

**Alfred Wegener (1880–1930)****Topic**

Wegener's opinions about changes in the Earth's crust over time were based on research available during his lifetime.

Introduction

Although Alfred Wegener studied astronomy at the University of Berlin, earning his Ph.D. in 1904, he was keenly interested in the sciences of meteorology, climatology, and geology. As a result, he spent much of his life in fieldwork collecting data on climate changes, weather patterns, and rock formations. In 1911, while teaching at the University of Marburg, Wegener read a scientific paper that listed identical plant and animal fossils on both sides of the Atlantic Ocean. Scientists of the day explained these findings by suggesting that the areas had once been connected by now submerged land bridges. However, Wegener had another idea. In this experiment, you will examine some of the data available to Wegener in 1911 and draw conclusions based on that data.

1. The information in the data table was available to Wegener in the early 1900s. With a seat partner, examine this data carefully.

Data Available to Wegener

1. The Appalachian mountains in eastern North America have rock structures similar to the mountains of Caledonian mountains of Greenland, Scotland, and Norway.
2. A stratum of rocks found in Ghana, Africa, can also be found in eastern Brazil. These rocks contain the same minerals, of the same ages, with the same fossils.
3. In warm regions such as Africa and South America, scientists have found evidence of glaciers.
4. Fossils of tropical plants can be found on the Arctic island of Spitsbergen.
5. Fossils of the sub-polar fern *Glossopteris* have been found in Africa, Australia, India, South America, and Antarctica.
6. Fossils of *Cynognathus*, a land reptile, are found in Argentina and southern Africa.
7. Fossils of *Lystrosaurus*, a land reptile, are found in Africa, Antarctica, and India.
8. Fossils of *Mesosaurus*, weakly swimming, fresh water reptiles, are found in western southern Africa and South America.

2. Detach the "Pangaea Puzzle" map from the back of this package.

Symbol	Meaning
	"Scrape Marks" showing flow of ancient glaciers
	A certain type of rock
	Another certain type of rock
	Cynognathus fossils
	Lystrosaurus fossils
	Glossopteris fossils
	Mesosaurus fossils

3. Colour the legends on your map. The symbols are explained in the table above.
4. CAREFULLY cut out each of the continents and paste them on to a new sheet of paper, matching up the shapes and colours like a jigsaw puzzle. Neatness counts!!!
5. As a group, suggest three possible explanations for information provided in the data table and on your map. Record your three explanations below.
6. Vote on the explanation you consider most realistic and highlight that number.

3 Explanations for the data available to Wegener:

1.

2.

3.

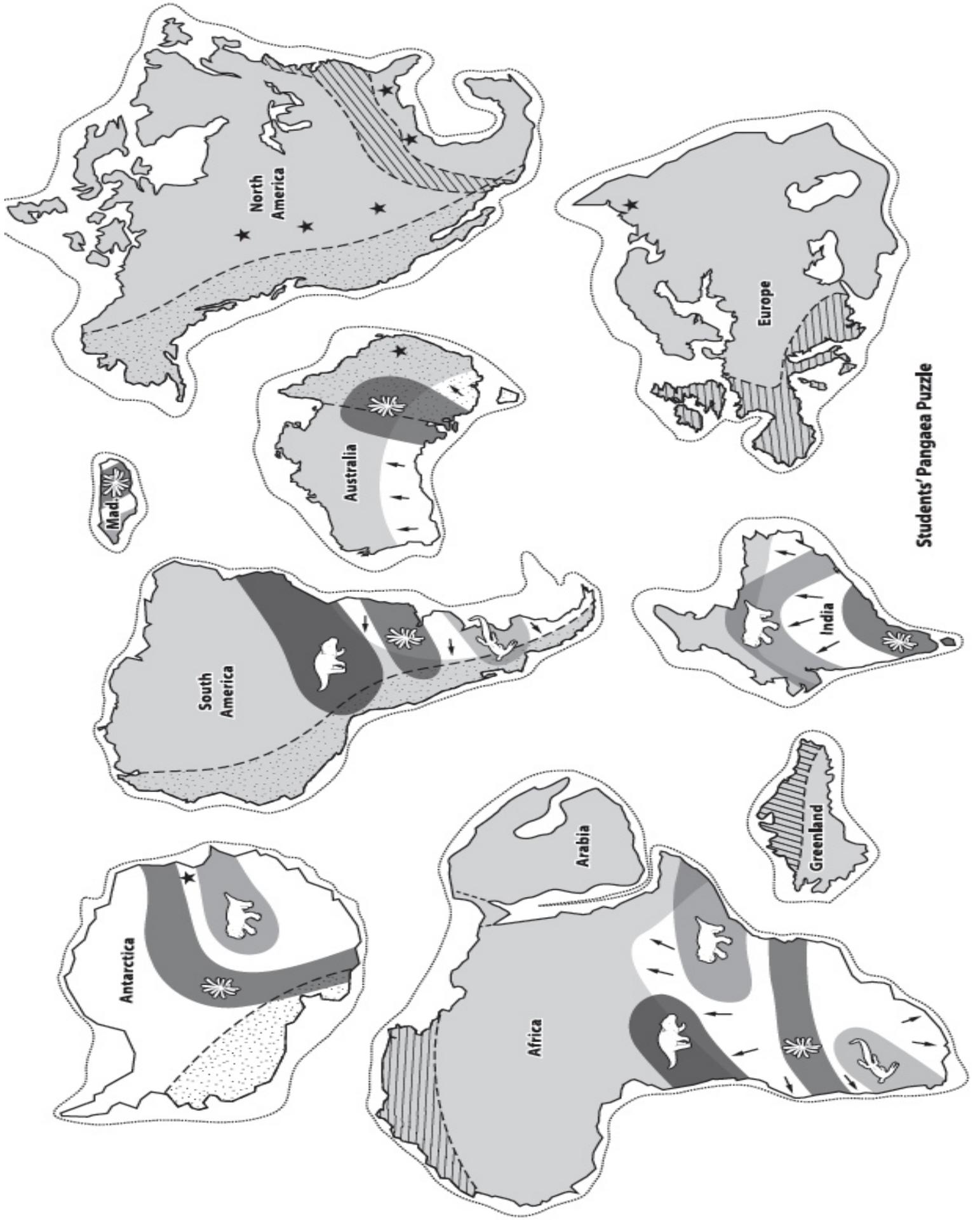
Analysis

1. Based on your group's explanation, explain why present-day marsupials in Australia are very similar to the opossums found in the Americas.
3. Some scientists of Wegener's day pointed out that Mesosaurus could swim, so some of the animals may have migrated from Africa to South America. How do you think that Wegener would have answered these scientists?
4. Read the following... there is a question for you to answer at the end!

What's Going On?

In 1915, Wegener published *The Origin of Continents and Oceans* in which he outlined his ideas about changes in the Earth's surface. He noticed that large geological features like mountain ranges lined up neatly when the continents were brought close together. Wegener proposed that about 300 million years ago, all of the continents formed a single land mass, Pangaea. When Pangaea split, the resulting land masses began drifting apart. Wegener dubbed his theory "continental drift." In his book, Wegener provided extensive supporting evidence for this theory. Wegener's ideas were met with hostility by other scientists of the day because he did not offer an explanation for the mechanism that led to such dramatic changes in the crust. By the 1960s, Wegener's theory had gained scientific support. Primarily through exploration of the sea floor, scientists learned that the Earth's crust is made up of several large, solid plates that float on top of a molten layer. The crust of both the continents and oceans forms these plates. Plates are pushed apart by molten rock that rises to the surface at an extensive system of oceanic ridges. When two plates collide, mountain ranges may be pushed up or one plate sinks below the other. The edges of plates are areas of tremendous geologic activity. Ongoing work by scientists continues to show that Wegener's ideas were logical and accurate.

- a) Why was Wegener's idea of continental drift not originally accepted by other scientists?
- b) How did Wegener's theory of continental drift help explain how fossils of tropical plants could be found in present-day polar climates?
- c) Use your textbook or any other source to look up the definition of "Continental Drift" and "Plate Tectonics". Provide a definition of each in your own words.



Students' Pangaea Puzzle