

Pacific Plate Movement

Overview:

In the early 1960s, Canadian Geologist J. Tuzo Wilson suggested that volcanic ocean island chains were created when Earth's plates move continuously over a stationary hotspot. In this activity students will look at a map of the Pacific to determine the direction the Pacific Plate is moving. Then they will chronologically organize maps of the Hawaiian Islands from millions of years ago to the present. Students also will learn to differentiate features of older and newer volcanic islands.

Objectives:

The student will:

- determine the direction the Pacific Plate is moving;
- put a sequence of maps showing island formation in the correct order; and
- identify features of older and newer volcanic islands.

Materials:

- Globe (optional)
- Student Worksheet: "Plate Movement"
- Student Worksheet: "Islands: Past to Present"

Answers to Student Worksheets:

Plate Movement Worksheet:

1. d) NW
2. d) NW

Islands: Past to Present Worksheet:

1. a) middle b) present day c) oldest
2. J. Tuzo Wilson

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Activity Procedure:

1. Explain that, in the early 1960s, Geologist J. Tuzo Wilson noticed a pattern in the ages of island chains in the Pacific Ocean. He proposed the idea that the Pacific Plate was moving over a hotspot and that this hotspot was responsible for the formation of these volcanic island chains.
2. Distribute the Student Worksheet: “Plate Movement” and ask students to use the map to answer the questions. Remind students that hotspots are stationary, and that Earth’s plates move over them.
3. After discussing the movement of the Pacific Plate, distribute the Student Worksheet: “Islands: Past to Present.” Ask students to use what they learned from the Student Worksheet: “Plate Movement” to help them complete the questions.

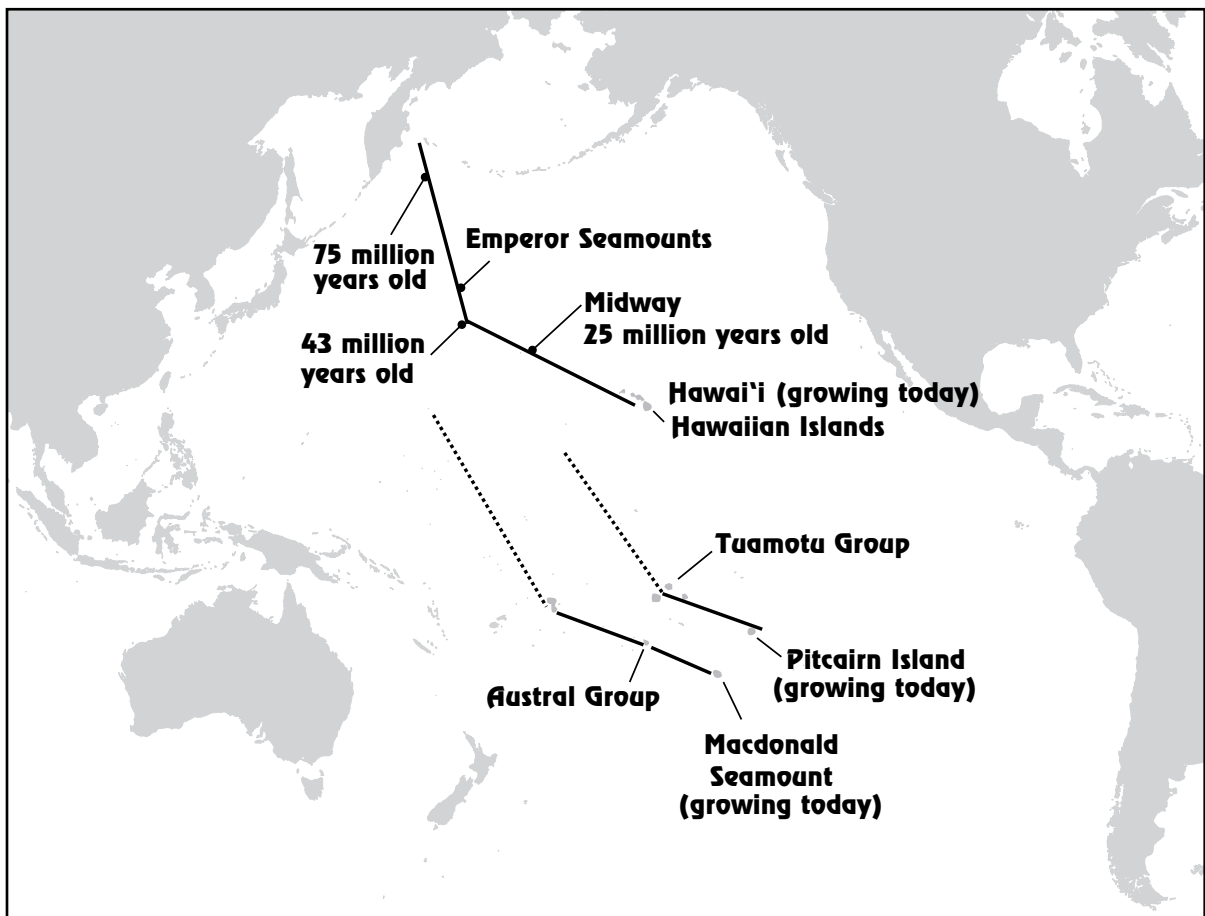
Extension Idea: Ask students to figure out the geographic coordinates of the hotspot, and research why the shape of each island is changing over time.

Plate Movement

Background Information: In the early 1960s, Geologist J. Tuzo Wilson examined a map like the one below. He noticed a pattern in the ages of island chains in the Pacific Ocean. He proposed the idea that the Pacific Plate was moving over a hotspot and that this hotspot was responsible for the formation of volcanic island chains.

Directions: Use the map below to answer the following questions. *HINT: Determine the direction in which the older islands on the Pacific Plate are found. This is the same direction in which the Pacific Plate is moving over a hotspot.*

1. Relative to the hotspot, in what direction are the older islands found on the Pacific Plate?
 - a. NE
 - b. SE
 - c. SW
 - d. NW
2. What direction is the Pacific Plate moving over the hotspot?
 - a. NE
 - b. SE
 - c. SW
 - d. NW

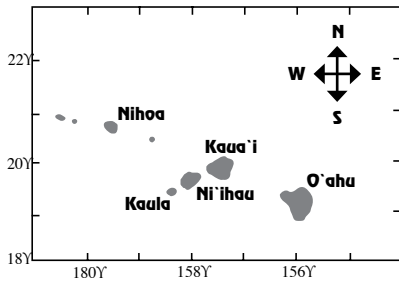


Islands: Past to Present

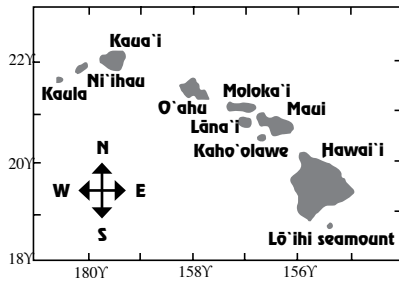
On the “Plate Movement” worksheet, you determined the direction the Pacific Plate is moving. Now you will see what the Hawaiian Islands probably looked like from millions of years ago until present. Note the latitude and longitude on each map.

- Look at the maps below and determine the relative ages of the islands in each. Label the maps correctly with the appropriate term: *oldest*, *middle* or *present day*.

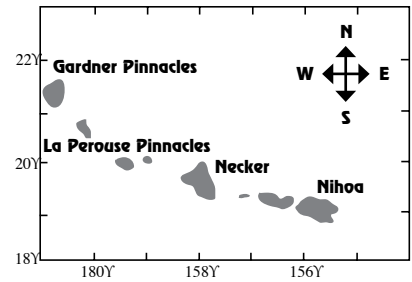
Remember, each island was formed as it moved over the hotspot. The maps depict the islands as they appeared when they were near the hotspot. Earth’s Pacific Plate is moving northwest, so older islands move toward the northwest corner of each map, as new islands appear in the southeast corner.



a. _____



b. _____



c. _____

- What geologist proposed the idea that the Hawaiian Islands formed as Earth’s plates moved over a hotspot in Earth’s mantle?
