What geologic evidence supports the existence of Pangaea?

Scientists hypothesize that Earths seven continents were once connected as a single land mass, called a supercontinent. That land mass began to separate about 200 million years ago. Over time, the continents have slowly shifted to their present positions by movement that we call continental drift. Alfred Wegener, an early proponent of the theory of continental drift, named the former supercontinent Pangaea, meaning “all land”.

The shape of present-day continents (especially the way some continental coastlines could be fit together like pieces of a jigsaw puzzle) prompted Wegener to hypothesize about the existence of Pangaea. Wegener and other scientists discovered additional geologic evidence to support the existence of Pangaea.

Fossils of the reptile Mesosaurus have been found in South America and Africa. Because Mesosaurus live in fresh water and on land, it is improbable that it swam between the continents. This fact suggests that South America and Africa were once joined.

Another fossil that supports the existence of Pangaea is Glossopteris, a fossil fern that once flourished n warm tropical climate. Glossopteris fossils have been found in Africa, Australia, India, South America and Antarctica. It is improbable that Glossopteris could have originated independently in so many isolated locations lending weight to the theory that these continents were once connected and shared a similar climate.

Rock structures provide another clue to the existence of Pangaea. For example, parts of the Appalachian Mountains of the eastern United States are similar to mountains found in Greenland and Western Europe. Furthermore, similar folded rock belts can be found on the southeastern coast of South America, as well as the southwestern coast of Africa.

Glacial deposits and grooved bedrock in the southern parts of South America, Africa, India, and Australia suggest that these areas were once connected and covered by glaciers.

Finally, radiometric dating has shown that rocks of a similar age can be found on the northwestern African coastline and hear the center of South Americas’ eastern coastline.

In this Virtual Lab you will use geologic evidence to reconstruct the former supercontinent Pangaea.

Objectives:

* Describe how geologic evidence supports the existence of the former supercontinent Pangaea
* Reconstruct Pangaea by examining rock, fossil, and glacial evidence and by manipulating the shape and orientation of the continents.

Procedure:

1. Click the left and right arrows to see each of the seven continents.
2. Click the puzzle piece to see three versions of each continent. The different versions appear in random order and represent the continents shape 250 million years ago, 66 million years ago and today.
3. Determine which versions shows the continents shape 250 million years ago and click it.
4. Drag the continent to the place on the map where you think it was located 250 million years ago.
5. Examine the shape of another continent. Click the buttons in the Legend for geologic clues.

\*NOTE: During the existence of Pangaea, continents fit together like pieces of a jigsaw puzzle. Also, geologic similarities were found in connected areas.

1. Using information about the shape and geology of the continents, drag each of the seven continents to the map to reconstruct Pangaea.
2. Click the Check button. If you dragged a continent from the wrong time period or to the wrong location on the map, it will be highlighted yellow. Drag it to the Puzzle Box and try again.
3. When all the continents of the correct age are in the correct location on the map, click the Present Day button to see an animation of continental drift.
4. Complete the Journal Questions.

Journal Questions:

1. Describe the process you use to reconstruct Pangaea.
   1. Did you use the legend?
   2. Which clues were the most helpful?
2. What types of geologic evidence supports the existences of Pangaea?
3. What type of geologic evidence provides the greatest support for the hypothesis that the eastern coast of North American was once joined with the western coast of Europe?
4. How do you think Wegener’s background as a climatologist contributed to his hypothesis that the continents were once joined?