON OVERVIEW:

Is volcanic soil really better for plant growth?
In this series of lessons, students conduct a scientific investigation of soil types on plant height. First, students begin by looking at different soils and recording their observations. Students then make predictions on which soil type will make plants grow taller. Finally, students will plant seeds in different soil types and take periodic measurements of plant height.

SCIENCE STANDARDS:

- K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

MATH STANDARDS:

- Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
- Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

SCIENCE & ENGINEERING STANDARDS:

- K2-ETS1-1. Ask questions based on observations to find more information about the natural and/or designed world(s).

FROM THE FILM:

In the film ***Volcanoes***, we see dangerous volcanoes surrounded by rich landscapes of plants and animals. Humans gravitate towards volcanic areas to find useful minerals and fertile soil for crop growth. In this lesson, students investigate the result of growing plants in volcanic soil.

MATERIALS:

- Plastic sandwich/snack bags
- Three soil types (You can dig some up from local sites like your home or the school. You can also purchase different types of potting soil at a local hardware store).
- Volcanic soil (available online and in hardware stores)
- Pea plant seeds
- Magnifying glasses
- Crayons or colored pencils
- Plastic cups
- ¼ cup measuring device
- Measuring blocks or rulers

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TEACHER PREP:

DAY 1:

To assemble the soil bags, use a permanent marker to label each bag with the "type" of the soil (one should be volcanic, the other two can be from soil around the school, your home, etc). Fill each bag with 2 tablespoons of the soil and seal.

DAY 2:

Before class, prepare plastic cups to grow pea plants. Students will fill the cups and plant the seeds. Beforehand, use a sharp object to pierce the bottom of each cup to drain water during the growing period.

Select a good area for the pea plants to grow. If your classroom does not get good sunlight, you may want to consider finding a safe place outside where the plants will not be disturbed for a period of 2-3 weeks. If you are growing inside, consider placing the cups on a baking sheet. Doing so will prevent excess water from draining out of the cups and on to the counter top.

TO DO:

BEFORE VIEWING THE FILM:

1. Ask students; do they know what a volcano looks like? Have students briefly stop for 5 minutes and draw what they imagine a volcano looks like. Afterwards, ask students:

"Do you predict that lots of animals live near a volcano?"

"Do you predict that lots of plants grow on a volcano?"

Inform students that they will soon watch the film, ***Volcanoes***. This is a film about the active volcanoes on planet earth. Ask students to pay special attention to what animals and plants they see living next to a volcano.

DAY 1:

1. As a warm up, hand back the volcano picture drawings to the students. Ask: *"How would you draw the volcano differently after you watched the film?"*

2. If students have not already mentioned the plants and animals growing near volcanoes, remind them that the film claimed the rich soil made by volcanoes is perfect for growing food. Together as a class, you will investigate this claim by doing an experiment. You will grow peas in three different soil types, one of which is volcanic soil. You will measure the height of the peas and decide if the claims made in the film are correct.

3. Remind students that plants need soil in order to grow. The soil gives the plants minerals and nutrients to grow tall and healthy. However, not all soil is the same. Just like human food, some soils are more nutritious than others.

4. To start, you will first examine three different soils. Group students into pairs of two or groups of three. Give each group three bags of the soil types (assembly instructions found in the teacher prep section). Show students how to examine the soil with a magnifying glass and record their observations on the "Examining Soil" activity page(s). Allow students 10-15 minutes to examine the soil and record their observations.

5. Call the class back together and ask them to share their observations.

6. Have students make a prediction on what soil type will grow the tallest pea plants. Demonstrate how to write a prediction and allow students to fill in their own.

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DAY 2:

1. As a warm up, have a couple students read their pea plant predictions for the class.

2. Tell the class that today, they will be setting up the experiment to see what kind of soil allows the peas to grow the tallest. The directions for setting up the experiment are found on the "Pea Plant Experiment" activity page(s). Demonstrate how to set up one set of pea plants before you begin. Show students where they will keep the pea plants in the classroom (or outside if there is no good lighted area of your classroom).

3. Give students 15 minutes to set up their pea plants and move them to the area where they will grow.

4. Remind students that plants need more than just soil. They need water to "drink" and sunshine to make sugar.

5. Show students how to water the plants and allow them to do the same.

6. Optional, conclude class by reminding students of the different needs of plants and animals to grow and allow them to color in the "Photosynthesis" activity page(s).

DAY 3: (2-3 WEEKS LATER)

1. Have students retrieve their plants from the growing area.

2. Using a ruler or measuring blocks (depending on the age of students), demonstrate how to measure the height of the plants.

3. Allow students to measure and create a bar graph of the plant heights.

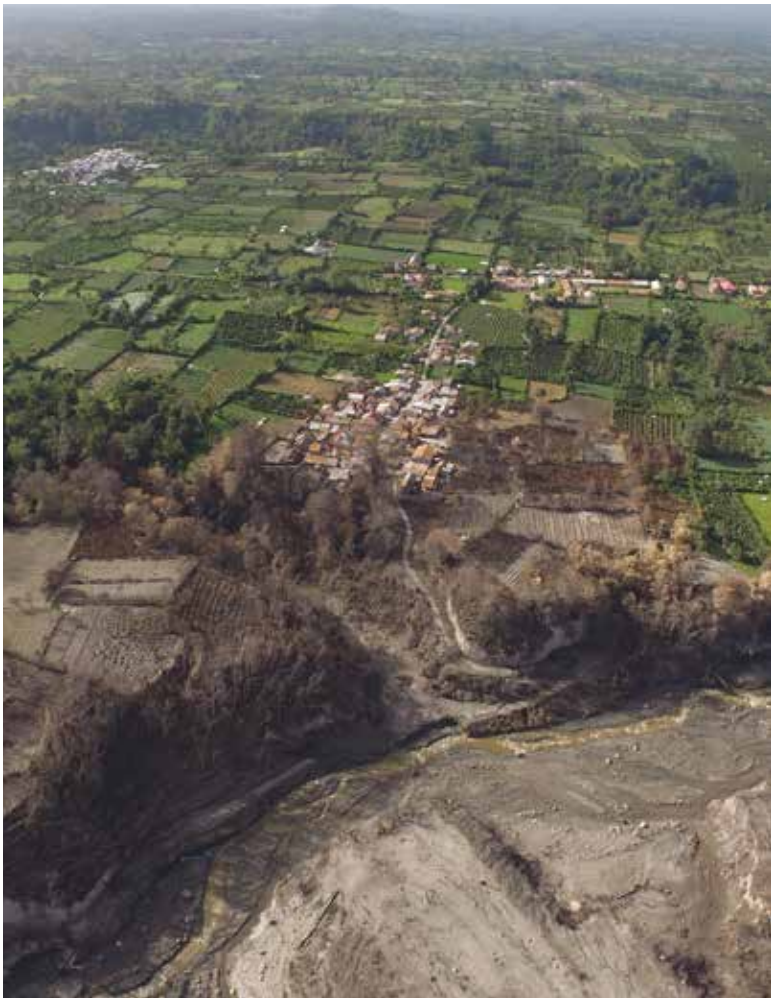
4. Ask students:

What were your original predictions?

Did the plants grow the way you thought they would?

What might be the reasons for unexpected results?

How does this make you think about plants growing near volcanoes?



Volcanic ash covers farmland after a recent eruption in Sinabung, Indonesia.

Examining Soil

Directions: Your teacher will give you three soil bags.

Observe with your eyes.

- **What color is it?**
- **What do you see with the magnifying glass?**
- **What shapes do you see?**

Observe with your fingers.

- **Open the bag.**
- **Pinch a small amount of soil between two fingers.**
- **What does it feel like?**
- **Is it wet? Dry? Rough? Smooth?**

Soil 1: Where is it from?: _____

Draw what you see:

Observations: _____

_____

Soil 2: Where is it from?: _____

Draw what you see:

Observations: _____

_____

Volcanic Soil:

Draw what you see:

Observations: _____

_____

My Prediction: Which soil is best?

I believe that the _____ soil will grow the tallest plant because _____ .

Pea Plant Experiment

Directions: Obtain the materials from your teacher.
Fill in the information on the plants labels (below).
Cut out the plant labels and tape the plant labels to the cups.
Fill each cup with soil.
Use your finger to press a small hole in the soil.
Place three seeds in the hole and cover seeds with ½ inch soil.
Water each day with ¼ cup water.

Group Names:

Soil Type:

Group Names:

Soil Type:

Group Names:

Soil Type:

Group Names:

Soil Type:

Photosynthesis

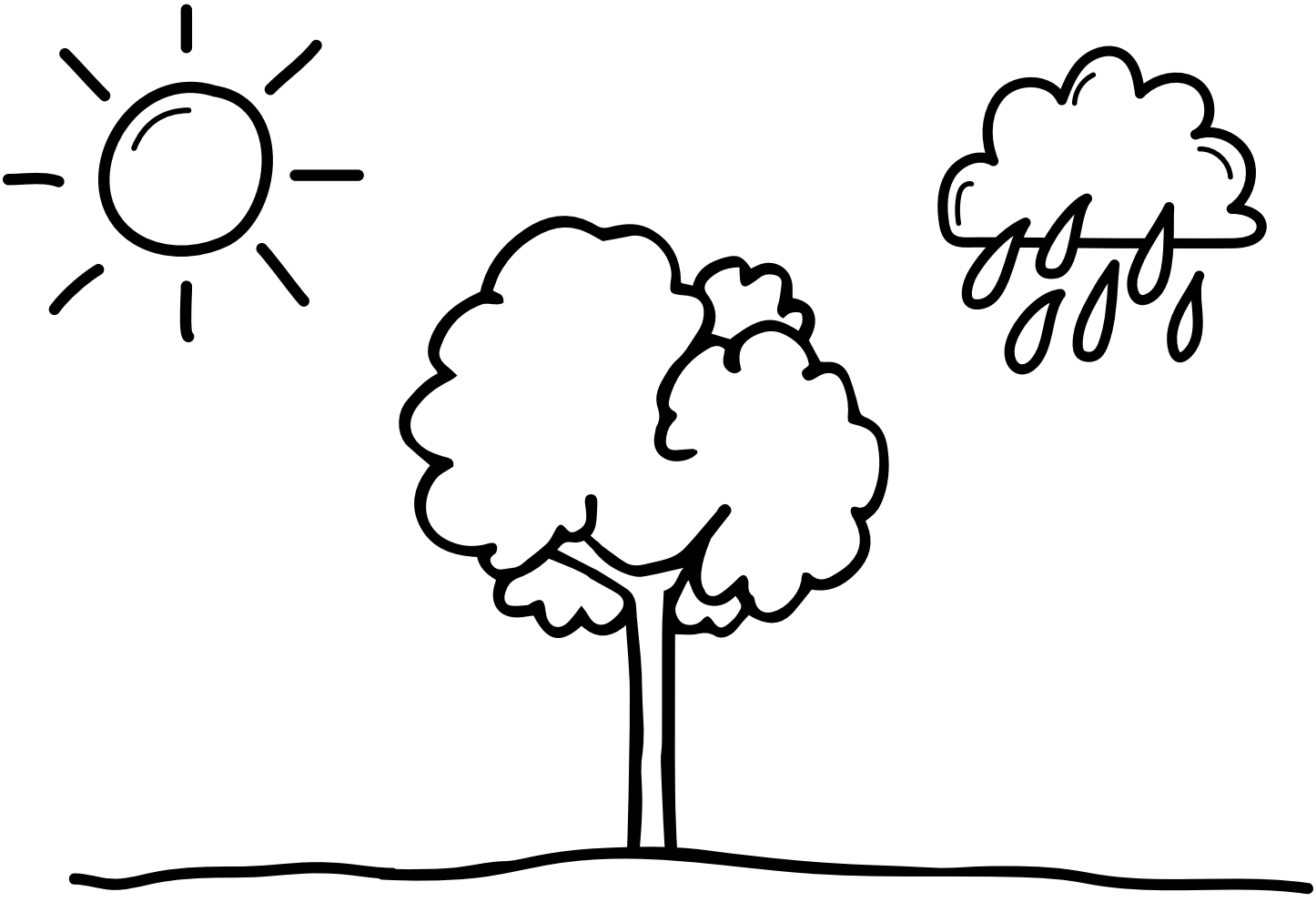
Directions: Plants have different needs than animals. Color in the image below. Fill in the information.

The sun gives plants

_____ .

The rain gives plants

_____ .



The soil gives plants

_____ .