Be an Engineer!

Build a model to show how the Great Lakes formed. Use soil and large pieces of ice to model the role of ice sheets as they carved out the Great Lakes Basin and then filled it with water. How will you make the ice sheets? How will they move? What shapes will be left behind? Write a plan for your model and draw a sketch before constructing it.

After designing your model, allow the ice to melt. Observe how the water flows and which areas of your model it fills in.

Beyond the Book

Use the Internet to learn how invasive species are entering the Great Lakes and threatening other species.

Notes

The Great Lakes

FOCUS Question

How did the Great Lakes form?

Scale, Proportion, and Quantity

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The Great Lakes

Written by Katherine Follett

www.sciencea-z.com

The Largest Lakes

In the middle of North America lie five lakes, all connected by rivers. These are no ordinary lakes. They're the Great Lakes. Together they hold over 20 percent of Earth's fresh water. If the Great Lakes were spread out evenly, their waters would flood the continental United States 3 meters (9 ft.) deep! Like small seas, the Great Lakes have waves, powerful currents, and even tiny tides.

Where did these enormous lakes come from? The formation of the Great Lakes goes back to the most recent ice age. The lakes, and the land around and under them, reveal their incredible history.

THE GREAT LAKES

The Great Lakes are more like inland seas with coastal cities, like Toronto, Ontario.

Notes

Read-Think-Write

Write your answers on separate paper. Use details from the text as evidence.

1. What is a *glacial period?*
2. What are two ways in which ice sheets created a large basin in North America?
3. Look at the table on page 5. Which of the measurements make Lake Superior the largest of the Great Lakes?
4. Why do some scientists consider Lake Michigan and Lake Huron to be a single lake?
5. How does Lake Erie affect the weather of cities on its east coast?

FOCUS Question

How did the Great Lakes form? Identify the events that changed ice sheets and the underlying land into the Great Lakes we see today. How did the land change?

The Great Glaciers

Across Canada and the northern United States, saber-toothed cats and mammoths once roamed snow-covered lands. This ice age lasted from about 110,000 to 12,000 years ago. It was just one of a series of "cold snaps" that have hit Earth over the past 2.5 million years. Scientists call these cold snaps *glacial periods.*

During the last glacial period, snow accumulated and never melted. Over thousands of years, the snow became tightly packed under its own weight. It formed enormous sheets of ice. These ice sheets spread and grew up to 3 kilometers (1.8 mi.) thick.

Today, ice sheets still cover Greenland. They are slabs of ice that cover vast areas of land.

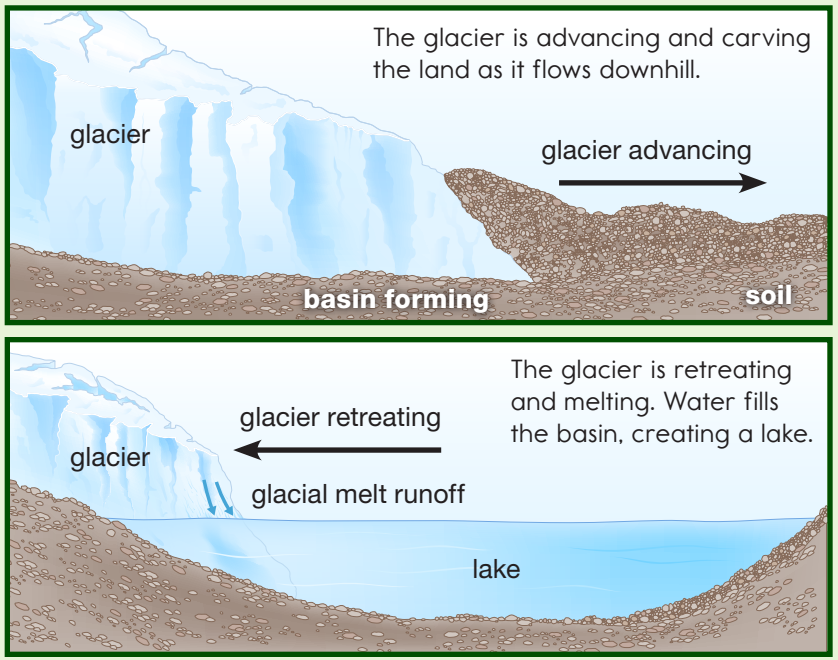
During the last glacial period, ice sheets spread as far south as present-day Indianapolis. Much of the rest of the United States was a cold, arctic tundra.

Sculpted by Ice

The heavy ice sheets acted like bulldozers as they grew and shifted. They scraped away at the rock and pushed away soil. The land beneath the ice sheets sank down under the heavy weight of the ice.

During each glacial period, ice sheets scooped and pushed away more land. By 12,000 years ago, they had carved enormous basins in the middle of North America. As Earth slowly warmed up again, the ice sheets melted and water flooded the low-lying basins. This process formed the Great Lakes.

ICE CARVES THE GREAT LAKES BASINS



The Lakes and People

Over thirty-five million people live near the Great Lakes. The cities of Chicago, Milwaukee, Detroit, Cleveland, and Toronto all sit on their shores. These cities depend on the lakes. The Great Lakes help move cargo from the Atlantic Ocean to the West and even connect to the Mississippi River. Many people use the lakes for drinking water, recreation, and fishing.

People also affect the lakes. Large industries along the shores may cause pollution. A warming climate means the Great Lakes do not freeze as often or as completely as they used to. Scientists aren't sure how this affects the fish, plants, and other life in and around the lakes. Today, many laws protect the Great Lakes from pollution.

The Great Lakes are unique on Earth. Millions of people depend on them, and many are working to protect them.


A large shipping vessel sits at a dock in Marquette, Michigan, on Lake Superior.

Lake Ontario

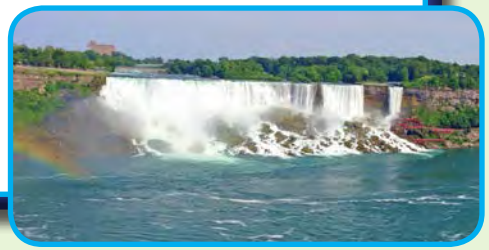
From Lake Erie, water flows down the Niagara River. It thunders over the Niagara Falls and enters Lake Ontario.

Ontario has the smallest surface area of the Great Lakes. However, it is deeper than its neighbor, Lake Erie, so it contains more water. Ontario is also the youngest Great Lake. Geologists say that the land under the lake is still rebounding from the weight of the ice sheet, like a chair cushion slowly rising after you stand up.

From Lake Ontario, water flows east through the St. Lawrence River. This river passes through eastern Canada and empties into the Atlantic Ocean.

Do You Know?

Water draining from the Great Lakes pours over a ledge of hard rock at Niagara Falls. This ledge, made of limestone, stood up to the scraping of the glaciers better than the rock around it. The rock formed a cliff called the Niagara Escarpment.



Today's Great Lakes

There are five main Great Lakes that flow from one to the next in a single system of fresh water.

Great Lake	Surface Area–square km (sq. mi.)	Maximum Depth–meters (ft.)	Volume–cubic km (cu. mi.)
Lake Superior	82,000 (31,700)	406 (1,332)	12,000 (2,900)
Lake Huron	60,000 (23,000)	228 (748)	3,500 (850)
Lake Michigan	58,000 (22,300)	282 (925)	4,900 (1,180)
Lake Erie	25,700 (9,910)	64 (210)	480 (116)
Lake Ontario	19,000 (7,340)	245 (804)	1,640 (393)

Lake Superior

"Superior" is more than just a name. Lake Superior has the largest surface area of any lake on Earth and contains Earth's third-largest volume of fresh water. That's more water than all the other Great Lakes combined.

Lake Superior, the northernmost of the Great Lakes, has forest along much of its shoreline.

Lake Huron and Lake Michigan

Water flows out of Lake Superior and down the St. Mary's River into Lake Huron. Lake Huron is connected to Lake Michigan by the Straits of Mackinac (MA-kuh-naw), which are 8 kilometers (5 mi.) wide. Since water flows back and forth through the straits, some scientists consider Lake Michigan–Huron to be one huge lake.

Lake Huron contains the largest island in a body of fresh water on Earth. Manitoulin Island has its own lakes. Some of these lakes even have their own islands!

Lake Michigan is only connected to the other lakes through Lake Huron. It is also the only Great Lake entirely within the United States.


The Great Lakes are large enough to form ocean-like beaches, like this one in Chicago.

Lake Erie

From Lake Huron, water flows south through the St. Clair River. It passes through Lake St. Clair, which is sometimes called the "sixth Great Lake." Then the Detroit River carries the water into Lake Erie.

Lake Erie is the shallowest Great Lake and the smallest by volume. Lake Erie is known for its dangerous weather. The shallow water warms quickly during the summer. The warm water evaporates, producing clouds and thunderstorms. In North America, winds and storms usually blow from west to east. Since Lake Erie is very wide, these winds can create huge waves. As summer turns to winter, cold winds pick up moisture from the still-warm lake and dump it on the eastern shore as lake-effect snow.


Lake-effect snow that forms over Lake Erie gives Buffalo, New York, a reputation for massive snowfalls.