Where Are the Volcanoes?

Mr. Smith's class is studying how the earth changes. Mr. Smith brings in a newspaper article to share with his students. The article is about a volcano that erupted in Japan. Four friends in Mr. Smith's class are talking about the newspaper article.

Roger: Volcanoes can be found anywhere! They're randomly located all over earth.

Ben: Volcanoes are found only in hot places.

John: Volcanoes are found only on land.

Scott: Volcanoes can be found on land, underwater, and in hot and cold places. Some places on earth have many volcanoes. Other places don't. There is a pattern to where volcanoes can be found on earth.

Which person do you most agree with and why? Explain your thinking.

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Teacher Notes

Purpose
The purpose of this assessment probe is to elicit students' ideas about the location of volcanoes. The probe is designed to find out if students recognize that volcanoes are not distributed randomly around the world.

Related Concepts
plate tectonics

Explanation
The best response is Scott's. Volcanoes tend to be located along tectonic plate boundaries. One well-known example is the Ring of Fire, which approximates the Pacific Plate boundary. Volcanoes are found along plate boundaries all over the world. They are found on both land and underwater regardless of the area's climate.

Curricular and Instructional Considerations
At the elementary level, students are introduced to volcanoes (and earthquakes) as agents of change in the earth's surface. The concept of tectonic plates may be introduced, but the theory of plate tectonics is beyond the scope and sequence of the elementary grades. Instead, students should focus on making observations and identifying patterns and volcanic (and seismic) data.

Related Ideas in *National Science Education Standards* (NRC 1996)

K-4 Changes in the Earth and Sky

- The surface of the earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes, such as landslides, volcanic eruptions and earthquakes.

5-8 Structure of the Earth System

- Lithospheric plates on the scales of continents and oceans constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from these plate motions.

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Related Ideas in *Benchmarks for Science Literacy* (AAAS 1993)

6- 8 Processes the That Shape the Earth

- The interior of the earth is hot. Heat flow and movement of material within the earth cause earthquakes and volcanic eruptions and create mountains in ocean basins. Gas and dust from large volcanoes can change the atmosphere.

Suggestions for Instruction and Assessment

Geography activities are best for helping students understand the nonrandom distribution of the world's volcanoes. Have students plot the locations of volcanoes around the world, or create a large map as a class. Discuss the results. What patterns do students notice?

Student should realize that volcanoes tend to be located in clusters. Introduce tectonic plates and plate boundaries at your discretion. Students may also realize that not all volcanoes are found only on land and that volcanoes can be found in cold climates. Reading and Internet research will allow students to learn more about the world's volcanoes.

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