

Study Guide For Teachers

Billy B. In *Geology Rocks*

presented by

Young Audiences

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ABOUT THE PROGRAM

Children will listen to the songs so they can sing with and, in some cases, dance with Billy B. while he performs his original songs, dances and poems about geology. Billy B. uses a multi-layered backdrop to give visual examples of the earth's composition: volcanic, plate tectonics and erosion.

BACKGROUND INFORMATION FOR STUDENTS

Billy B. will adjust to the knowledge level he senses from the students but, on the most basic level, the students should be aware of the sun/planets/ solar system concept. They should also be aware of "man-made" surfaces (cement, asphalt, etc.) as opposed to natural surfaces and landforms (mountains, plains, valleys, beaches, etc.).

LEARNING GOALS

The objective of "Geology Rocks!" is to introduce some of the major concepts of the science of geology

- while engaging the students in an audience participatory good time.
- Find and appreciate opportunities they have to become part of the performance and how all their activities directly represent the dynamic energy, movement and dimension involved in the study of geology.

BEFORE THE PROGRAM

The basic vocabulary words below are the building blocks Billy will use to establish some of the basic concepts in his show. Words such as "crust" will have a new meaning for those children who know it as the outside of bread, but Billy wants to make sure the children are familiar with words like "crust" before he gives them new meanings. Words without definitions are left for the teacher to define in his/her own words for the students:

<i>planet</i>	<i>plate</i>
<i>mountain</i>	<i>layers</i>
<i>valley</i>	<i>cycle</i>
<i>sun</i>	<i>stars</i>
<i>crust</i>	<i>weather</i>
<i>volcano</i>	<i>shift</i>
<i>plate</i>	<i>continent</i>

AFTER THE PROGRAM

A. Divide the class into two groups. One group represents a continental "tectonic plate" while the other group represents an oceanic "tectonic plate". When these two "plates" come together (converge), the continental plate will create a coastal mountain chain while the oceanic plate will create a deepwater trench. Have the "plates" converge (SLOWLY) and the continental group of kids at the convergent area become coastal mountain range (arms raised) and the oceanic group at the convergent area will sub duct (squat down) and become a deepwater trench.

1. *Mime* - Imitate a volcano building up pressure from below and erupting.

2. *Visual Arts* - Draw the Grand Canyon emphasizing the layer of rock.

3. *Dance/Movement* - When reviewing concepts presented in the show repeat the movement/dances done by Billy B. for those concepts.

4. *Music* - Sing memorable lines from "Geology Rocks" Also have the students write their own songs using the concepts and vocabulary covered in the performance.

B. On a world map, plot the locations of active volcanoes and recent earthquakes. Scan newspapers for reports of recent eruptions and earthquakes to add to your map. Notice any pattern of occurrence that might result. Do these new earthquakes and eruption occur along plate boundaries?

C. Make a small package of Jell-O. Pour into a small flat pan (roughly 11X7). Refrigerate and allow to set. Make some cuts through the layer, try curves and straight lines. Place pan briefly in warm water to loosen the bottom. Now try pushing from both ends. How does the Jell-O react? What happens at the "faults"?

D. Hard boil an egg and slice it, complete with the shell, through the center. How is the cross-section of the egg similar to the cross-section of the Earth? How is it different? a. (Math exercise: Measure the thickness of each layer. Find a cross-section of the Earth with dimensions of each layer given. If the Earth were reduced to size of the egg, would the egg layers be in the correct proportion?)

E. Build and paint a paper mache model of a volcano around a small baby food jar. Fill the baby food jar with vinegar. Add baking soda to make the volcano erupt! Food coloring can be added. Corn syrup added to the vinegar can make the mixture a little thicker but the reaction will be slower.

VOCABULARY WORDS

soil - a complex mixture of organic and inorganic materials.

rock - an aggregate of one or more minerals

erosion - the transportation of products of weathering by water, gravity, wind or ice.

aggregate - composed of mineral fragments or crystals mixed in one rock

crystal - a solid object with flat sides (called faces) that meet in straight lines and sharp points

mineral - a naturally occurring solid composed of an orderly arrangement of one or more chemical elements.

element - a substance composed entirely of one of the more than 100 different types of atoms.

fault - a break in the rocks along which there has been movement.

igneous rock - rock that has cooled from a molten condition.

lava - molten rock on the surface of the ground; also the name for rock formed this way. magma - molten rock below the surface of the earth.

metamorphic rock - a rock that has been changed by heat, pressure or heat and pressure together.

sedimentary rock - rock composed of sediment that have been deposited by water, wind, or ice.

ARTIST INFORMATION

A veteran performer, Billy B. has performed for the National Geographic Society and the National Wildlife Federation, as well as at the White House, the Kennedy Center, the Smithsonian and in front of 200,000 people during the 20th National Earth Day. Billy B. has recorded several albums of original songs and has also written the script and music and performed for television, video and film.

RESOURCES

Dixon, Dougal, (1992), The Practical Geologist. Simon and Schuster.

Erickson, Jon, (1994), Quakes, Eruptions and Other Geology* Cataclysms. Facts on File, The Changing Earth Series.

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Famdon, John, (1992), How the Earth Works. The Reader's Digest Assoc., Inc.

Fodor, R. V., (1993), Chiseling the Earth: How Erosion Shapes the Land. Enslow Publishing.