Fossils in Time Activity

Movements of Earth’s continental and oceanic plates through time, with associated changes in climate and geographic connections, have affected the past and present distribution of organisms.

Fossils provide evidence of how life and environmental conditions have changed.

In early 1915, the German scientist Alfred Wegener theorized all of the continents had been part of one large land mass about 225 million years ago. This super-continental land mass was called Pangaea, a Greek word that means “all earth.” It broke up over time, and the pieces have been drifting apart ever since.

A few years after Wegener proposed his theory, South African geologist, Alexander Du Toit, further theorized that Pangaea divided into two supercontinents. Du Toit called the northern supercontinent, Laurasia, and the southern one called Gondwanaland.

In this investigation you will use several fossils to try to reconstruct how Earth’s landmasses may have appeared approximately 225 million years ago.

Fossils are the remains or evidence of living organisms. They come in different forms, including casts, molds, imprints, amber, and ice of both plants and animals. Scientists use fossils as a tool to understand how the continents appeared millions of years ago.

Materials

• Fossil map
• Scissors
• Glue stick
• Title Page

☐ Cut out the continents and color the patterned areas with colored pencils.

☐ Assemble the continents and land masses (Africa, India, Australia, Antarctica, South America, and Madagascar) together on the title page. The patterned areas (fossil plant and animal occurrences) along with the shape of each landmass will provide clues to how the continents fit together.

☐ Glue and label each continent.

Note: Central American did not exist 240 million years ago. India was once attached to Africa and Antarctica.
## Table 1  Fossils and Where Found

<table>
<thead>
<tr>
<th>Description</th>
<th>Locations found</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A mammal-like reptile, not a dinosaur the size of a wolf</td>
<td>South America (Argentina), southern Africa (near Cape Town)</td>
</tr>
<tr>
<td>• Lived on open plains</td>
<td></td>
</tr>
<tr>
<td>• Probably warm-blooded</td>
<td></td>
</tr>
<tr>
<td>• May have given birth to live young</td>
<td></td>
</tr>
<tr>
<td>• Deciduous (loses leaves in the cool season)</td>
<td>southern tip of India</td>
</tr>
<tr>
<td>• Seed fern</td>
<td>Antarctica (Prince herald Coast and Oates Coast)</td>
</tr>
<tr>
<td>• Leaves tongue shaped</td>
<td>Southeastern Australia (near Melbourne),</td>
</tr>
<tr>
<td>• About 12 ft (3.6 m) tall</td>
<td></td>
</tr>
<tr>
<td>• Reptile (not a dinosaur)</td>
<td>Antarctica (Wilhelm II Coast)</td>
</tr>
<tr>
<td>• No teeth – two tusk-like fangs made of horn</td>
<td>Madagascar</td>
</tr>
<tr>
<td>• Plant-eater</td>
<td>Africa (Eastern Tanzania)</td>
</tr>
<tr>
<td>• 3 feet (1 m) long</td>
<td>Central India</td>
</tr>
<tr>
<td>• Lived in herds near lakes and swamps.</td>
<td></td>
</tr>
<tr>
<td>• Fresh-water dwelling reptile (not a dinosaur)</td>
<td>southern South America (Eastern Brazil)</td>
</tr>
<tr>
<td>• Carnivore - probably ate fish and shrimp</td>
<td>West Africa (Cameroon)</td>
</tr>
<tr>
<td>• Elongated head and snout with nostrils near its eyes</td>
<td></td>
</tr>
<tr>
<td>• Flattened tail used for swimming</td>
<td></td>
</tr>
<tr>
<td>• 1.5 feet (45 cm) long. was one of the first aquatic reptiles.</td>
<td></td>
</tr>
</tbody>
</table>

*Cynognathus*

*Glossopteris*

*Lystrosaurus*

*Mesosaurus*
Stop and think

For each plant or animal, explain if it would have been possible for them to have crossed the ocean if the continents were in their present day configuration.

1. Cynognathus __________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________  

2. Glossopteris _________________________________
   _______________________________________________________________________
   _______________________________________________________________________  

3. Lystrosaurus ____________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________  

4. Mesosaurus ____________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________  

5. Which of the fossils were found in Antarctica?________________________
   _______________________________________________________________________
   _______________________________________________________________________  

6. Finding reptile-like fossils in Antarctica seems strange or unexpected. Why?
   _______________________________________________________________________
   _______________________________________________________________________  

7. Glossopteris is an extinct type of plant referred to as a seed fern. These plants most likely thrived in warm tropical climates. Do any of the locations where the fossils of the glossopteris have been found seem strange? Explain your answer. 
   _______________________________________________________________________
   _______________________________________________________________________  

8. How did the fossils of Cynognathus help you construct your map? _______
   _______________________________________________________________________
   _______________________________________________________________________  

9. Where on your new map is Australia? What continents is it connected to? Which fossils did you use to help place Australia? How were they useful?
   _______________________________________________________________________
   _______________________________________________________________________  
   _______________________________________________________________________  

10. What other evidence might be useful for connecting the continents together into one giant landmass? 
   _______________________________________________________________________
    _______________________________________________________________________
    _______________________________________________________________________  
Fossil Map

- Color the fossils with colored pencils, each in its own color.
- Cut out the land masses.
- Assemble the continents and land masses (Africa, India, Australia, Antarctica, South America, and Madagascar) together on the title page. The patterned areas (fossil plant and animal occurrences) along with the shape of each landmass will provide clues to how the continents fit together.
- Glue the land masses.