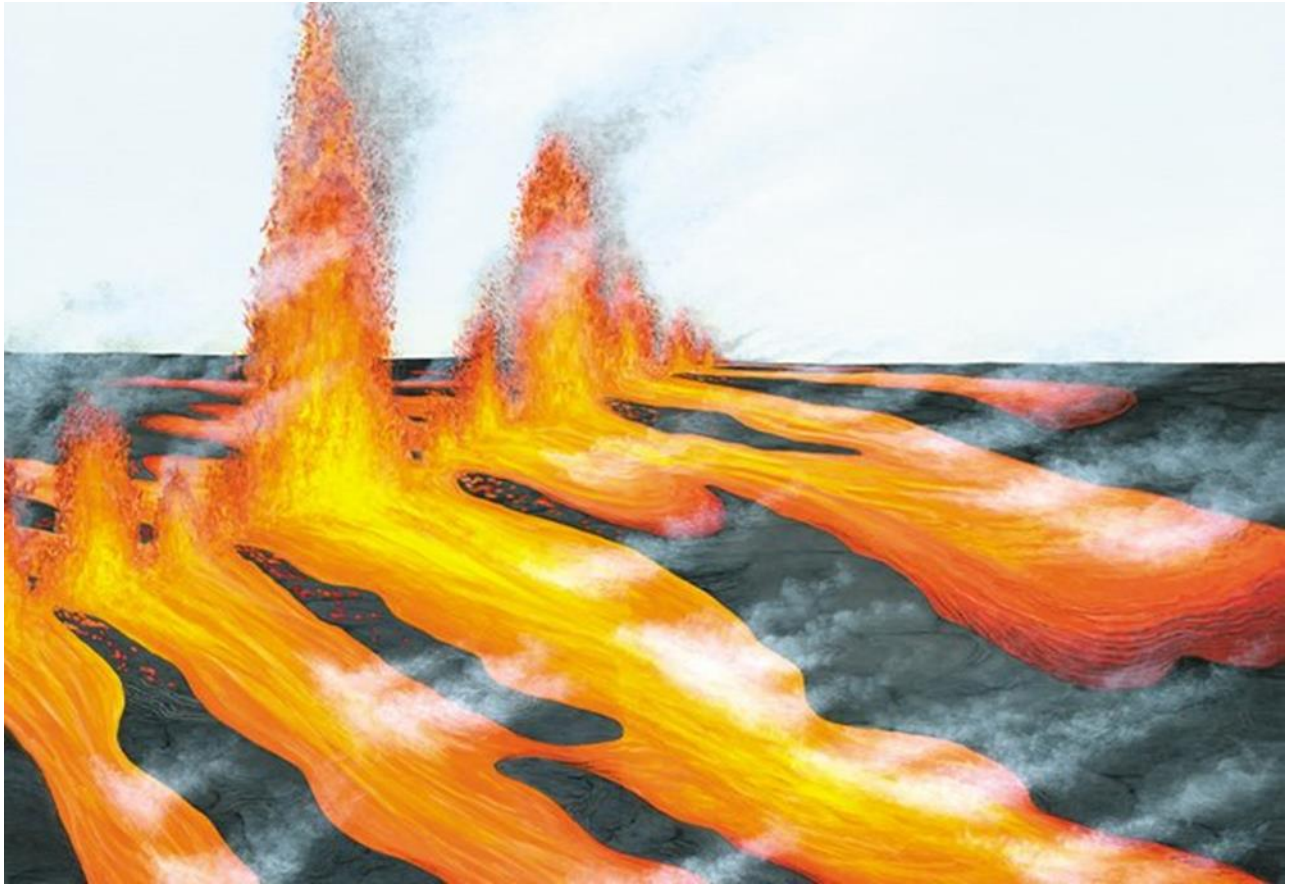


# Lake Superior was Created by Fire and Ice



Name: \_\_\_\_\_

Date: \_\_\_\_\_

*Read the timeline of Lake Superior Geology and answer the questions at the end.*

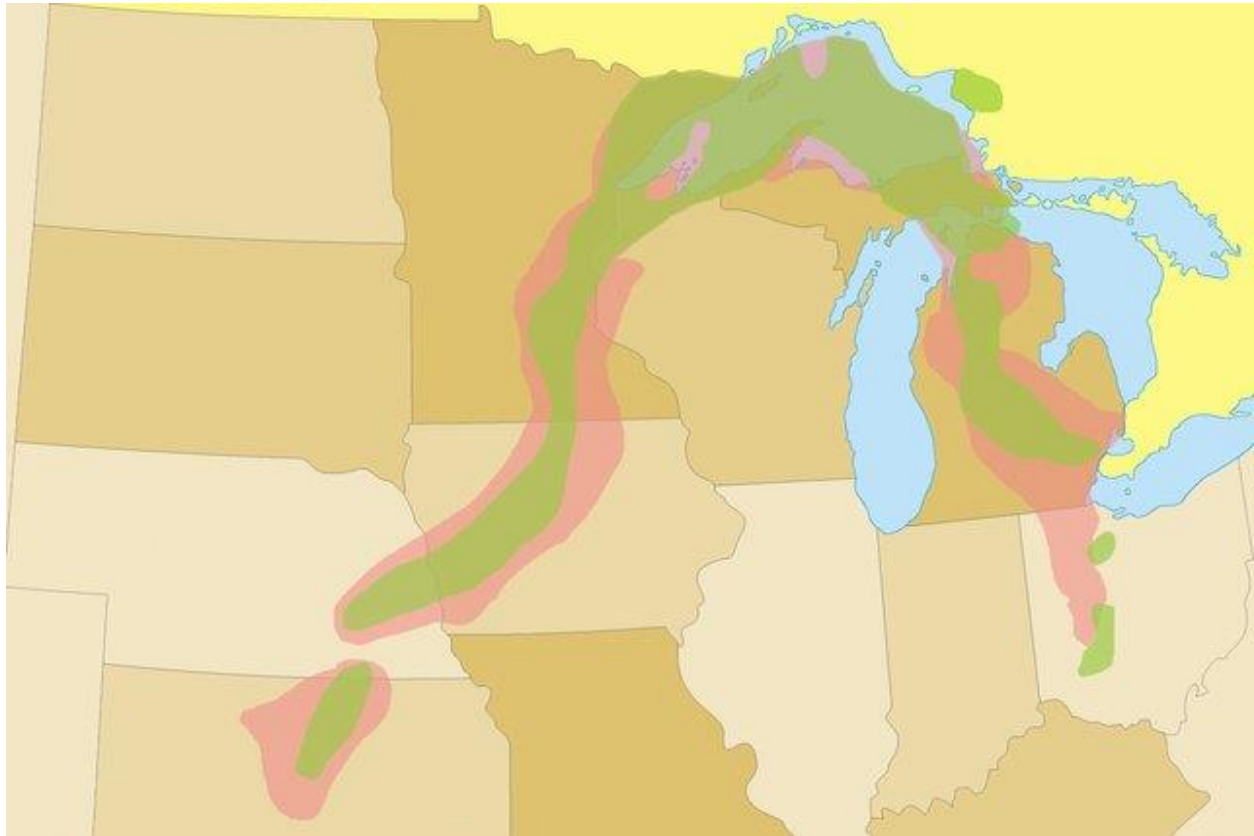
## **1 billion years ago:**

Molten lava erupted from the Mid-Continent Rift, a crack in the crust of the Earth that opened up from Lake Superior to St. Louis, Missouri. The rift was pulling apart for about 20 million years!

## **950 million years ago:**

The rifting produced a blanket of an igneous rock called basalt up to 10 miles thick! The basalt was heavy and slowly sank into the earth creating a low area that would become the Lake Superior basin.

Ancient rivers eroded rock and deposited the sand that makes up the Apostle Islands and Bayfield Peninsula in the state of Wisconsin, and Pictured Rocks National Park in the state of Michigan. The sand deposits hardened into a sedimentary rock called sandstone.



*The Midcontinent Rift is shown in green. Magma pushed up underneath the surface in the pink areas, but did not erupt.*

**500 million years ago:** The area around Lake Superior stabilizes, and the volcanic activity slowly ends.

**2.5 million years ago:** The Ice Age began! Glaciers formed on the surface of the earth. These huge rivers of ice slowly moved over the surface, knocking over everything in their path. They were very heavy and could be two miles high.



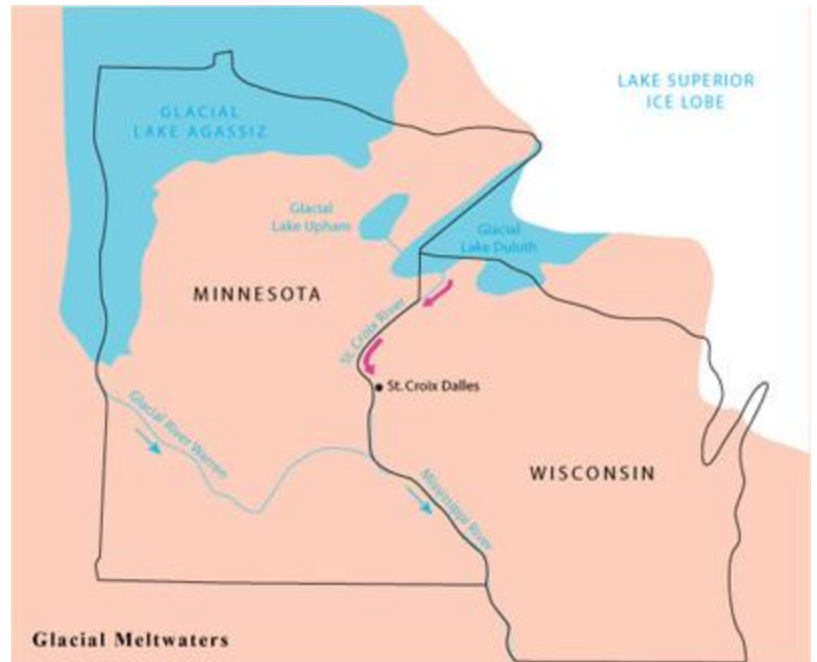
Glaciers sculpted the Great Lakes basin into its present shape. Glaciers also carried and deposited rocks. Many rocks you see near Lake Superior were carried from other places by glaciers. Examples of these include slate and gneiss, both metamorphic.

**11,000 years ago:** Glacial Lake Duluth, an early larger form of Lake Superior, forms as the glaciers melt and retreat northeastward. The lake's huge outflow of water near present-day Duluth carved the St. Croix River Valley and fed the Mississippi River.

**10,000 years ago:** During the retreat of the glaciers, the water levels in Western Lake Superior changed often, rising 500 feet above or falling 250 feet below its current level.

Eventually, the St. Marys River became Superior's outflow, and the water level lowered to its present state. Paleo-Indian people moved into the Lake Superior region.

**Today:** The Lake Superior basin continues to spring back after being squashed by the last glacier. This "isostatic rebound" is greatest along Canadian shores, which are rising about 18 in every 100 years. Lake levels continue to change, rising and lowering on a 13-year cycle.



You can spot igneous rocks along the Lake Superior shore at all of the Minnesota State Parks. Many of these rocks were formed by lava flows and were too hard to be destroyed by the glaciers. In some areas, you can find scrapes and scratches caused by glaciers on the rocks.

## Questions for Understanding: Lake Superior Geology

1. Find and underline the following words in the text: metamorphic, sedimentary, igneous
2. Using clues in the story, how do you think sedimentary rocks are formed?
3. Using clues in the story, how do you think igneous rocks are formed?
4. Isostatic rebound is happening under your feet right now! Find the words "isostatic rebound" in the text and underline it. What does isostatic rebound mean?
5. Floodwood MN would have been much closer to the shore of the large Glacial Lake Duluth then you are now to Lake Superior. How many years ago did Glacial Lake Duluth exist?
6. We no longer see volcanos or lava flows along the shore of Lake Superior. How many years ago did volcanic activity end in this region?
7. **Thinking question:** Does ancient geology still effect our lives near Lake Superior today? Why or why not? Make an argument to support your answer.