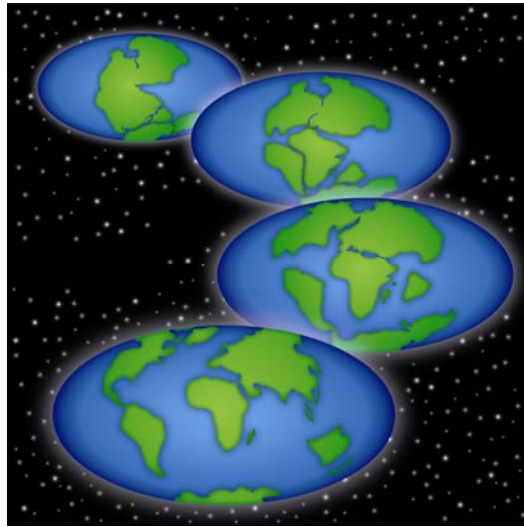


## The Fossils of Antarctica



### Introduction

Two hundred million years ago, all of the continents on Earth were joined in one large supercontinent scientists call Pangaea. The formation of Pangaea dried up many shallow seas, which led to the evolution of new species on land. This is the time during which mammals first began to appear. During the Mesozoic Era, around 190 million years ago, Pangaea began to break up. The breakup resulted in two landmasses: Laurasia, the northern group of continents, and Gondwanaland, the southern group of continents. Gondwanaland included South America, Antarctica, Australia, Africa, and India. By the end of the Cretaceous Period 65 million years ago, Africa and South America had moved apart. By 43 million years ago, Australia and Antarctica had separated and moved to their present locations.

How do we know that these events actually happened? You have probably noticed that South America and Africa seem to fit together like puzzle pieces. Because of this fit, many people wondered if the continents once were joined. A German scientist named Alfred Wegener proposed that all of the continents once had been joined in a supercontinent that he called Pangaea. He suggested that Pangaea began to break apart millions of years ago and that the continents continued to move until they reached their present locations. He called his hypothesis *continental drift*. Today, Wegener's hypothesis is known as the theory of plate tectonics. Wegener was the first scientist to base his hypothesis on more than the fit of the continents. He collected data on rock formations, fossils, and climates to support his hypothesis. Wegener found the same rock formations and fossils in Africa, South America, and Antarctica. Some of the fossils were of species that grew in only one type of climate, yet the fossils were found on continents with differing climates. How could there be fossils of tropical and temperate climate species in Antarctica, a continent that is permanently covered with ice and snow? Have any fossils been found in Antarctica that can support Wegener's hypothesis and, thus, the theory of plate tectonics?

## **Task**

Your job in this WebQuest is to discover what fossils have been found in Antarctica and to identify how those fossils either support or disprove Wegener's hypothesis and the theory of plate tectonics. After you explore the different fossils that have been found in Antarctica, you will interpret the meaning of these fossils as indicators of the climate that once prevailed in Antarctica. Finally, you will present your interpretation to the class. You will use visual aids that support your position. Answer the questions below in your journal to help guide your research.

## **Process**

Use the resources listed below to research the fossils of Antarctica. As you explore each site, look for answers to the questions. After completing your research decide if you think the fossil support or disprove Wegener's hypothesis and the theory of plate tectonics. Then, prepare visual aids that support your position and plan your presentation.

### ***Questions about the Fossils of Antarctica:***

1. What were the first fossils found in Antarctica? Where and when were they found?
2. What was the first dinosaur fossil found in Antarctica? Where and when was it found?
3. What dinosaur fossil was found on Vega Island in 1986?
4. What are the two reasons the fossil found on Vega Island is of particular importance to understanding the climate and location of Antarctica millions of years ago?
5. The first dinosaur fossil and the fossil found on Vega Island in 1986 were representative of what geologic time period?
6. What dinosaur fossil was found in the Transantarctic Mountains in the summer of 1990-1991? During what geologic time period did this dinosaur live?
7. Besides the fossils already discussed, name the other fossil animals that have been found in Antarctica.
8. Why have so few dinosaur fossils been found in Antarctica?
9. Early expeditions to Antarctica reported on seeing fossils, but they did not collect them. Who first reported seeing fossils of leaves and stems of plants? Who reported finding beds of coal near the South Pole?
10. How do plant fossils and beds of coal support the idea that Antarctica once was warmer than it is today?

## **Resources**

Look at the web sites given here to find the information that will enable you to answer questions about Antarctica fossils.

Antarctica Yields Two Unknown Dinosaur Species

[http://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=103111&org=NSF](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=103111&org=NSF)

New Dinosaur Finds in Antarctica Paint Fuller Picture of Past Ecosystem

[http://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=102864&org=olpa&from=news](http://www.nsf.gov/news/news_summ.jsp?cntn_id=102864&org=olpa&from=news)

Origins Antarctica

<http://www.exploratorium.edu/origins/antarctica/ideas/gondwana2.html>

USGS Historical Perspective

<http://pubs.usgs.gov/gip/dynamic/historical.html>

Fossils From Mesozoic Era Antarctica.

<http://www.enchantedlearning.com/subjects/dinosaurs/dinofossils/locations/Antarctica.shtml>

When Dinosaurs Roamed Antarctica

<http://www.newscientist.com/article/mg13718603.300-science-when-dinosaurs-roamed-antarctica---.html>

Vega Island

[http://en.wikipedia.org/wiki/Vega\\_Island](http://en.wikipedia.org/wiki/Vega_Island)

## Evaluation

Read this rubric to determine how you will be scored for your presentation.

Criteria					Points
	1	2	3	4	
<b>Task</b>	The task was not completed.	It appears that some effort was made to complete the task, but major ideas are missing. References are missing.	The task was completed as assigned, but some of the rationale for the design was faulty. Most references are valid.	The task was completed with great attention to detail and clear reasons for conclusions given. References are given and are valid.	
<b>Process</b>	The process was not followed.	The research was complete, but the design and presentation could have been better organized.	All the steps of the process were followed and the design was good.	It is clear that much effort went into the project. The ideas show a high degree of originality and imagination.	
<b>Presentation</b>	Presentation was sloppy and not well prepared.	The presentation included key ideas but lacked general cohesiveness.	The presentation was well organized with only minor errors.	Presentation is well organized, point of view clearly stated, and visual aids are well utilized.	

## Conclusion

In the process of completing this WebQuest, you've become informed about the fossils found in Antarctica and what those fossils tell us about the climate and location of Antarctica millions of years ago. You have learned that some dinosaur fossils found in Antarctica were previously found only in the Americas. You have discovered that some Antarctica fossils were of species that could live only in temperate or tropical climates. You have developed research skills as you explored the Web sites given and identified the relevant information to answer the set of questions above.