1. Some students are testing rock samples they collected. If you wanted to test these rocks for calcite, what would you put in the bottle and what would you expect to happen if calcite is there?

(Mark the one best answer.)

- **A** Put water in the bottle; if there is calcite, the rock will dissolve.
- **B** Put salt water in the bottle; if there is calcite, the rock will turn a darker color.
- **C** Put acid in the bottle; if there is calcite, the rock will fizz.
- **D** Put liquid soap in the bottle; if there is calcite, the liquid will form a dome on the rock.

2. Consider the following diagram of a river flowing through a landscape. A rain storm causes a large amount of water to flow through the river in a very short time.

![Diagram of a river with key points X, Y, and Z]

Key
- **X** points to the outside of the curve where the water runs faster.
- **Y** points to the inside of the curve where the water runs slower.
- **Z** points to the mouth of the river where it empties into the ocean.

Which size sediments would you most likely find at each location, X, Y, and Z? Explain why.
3. The diagram below shows two rock columns.

![Rock Columns Diagram]

a. A mining company is sending a team to Paradise Canyon to drill down below Kimi Sandstone. What kind of rock do you think they will find directly under the Kimi Sandstone?

*(Mark the one best answer.)*

- A  Sunshine Shale
- B  New York Limestone
- C  Purple Sandstone
- D  American Shale

b. Surprise Canyon is located between these two canyons, 20 kilometers away from Vacation Canyon and 15 kilometers away from Paradise Canyon. What kind of rock do you think you might find at the top of Surprise Canyon?

*(Mark the one best answer.)*

- F  Sunshine Shale
- G  New York Limestone
- H  Purple Sandstone
- J  American Shale
4. Which explanation best describes how a boulder can turn into silt as it moves down a river?  
(Mark the one best answer.)

- A Water washes over the boulder until it is silt-sized.
- B The boulder hits other rocks or objects and breaks apart.
- C The boulder moves down the river until it lands in a basin and becomes silt.
- D A chemical reaction turns the boulder into silt.

5. You find some soil that is mostly made of clay and silt, but no sand. How might this soil have formed?  
(Mark the one best answer.)

- A Slow-moving water carried the sand downstream and left behind the silt and clay.
- B Wind blew all the sand away, leaving behind the silt and clay particles.
- C Silt, clay, and organic material settled out of slow-moving water.
- D A fast-moving stream washed away all the sand.

6. You dig up two soil samples and forget to record where they came from. If you return to the soil samples a week later, what are the characteristics of the soils you would use to match them to the locations where they were collected?  
Write Y next to each characteristic that would help identify the soil sample’s location; write N next to each characteristic that would not be helpful.

- Volume of the sample
- Kinds of sediments
- Amount of moisture
- Color of the sample
- Amount of organic material
7. Use the cross-section drawing to answer the following items.

![Grand Canyon Cross Section of Location X](image)

a. The Colorado River started eroding the Grand Canyon 6 million years ago. Of the layers shown at location X, which two layers did the Colorado River erode away first? *(Mark the one best answer.)*

- A. Kaibab Formation and Toroweap Formation
- B. Redwall Limestone and Supai Group
- C. Bright Angel Shale and Tapeats Sandstone
- D. All layers are eroded at the same time by the Colorado River.

b. If you could return to the Grand Canyon in 1 million years, you might be able to see the Muav Limestone or the Bright Angel Shale at water level. What variables would determine how much the river has eroded in that million years?

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