

# Rapid Changes to Earth's Surface

## Teacher Facilitation Notes

### In General . . .

- Project the slide deck in edit mode—do not show it as a slideshow.
- Hide the speaker notes before projecting. (View/Show Speaker Notes)
- Hide the toolbar. (Click on the up arrow at the right end of the tool bar.)
- Call on students to read the various content shown on slides.
- For each investigation, assemble the needed materials for each group and place in a central location for ease of distribution.
- Duplicate copies of the data sheets for each student.

### Materials Needed:

#### *Per student:*

Science notebook                      Pencils

#### *Per group:*

Aluminum baking pans, 2	Scissors	Duct tape
Cardstock, 1 sheet	Damp sand, 60 mL	Beaker, 250 mL
Paper towels	Metric ruler	Spoon
Plastic or foam bowl for mixing sand and rocks		
Pebbles/small rocks, 125 mL	Clipboard/plastic-covered binder	

### Engage: Mt. St. Helens

- Have students carefully observe and discuss the changes they see between the two photographs.
- Brainstorm what might have caused the changes in the volcano over time.
- Read and discuss the second slide. Have students tell what they know about volcanoes and how they affect the Earth's surface.

# Rapid Changes to Earth's Surface

## Teacher Facilitation Notes, p. 2

### **Explore: The Changing Earth**

- Watch the video about the three little pigs. Discuss where each built its house and what happened because of the places they built.
- Use the next video to introduce volcanoes and volcanic eruptions to the students.
- Instruct students to answer the questions in their science notebooks. Then call on volunteers to give their answers. Fill in the text boxes as students volunteer the information. If desired, go to the key slide and show possible answers.
- Watch and discuss the earthquake video. You can watch all of the earthquakes or just one or two, as desired.
- Click on the US map to go to a government site that tracks US earthquakes. Click on the orange circles to see where the earthquakes occurred and their magnitude (how strong they are).
- Instruct students to answer the questions in their science notebooks. Then call on volunteers to give their answers. Fill in the text boxes as students volunteer the information. If desired, go to the key slide and show possible answers.
- Continue in the same manner for the landslide video.
- Depending on student ability level, have groups work through the investigation independently or as a whole class.
- Facilitate a class discussion about how volcanic eruptions, earthquakes, and landslides change the Earth's surface.

### **Explain Read All About It-Rapid Changes to Earth's Surface**

- Call on volunteers to read each paragraph of the explanation slides.
- Emphasize the vocabulary terms as students read the passage.
- Have students orally answer the questions on the question slides as you record the answers in the appropriate text boxes. **OPTIONAL:** Go to the answer key slides to check their answers as they are given. This reinforces correct answers and clears up any misconceptions or incorrect answers.
- Discuss as desired.

# Rapid Changes to Earth's Surface

## Teacher Facilitation Notes, p. 3

### **Elaborate: Spin to Win–Rapid Changes to Earth’s Surface**

- Divide the class into 3-4 groups.
- Play the game according to the directions on the slide. Give each team 100 points for guessing the correct term.
- Play as time and interest dictate.
- Discuss as desired.

### **Evaluate**

- Let students complete the quiz independently.
- Discuss evaluation activities as desired.

# Rapid Changes to Earth's Surface

Name: KEY

## Evaluation

**Directions** : Choose a term from the Term Bank to go in each blank to explain how rapid changes to the Earth's surface happen.

### Volcanic Eruption

A volcanic eruption occurs when melted rock (called magma), smoke, and gases suddenly come out of an opening in the Earth's surface. When the lava flowing out of the volcano cools, it hardens and forms new rock. Because of this, volcanic eruptions create new land in a very short period of time. This new land can create islands in the ocean or change the surface of the land.

### Landslide

Landslides can happen when the sides of hills or mountains become unstable. They can also occur during heavy rainfall or after an earthquake. These events cause loose sediments to slide down the hillside. Gravity is the force that pulls the rocks and sediments down to the bottom of the hill or mountain. Landslides are dangerous because large amounts of land are covered with sediments in a short period of time.

### Earthquake

An earthquake is a shaking of the Earth's surface. An earthquake can cause rapid changes to the Earth's surface because the shaking can cause large cracks to form in the ground and buildings to fall down.

### Term Bank

buildings

cracks

earthquake

gravity

hill

islands

lava

magma

mountains

period

rainfall

rapid

rock

sediments

shaking

slide

time

# Rapid Changes to Earth's Surface

Name: KEY

## Evaluation

**Directions:** Read each statement below. Write an E on the line if the statement describes an earthquake, a V next to statements describing volcanoes, and an L if the statement describes landslides.

1.   **V**   Lava pours out of weak spots in the Earth's crust.
2.   **E**   A release of energy causes the Earth to shake.
3.   **L**   Large amounts of rock and mud slide down a hillside.
4.   **L**   Gravity pulls loose rocks and soil down the side of a mountain.
5.   **E**   These sometimes cause tsunamis to form.
6.   **V**   Rocks, ash, and hot gases rise up into the air.
7.   **E**   Buildings and bridges quickly fall down.
8.   **L**   Large boulders can fall into a river, causing floods downstream.
9.   **V**   Plants and animals that cannot escape are destroyed by heat.
10.   **L**   Repeated flows can create new mountains and islands.
11.   **E**   Great cracks can form in the ground.
12.   **V**   Heavy rainfall causes rocks and mud to move and cover trees and houses.
  
13. Earthquakes can change the Earth's surface in all of the following ways EXCEPT—
  - A creating new mountains
  - B** depositing sand on deltas
  - C forming large cracks in the ground
  - D causing landslides and tsunamis

# Rapid Changes to Earth's Surface

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

## Explore: The Weathering of Rocks

### Question

How do landslides change the Earth's surface?

### My Hypothesis

1. If there is a landslide on the slope, which house do you think will be damaged the most? Why? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

	Model House	Predict: House Will be Damaged (yes or no)	What actually happened?
<b>125 mL of water</b>	1		
	2		
	3		
<b>250 mL of water</b>	1		
	2		
	3		

2. How did more water (250 mL of water affect how much damage the houses received? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Rapid Changes to Earth's Surface

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

## Evaluation

**Directions :** Choose a term from the Term Bank to go in each blank to explain how rapid changes to the Earth's surface happen.

### Volcanic Eruption

A volcanic eruption occurs when melted rock (called \_\_\_\_\_), smoke, and gases suddenly come out of an opening in the Earth's surface. When the \_\_\_\_\_ flowing out of the volcano cools, it hardens and forms new \_\_\_\_\_. Because of this, volcanic eruptions create new land in a very short period of \_\_\_\_\_. This new land can create \_\_\_\_\_ in the ocean or change the surface of the land.

### Landslide

Landslides can happen when the sides of hills or \_\_\_\_\_ become unstable. They can also occur during heavy \_\_\_\_\_ or after an \_\_\_\_\_. These events cause loose sediments to \_\_\_\_\_ down the hillside. \_\_\_\_\_ is the force that pulls the rocks and sediments down to the bottom of the \_\_\_\_\_ or mountain. Landslides are dangerous because large amounts of land are covered with \_\_\_\_\_ in a short \_\_\_\_\_ of time.

### Earthquake

An earthquake is a \_\_\_\_\_ of the Earth's surface. An earthquake can cause \_\_\_\_\_ changes to the Earth's surface because the shaking can cause large \_\_\_\_\_ to form in the ground and \_\_\_\_\_ to fall down.

### Term Bank

buildings

cracks

earthquake

gravity

hill

islands

lava

magma

mountains

period

rainfall

rapid

rock

sediments

shaking

slide

time

# Rapid Changes to Earth's Surface

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

## Evaluation

**Directions:** Read each statement below. Write an E on the line if the statement describes an earthquake, a V next to statements describing volcanoes, and an L if the statement describes landslides.

1. \_\_\_\_\_ Lava pours out of weak spots in the Earth's crust.
2. \_\_\_\_\_ A release of energy causes the Earth to shake.
3. \_\_\_\_\_ Large amounts of rock and mud slide down a hillside.
4. \_\_\_\_\_ Gravity pulls loose rocks and soil down the side of a mountain.
5. \_\_\_\_\_ These sometimes cause tsunamis to form.
6. \_\_\_\_\_ Rocks, ash, and hot gases rise up into the air.
7. \_\_\_\_\_ Buildings and bridges quickly fall down.
8. \_\_\_\_\_ Large boulders can fall into a river, causing floods downstream.
9. \_\_\_\_\_ Plants and animals that cannot escape are destroyed by heat.
10. \_\_\_\_\_ Repeated flows can create new mountains and islands.
11. \_\_\_\_\_ Great cracks can form in the ground.
12. \_\_\_\_\_ Heavy rainfall causes rocks and mud to move and cover trees and houses.
  
13. Earthquakes can change the Earth's surface in all of the following ways EXCEPT—
  - A creating new mountains
  - B depositing sand on deltas
  - C forming large cracks in the ground
  - D causing landslides and tsunamis