Lesson Plan

What's the Difference?

Book: *Engineering for Avalanches and Landslides*
Series: Engineering for Disaster
Level: Navigator

Objective
To help students compare and contrast avalanches, landslides, and rockfalls using a Venn diagram.

Supplies
- *Engineering for Avalanches and Landslides* book
- Whiteboard
- Whiteboard markers
- Pencils and paper

Before the Activity
Have students read *Engineering for Avalanches and Landslides*. Draw a large, three-circle Venn diagram on the whiteboard. Label the circles "Avalanches," "Landslides," and "Rockfalls."

Activity
Engineering for Avalanches and Landslides looks at three natural disasters: avalanches, landslides, and rockfalls. Some of the causes and engineering solutions for these disasters are the same, and some are different. Students can use a Venn diagram to clearly summarize the similarities and differences among these three types of natural disasters.

Ask students to draw a copy of the Venn diagram on their papers. Students should use this diagram to write about the ways in which avalanches, landslides, and rockfalls are similar and different. Students should write facts that are true about avalanches and related engineering solutions in the "Avalanches" circle. They should write facts that are true about landslides and related engineering solutions in the "Landslides" circle, and so forth. In the area where two circles overlap, students should write facts that are true about both of the topics. In the area where all three circles overlap, students should write facts that are true about all three of the topics. Once complete, the Venn diagrams will show what is unique about each natural disaster and what it has in common with the other natural disasters.

After several minutes of individual work, invite students to share their responses. Add their answers to the whiteboard. Provide coaching as needed.

Evaluation

Use the following sample answers to evaluate students' responses. Could students articulate the differences and similarities among avalanches, landslides, and rockfalls?

Sample Answers

Avalanches Only

- caused by heavy snowfall (p. 21)
- sometimes deliberately caused by engineers to make the slope stable again (p. 22)
- Engineers build snowsheds over roads to protect traffic (p. 22).
- Engineers build wedge-shaped walls to protect buildings (p. 23).
- Engineers build deflecting dams to change an avalanche's direction (p. 24).

Landslides Only

- caused by heavy rains (p. 6)
- caused by droughts and wildfires (p. 10)
- caused by earthquakes and volcanic eruptions shaking the ground (p. 11)
- caused by construction and road traffic (p. 12)
- Engineers might build rock, log, or concrete barriers (p. 6).
- Engineers might remove rocks or soil from a hill's surface (p. 11).
- Engineers create drainage systems to move extra water through ditches and pipes rather than into the soil (p. 11).

Rockfalls Only

- caused by tree roots forcing rock apart (p. 17)
- caused by water in rocks freezing, expanding, and creating cracks in the rocks (p. 17)
- Workers drill long metal bolts into rock to hold it in place (p. 18).

Avalanches and Landslides

- caused by vibrations that shake the ground (p. 11, 21)

Avalanches and Rockfalls

- N/A

Landslides and Rockfalls

- Gravity pulls soil and rocks downhill (p. 9).
- The roots of trees and other vegetation help hold soil and rock together (p. 9).
- Plastic or steel nets can hold soil and rock in place (p. 12, 19).
- Debris basins catch falling rocks and soil (p. 12–13).

Avalanches, Landslides, and Rockfalls

- Retaining walls and fences can block slides (p. 13, 22).
- Engineers might replant trees and other vegetation to help reduce damage (p. 11, 14, 22).

Standards

This lesson may be used to address the Common Core State Standards' reading standards for informational texts, grade 5 (RI 5.1, 5.3), and the National Science Education Standards' Content Standards D, E, and F, grades 5–8.