QUICK CHANGE

Science Concept:

Earthquakes can rapidly change the surface of Earth.

Objectives:

The student will:

- describe how earthquakes rapidly change Earth's surface;
- predict and observe how an earthquake affects a model house; and
- create a poster about earthquakes with labels, captions, and illustrations.

GLEs Addressed:

Science

[6] SD2.3 The student demonstrates an understanding of the forces that shape Earth by describing how the surface can rapidly change as a result of geological activities (i.e., earthquakes, tsunamis, volcanoes, floods, landslides, avalanches)

[6] SA1.1 The student demonstrates an understanding of the process of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

Writing

[6] W2.2.2 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms using appropriate information and structure (i.e., step-by-step directions, descriptons, observations, or report writing).

Vocabulary:

convergent boundaries – where crust is destroyed as one plate dives under another

divergent boundaries- where new crust is generated as the plates pull away from each other

fault plane - the fault plane is the planar (flat) surface along which there is slip during an earthquake; a break in the continuity of a body of rock, with dislocation along the plane of the fracture

landscape - a section or expanse of rural scenery, usually extensive, that can be seen from a single viewpoint

landslide - a collapse of a mass of Earth, mud, and/or rock from a mountain or cliff

lateral fault - In a lateral or strike-slip fault, the rocky blocks on either side scrape along side-by-side. The movement is horizontal and the rock layers beneath the surface do not move up or down on either side of the fault

normal fault - a fault that drops rock on one side of the fault down relative to the other side

reverse fault - a fracture in Earth along which one block is pushed up relative to the other side

subduction -the process by which collision of Earth's crustal plates results in one plate's being drawn down or overridden by another, localized along the juncture (subduction zone) of two plates.

transform boundaries - where crust is neither produced nor destroyed as the plates slide horizontally past each other

Materials:

- Plastic spoons
- Food coloring
- Markers
- Cardboard
- Paper plates
- Fruit roll-ups

- Soil
- Clay
- White frosting
- Poster boards
- Sand
- Popsicle sticks
- Glue
- Toy trees
- Toy animals
- Science journal

Activity Preparation:

Prepare workstations consisting of paper plates, plastic spoons, white frosting, food coloring, and fruit roll-ups.

Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

Gear Up

Process Skills: inferring, describing, and observing

1. Distribute paper plates, plastic spoons, white frosting, food coloring, and fruit roll ups. Instruct students to put the frosting onto the paper plate. Ask students to decide what color to make their "Earth" (using the food coloring). Ask students to unwrap a fruit roll-up, tear it in half and put both halves on top of their frosting.
2. Demonstrate a model of fault movement (convergence) by pushing the fruit roll-ups into each other. Ask students to do the same. Ask what type of change has occurred.
3. Demonstrate a model of fault movement (subduction) by gently pushing the fruit roll-ups halves together, sliding one on top of another. Ask students to do the same.
4. Ask the different between the two types of movement. (convergent vs. subduction)
5. Demonstrate fault movement (transform) by sliding the fruit roll-up halves next to each other. Ask students to do the same. Ask students what is happening to Earth's surface in this model.
6. Demonstrate faults pulling away from each other (divergence). Ask students to do the same. Ask students what happened to Earth.
7. Ask students to record their findings in their science journal.

Explore

Process Skills: developing models, communicating, and planning

8. Divide students into small groups. Ask groups to create a landscape using available materials and simulate an earthquake to show how the surface of Earth changes in a rapid fashion.
9. Ask groups to share a description of their model, and what happened when they simulated their earthquake.
10. Instruct students to draw and record their exploration and findings as a group.

Generalize

Process Skills: describing and making generalizations

11. Ask students the following questions and discuss:
    a. Do earthquakes cause changes to Earth's surface? How?
    b. What happens when an earthquake occurs?
    c. What land changes do you think an earthquake causes?
    d. What signs can we see that an earthquake occurred?
    e. Does the type of structure (material its made of) affect its stability during an earthquake? Explain.

Apply

Process Skill: describing and making generalizations

12. Ask students to describe, in their science journal, how soil type can cause dramatic surface changes during an earthquake. Give an example.

QUICK CHANGE

RUBRIC

Assessment Task:

1. Build and construct a model house and predict and observe what happens to the house during a simulated earthquake.
2. Create a poster with illustrations showing at least three rapid changes that occur to Earth's surface in an earthquake. Predict and record at least two observations of changes that affected the house during the earthquake. Include labels and captions on your poster.

Rubric:

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student describes how earthquakes rapidly change Earth's surface.	[6] SD2.3	The student may describe two or less ways Earth's surface changes rapidly.	The student describes at least three ways earthquakes can rapidly change the surface of Earth.	The student describes more than three ways earthquakes can rapidly change the surface of Earth.
The student predicts and observes how an earthquake affects a model house.	[6] SA1.1	The student may predict and observe how an earthquake affected the model house.	The student predicts and records at least two observations on how an earthquake affected the model house.	The student predicts and records at least three observations on how an earthquake affected the model house.
The student creates a poster about earthquakes with labels, captions, and illustrations.	[6] W2.2.2	The student may create a poster about earthquakes with labels and captions.	The student creates an illustrated poster about earthquakes with labels and captions.	The student creates an illustrated poster about earthquakes with labels, captions, and supporting details.