Pangaea Science Theories

Overview:

During this lesson, students will use scientific resources to research Pangaea, then write a theory explaining what force caused Pangaea to split apart, and supply evidence to support each theory.

Objectives:

The student will:

- write a theory about what force caused Pangaea to split apart;
- write five pieces of evidence to support his or her theory;
- research Pangaea; and
- discuss Pangaea science theories with group members.

Materials:

- Scientific resources: books, journals, encyclopedias, *Ola Ka Honua: Volcanoes Alive* DVD, etc.
- Transparencies: "Pangaea" and "Modern Earth"
- Student Information Sheet: "Sample Science Theory"
- Student Worksheets: "Pangaea Fastwrite" and "Pangaea Science Theories"

Activity Procedure:

1. Explain that students will learn to write a science theory, find evidence to support their theories, and describe how they can test their theories. Remind students that a science theory is an idea that explains how something works. The ideas that make up a science theory can be tested by conducting repeated experiments under controlled conditions.
2. Distribute the Student Information Sheet: "Sample Science Theory." Review the question about wind blowing onshore during a hot day, which prompted the theory and the evidence supporting the theory. Note that the theory can be tested by repeated experiments.
3. Display Transparency: "Pangaea." Explain that long ago all continents on Earth were joined into a giant continent scientists now call Pangaea. Pangaea split apart to form today's continents. Display Transparency: "Modern Earth" so students can see the continents look today.
4. Distribute the Student Worksheet: "Pangaea Fastwrite." Ask students to spend one minute answering the question on the worksheet.
5. Break students into groups of three or four and distribute the Student Worksheet: "Pangaea Science Theories." Ask students to use reference materials such as encyclopedias, magazines, the *Ola Ka Honua: Volcanoes Alive* DVD, and other books to find a science theory and supporting evidence to explain what force caused Pangaea to split apart.

Answers to Student Worksheet:

Pangaea Fastwrite:

Answers will vary

Pangaea Science Theories:

1. b
2. Answers will vary

Name:_____ **Student Worksheet**

Pangaea Fastwrite

Directions: Answer the question below by writing the first things that come to mind during a one-minute "fastwrite."

What force do you think caused Pangaea to split apart?

Sample Science Theory

Question: What causes the wind to blow onshore during a hot day?

What theory can answer this question?

Theory: The wind blows onshore during a hot day because the land gets warmer than the ocean. This happens because higher temperatures create low density, causing warm air to rise and draw cooler air in from the ocean to take its place.

What evidence supports this theory?

Evidence A: It is warmer on land during the day.

How can this be tested? This can be measured by checking a thermometer at regular intervals throughout the day and comparing the measurements to those taken offshore.

Evidence B: The wind blows offshore during the night.

How can this be tested? This can be measured by using a windsock or a flag to observe the direction the wind is blowing throughout the day and night.

Evidence C: The air density decreases when the temperature increases.

How can this be tested? Inflating a balloon in a cool place and measuring its diameter with a piece of string can test this. When the balloon is taken outside into the hot sun, the temperature of the air inside the balloon will increase. This increase of temperature causes air molecules to move faster and hit the walls of the balloon with greater force. As a result, the volume of the balloon increases. The increased volume (with no change in mass) will decrease density.

Name:_____ **Student Worksheet**

Pangaea Science Theories

Names of Other Group Members:

_____ _____ _____

Directions: Read the questions below. Use scientific resources to help you develop a theory to answer question #1. For question #2, support your theory with three pieces of evidence (A, B and C) and indicate how each can be tested. *Hint: If you are using the Internet as a resource, search for Theory of Plate Tectonics and Theory of Continental Drift.*

Question: What force do you think caused Pangaea to split apart?

1. Which modern day theory could help explain what force caused Pangaea to split apart and continues to affect the movement of land masses today?
   a) Chaos Theory
   b) Theory of Plate Tectonics
   c) The Big Bang Theory
   d) The Global Pangaea Theory

2. What evidence supports the theory?

   Evidence A: _____

   _____

   How can this be tested?_____

   _____

   Evidence B: _____

   _____

   How can this be tested?_____

   _____

   Evidence C: _____

   _____

   How can this be tested? _____

   _____

