Science Concept:

Rainfall can change the surface of Earth.

Objectives:

The student will:

- identify landslides created by rainfall;
- describe how landslides can be caused and prevented; and
- write paragraphs that include relevant details and a main idea.

GLEs Addressed:

Science

[8] SD1.2 The student demonstrates an understanding of geochemical cycles by applying knowledge of the water cycle to explain changes in the Earth's surface.

[8] 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.

Writing

[8] W3.1.2 The student writes about a topic by writing in paragraphs that include relevant details and evidence that support the main idea of the paragraph and thesis statement.

Vocabulary:

erosion - removal of material by water, wind, or ice. As soon as a rock particle (loosened by weathering) moves, by some flowing agent such as air, water or ice, it is erosion

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

phenomenon - a fact, occurrence, or circumstance observed or observable

precipitation - falling products of condensation in the atmosphere, as rain, snow, or hail; the amount of rain, snow, hail, etc., that has fallen at a given place within a given period, usually expressed in inches or centimeters of water

prevention - the act of keeping from occurring; effectual hindrance; to avert

stable - in physics, having the ability to react to a disturbing force by maintaining or reestablishing position, form, etc.; in chemistry, not readily decomposing, as a compound; resisting molecular or chemical change; resistant to sudden change or deterioration

Materials:

- Safety goggles (one per student)
- Empty plastic water/pop bottle, 12 to16-ounce (one per group)
- Couscous, or other lightweight grain (one cup per group)
- Construction paper (one sheet per group)
- Water
- Large plastic trash bag (one per group)
- Nail to poke holes in plastic soda bottle (one per group)
- Flat container, such as a cookie sheet (one per group)
- Sand (approximately one gallon per group)

- Coffee can or several books (per group)
- Plastic netting
- Leaves
- Wire
- Plastic trees
- Straws
- Cardboard tubes of various sizes
- Nylon stockings
- Moss
- Play dough
- Rocks
- Push pins
- Scissors
- Science journals
- STUDENT WORKSHEET: "Exploring Landslides"

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: observing, inferring, and communicating

1. Divide the class into small groups. Give each group an empty plastic bottle and a nail, and each student a pair of safety goggles. Model proper safety procedures. Ask students to use the nail to poke holes into the shoulder of the bottle. The size and number of holes is irrelevant.
2. Distribute one cup of couscous and one sheet of construction paper to each group.
3. Instruct students to place the couscous in a pile on the paper. Ask students to use the water bottle to sprinkle the couscous with water. Ask the students what they saw. What happened after the water hit the couscous? Why?
4. Ask students to use their observations to make inferences about the effect of rain on the surface of Earth? Students should record observations/inferences in their science journals.

Explore

Process Skills: observing, developing models, and collecting data

5. Distribute the STUDENT WORKSHEET: "Exploring Landslides" to each group and review the directions with students.
6. Distribute materials and instruct students to begin. While students are working, move around the class questioning and making suggesting as needed. As student finish the investigations, ask them to discuss what they have learned in their group and then share their observations as a class.

Generalize

Process Skills: inferring, describing, communicating, and making generalizations

7. Ask students the following questions and discuss as a class:
    a. What did you observe when you poured water on your "land" (couscous)?
    b. What happened after it rained?
    c. Is this what was expected? If not, what did you discover?
    d. From what you have observed, can you make an inference about the effect of rain on the surface of Earth?
    e. Have you observed this phenomenon locally?
    f. From what you observed, what methods or materials did you use to reduce the effect of rain on your land?
    g. How can you prevent a landslide from occurring?
    h. What kind of materials are used in everyday life to prevent landslides?
    i. Which techniques that you discovered would work on a larger scale in a real-life situation?

Apply

Process Skills: describing and communicating

8. Explain not all landslides are created by rainfall. Ask students to think of another reason why landslides occur.
9. Ask students to decide which, if any, of the methods of preventing landslides they investigated will work on this type of landslide. Why or why not? Students should record their predictions in their science journal.

EXPLORING LANDSLIDES

RUBRIC

Assessment Task:

In your group, create a montage with images and explanations that describe landslides and how they can be prevented. Begin by locating at least two images of landslides created by rainfall and at least two images showing how landslides can be prevented. (Remember models created in "Explore" activity). Each group member can find one of each type of image then come back together. Next, as a group, write one paragraph for each photograph that explains either how the landslide was created or how the landslide was prevented. You will present your group montage project to the class.

Rubric:

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student identifies landslides created by rainfall.	[8] SD1.2	The student locates less than two images that show landslides created by rainfall.	The student locates two images that show landslides created by rainfall.	The student locates more than two images that show landslides created by rainfall.
The student describes how landslides can be caused and prevented.	[8] SA1.1	The student's description includes less than two examples of how landslides are caused by rainfall and less than four examples of how landslides can be prevented.	The student's description includes at least two examples of how landslides are caused by rainfall and at least four examples of how landslides can be prevented.	The student's description includes more than two examples of how landslides are caused by rainfall more than four examples of how landslides can be prevented.
The student writes paragraphs that include relevant details and a main idea.	[8] W3.1.2	The student may or may not write a paragraph for each image. Paragraphs may have a main idea supported by less than two supporting details. Findings may be presented to the class.	The student writes a paragraph for each image. Each paragraph includes a main idea and two supporting details. Findings are presented to the class.	The student writes a paragraph for each image. Each paragraph includes a main idea and more than two supporting details. Findings are presented to the class.

EXPLORING LANDSLIDES

STUDENT WORKSHEET

Members of Group_____
Your Name_____
Date_____

Materials:

- Empty plastic bottle with holes in it
- Flat container, such as a cookie sheet
- Sand (approximately one gallon)
- Coffee can or several books
- Water
- Nail to poke holes in plastic soda bottle (one per group)
- Plastic netting
- Leaves
- Wire
- Plastic trees
- Straws
- Cardboard tubes of various sizes
- Nylon stockings
- Moss
- Play dough
- Rocks
- Push pins
- Scissors

Procedure:

Model 1

STEP 1. Fill the flat container with sand and spread it at least 3 centimeters thick over the entire area. Raise the container with a coffee can or several books to create a slope.

STEP 2. Fill the bottle with water and "make it rain" until a landslide is caused.

STEP 3. Record your observations and illustrations in your science journal.

Model 2

STEP 4. Clean the flat container.

STEP 5. Fill the container with sand again and spread it at least 3 centimeters thick over the entire area. Again raise the container with a coffee can to create a slope.

STEP 6. Use the other materials provided (plastic or nylon netting, leaves, wire, plastic trees, straws, cardboard tubes-various sizes, nylon stockings, moss, play dough, rocks, push pins, scissors, etc.) to prevent a landslide.

STEP 7. Record your observations and illustrations in your science journal.