A-maze-ing Lake Superior

Mazes, Puzzles, and Amazing Facts About One of the World's Largest Lakes

Sea Grant
Minnesota
About This Book

Lake Superior is such an amazing lake that we decided to make an activity book about it. By solving the puzzles you’ll learn more about Lake Superior and the Great Lakes. If you get stumped, you can check the answers beginning on page 30.

This book is produced by Minnesota Sea Grant, a statewide program located at the University of Minnesota Duluth that supports research and public education programs related to Lake Superior and Minnesota’s inland waters. We are part of the National Sea Grant Program, which supports 30 similar programs in coastal states throughout the United States and Puerto Rico.

Have fun learning about Lake Superior!

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Racing Across Some Very Large Lakes

Lake Superior is the largest freshwater lake in the world by surface area and the third largest by volume. Only Lake Baikal (Siberia) and Lake Tanganyika (East Africa) contain more fresh water.

Race your way from Lake Superior to Lake Baikal!
Anchors Aweigh to the Atlantic!

There's a lot of water in the Great Lakes. If we could spread it evenly over the continental United States, we would be swimming in 10 feet of water!

Help the grain ship navigate from the Duluth-Superior Harbor to the open waters of the Atlantic Ocean.
Great Things About the Great Lakes

The Great Lakes hold about one-fifth of all the fresh water on the Earth’s surface. If all this fresh water was baked into a pie and a mouse ate the Great Lakes, this is how the pie would look.

If all the water in the Great Lakes was baked into a pie, choose which pie you think is cut most accurately.

A.  

B.  

C.  

D.  

The water levels of Lake Superior go up and down by about a foot each year depending on the weather and the Soo locks and dams. Study the profile of the Great Lakes then answer the questions that follow. (The answer is also a great way to help you remember the names of all the Great Lakes!)

Which lake receives the water of two other lakes?
Lake ______________

Which lake is closest to the ocean?
Lake ______________

Which is the second deepest lake?
Lake ______________

Which lake is shallowest?
Lake ______________

Which lake is the deepest and highest?
Lake ______________

Now write the first letter of your answers here:
___ ___ ___ ___ ___
A Swim in Superior

Lake Superior could hold the water from all the other Great Lakes, along with three more Lake Eries. Superior’s 3-quadrillion gallons of water could submerge all of North and South America under one foot of water.

Help the lake trout find its way to Isle Royale.
Wandering Water

A drop of Lake Superior water spends an average of 191 years in the lake before flowing out through the St. Marys River, evaporating or being consumed.

Follow the path of the drop of water to find out where it went.
Find Things to Do on the North Shore

CAMP  SKI  PLAY  READ HISTORY  FISH
EXPLORE  FLY KITES  VISIT A WATERFALL  SWIM
VACATION  ROCK HUNT  SKIP ROCKS  KAYAK
BIRD WATCH  HIKE  PICNIC  SAIL

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Skipping Rocks

Over 3.5 million people visit the North Shore of Minnesota each year. Many of them pick up a rock and skip it into Lake Superior. The best skipping rocks (and the most common rocks on the shore) are made of basalt or rhyolite. Basalt and rhyolite were once lava.

Which rock-skipper made the most splashes before their rock went "ker-plonk?"
Lake Superior agates are beautiful and semi-precious rocks. Agates began as gas bubbles trapped in cooling lava. Over time, water filled these bubbles and deposited minerals. The bands you might see in an agate are layers of these minerals.

Follow the bands of this agate to its center.
All Hands on Deck!

The Duluth-Superior Harbor is the busiest inland port in the nation. Taconite (pellets of iron ore) and coal are the major domestic cargoes. If you wait by the Aerial Lift Bridge in Duluth, you might see ships carrying grain back to their home ports in Europe, Asia or Africa.

Help Joe Sailor get to the star at the other end of this "1000-footer" ore boat.
Zebra Mussel Madness

Eeek! Zebra mussels invaded the Great Lakes in the 1980s and are reproducing in the Duluth-Superior Harbor. They are horrible pests in most of the Great Lakes and some inland lakes. Biologists think zebra mussels haven’t reproduced rapidly in Lake Superior because the lake is too cold and too low in calcium.

Can you find the identical twins to these zebra mussels?
Attack of the Vampire Fish

Sea lamprey are the most damaging invasive species in the Great Lakes. Lamprey suck the fluids out of other large fish. These primitive fish were able to get into the upper lakes when canals were built connecting them with the Lower Great Lakes about 85 years ago.

Follow the path of this sea lamprey to figure out which lake trout it attacked.
Many people like to fish in Lake Superior even though it has fewer fish than the other Great Lakes (because it is so cold and there is not much for fish to eat). Some of the species that anglers look for are lake trout, steelhead, and salmon such as coho, and chinook.

Find out which angler caught the lake trout and who ended up with the round goby (an invasive species). Who caught the boot?
Surgin’ Around a Sturgeon

Lake sturgeon are the largest and one of the oldest fish in the Great Lakes. This native can weigh over 200 pounds (90.7 kg) and live longer than 100 years. Lake sturgeon populations are still recovering from overfishing that happened about a century ago.

Find your way around this lake sturgeon.
Food Web Frolic

The sun fuels life in the lake. Follow the path of the sun’s energy through this food web to see if it ends up in a human or an eagle. You can only go in the direction that the arrow is pointing, so when two arrows point to each other you must chose a different path. This is like a maze.
Break Out of the Rip

Find 10 differences between the two pictures. Draw a line showing how the swimmer could break out of the rip current.

Rip currents are narrow, fast-moving channels of water that move away from shore. The National Weather Service considers rip currents the third deadliest weather-related hazard, behind heat waves and floods. There’s no need to stay away from the beach, though, just know what rip currents look like and how to get out of one.

Look for:

- A break in the incoming wave pattern.
- A channel of churning choppy water.
- A difference in water color.
- Foam or objects that move steadily offshore.

Escaping:

- Don’t fight the current.
- If you can’t escape, float calmly until the current slows.
- If you need help, call or wave for assistance.
- Swim at a beach protected by a lifeguard.
- Swim parallel to shore to get out of the current then head back to shore at an angle. (Rip currents are rarely more than 30 feet wide.)
Storm Chaser

If you don't like Lake Superior's weather, wait a minute! Lake Superior's weather can change often and rapidly. The stormiest months on the lake are usually October and November. One of the worst storms damaged over 18 ships and killed 36 people in 1905 with a combination of fierce winds (about 70 miles per hour) and a heavy snow that brought visibility down to nearly zero.

Help this boat sail around the storms to the dock.
A Duck in the Wind

Lake Superior has a tiny tide (about an inch) but it can have a very large seiche (pronounced "saysh"). A seiche happens when wind or air pressure push water toward one side of the lake, causing the water level to rise on one side and to drop on the other. When the wind stops, the water sloshes back and forth, like it does in a bathtub when you stop making waves. The wind in this picture pushed the rubber duck towards Superior’s south shore.

Follow the path of the wind to the duck.
Flying for Fries

Two types of gulls live along Lake Superior: ring-billed gulls and herring gulls. Ring-billed gulls are newer to the area. Their numbers have grown as human activities increased and they are now more common than herring gulls, which are larger and do not have black markings circling their bills. Many ring-billed gulls nest on an island about a half-mile away from Duluth’s Canal Park.

Although feeding gulls is frowned upon, help the gull taking off from Interstate Island find the French fry.
Migration Time

In 2003, over 100,000 hawks, eagles, and falcons flew past Hawk Ridge Nature Reserve in Duluth in just one day (a record)! More typically, about 93,000 raptors migrate across Hawk Ridge from mid-August through mid-December. Birds funnel down the North Shore of Lake Superior (they don’t like crossing the lake), riding thermals and updrafts created by the Sawtooth Mountains. The most common species are the broad-winged hawk, sharp-shinned hawk, and red-tailed hawk.

Follow the flight paths of the raptors in the picture to figure out where they ended up.
As the last glacier retreated northward 7,000 years ago, nomadic people of the Old Copper Culture visited glacial Lake Superior, maybe with dogs. About 3,000 years ago people of the Woodland Culture settled on the shores. Next, the Dakota (Sioux) occupied the land until the Ojibwa (Chippewa) moved over from Lake Huron in the 1600s. On behalf of France, Samuel de Champlain’s men, Brule and Grenoble, were the first Europeans on record to have touched Lake Superior in roughly 1623. In 1783, the area came under British rule. At the end of the Revolutionary War, 20 years later, most of the Lake Superior area became part of the United States of America.

Match the track with the right person.
Animals also leave tracks in the mud and sandy beaches around Lake Superior. Unscramble the animals’ names and then match them to their tracks.
Sam's Bad Day

Sam is a fisheries biologist and he’s having a terribly bad day. Someone left the water running and the sink overflowed. A storm is ready to overtake his research vessel. Seven of his fish escaped from the fish tank and one stole his sandwich! The pages of his manuscript are all over the floor and he misplaced lots of his equipment.

Help Sam find his fish and research tools.
Break the Fish-Code

Break the code to figure out the names of some of the 70 species of fish that live in Lake Superior.

Here's your starter key:

**COHO SALMON**
UAXA WGRIDAO

IGFQ BLAZB
JQIIAY SQLUX

WMWUAYQB
(a fat, deep-dwelling Lake Trout)

IGFQ XQLLMOT

PLAAF BLAZB
YGIIQJQ
(Minnesota’s state fish)

IAOTOAWQ WZUFQL

PZLPAB

WQG IGDSLQJ
OALBXQLO SMFQ

IGFQ WBZLTQAO
WIMDJ WUZISMO

IGFQ YXMBQKMWX
LGMOPAY WDQIB
Lured to the Lighthouse

Thirty-eight lighthouses once guided ships across Lake Superior. One of the most famous sits on the bluff at Split Rock. It was built in 1910 because large iron ore deposits interfered with navigation and the really deep water made it difficult for mariners to sound for depth at a safe distance. Also, steel manufacturers, a powerful political force, demanded a light after a November gale claimed seven ships in the waters near Split Rock five years earlier. The light operated until 1969.

Help the rock climber scale the bluff and use the ropes to join her friend on the lighthouse tower.
Sink, Sank, Sunk

Most of Lake Superior’s 350 shipwrecks occurred when low-pressure systems passed over the lake, whipping up storms. Some of these wrecks make for interesting scuba diving because they are well preserved in Superior’s cold water.

Decode the sentence below to learn a shipwreck fact. To help you get started, look at the key word in the third line.
A Trashy Race

Anna and Erik decide to race to the trash can. The trash they pick up on their way can be redeemed for seconds. If Erik reaches the trash can four seconds before Anna, who won after the trash was redeemed? How many seconds-worth of trash is left on the beach?
Balancing on Ice

Lake Superior hardly ever freezes over completely despite the region's frigid temperatures. There is so much water in the lake that it takes a long time to cool down after summer. Wind often keeps it moving enough to prevent ice from forming. Still, by about mid-January temporary fish houses start popping up nearshore as people try their luck at ice fishing for Kamloops (rainbow trout) and maybe an occasional salmon.

Find 10 differences between the ice fishing pictures.
Lake Superior Crossword

ACROSS

2. Native American people along Lake Superior
4. Largest lake by surface area in the world
9. Lake Superior is full of this
10. Lake Superior is very ___
11. The place you live
12. Don't forget to ____ an anchor to your boat
14. Especially in fall, you might see a _____ along the North Shore
15. One of the commercial fish species in Lake Superior
16. Someone who exchanges one thing for another
20. Lake Superior's temperature
21. The study of fresh water lakes
23. A state bordering Lake Superior
24. A wind-caused rocking of lake water
27. An exotic species that swam into Lake Superior
29. Lake Superior is the _______ Great Lake

DOWN

1. The shallowest Great Lake
2. The largest boat traveling through Lake Superior
3. It changes often along the shore
5. Semi-precious Lake Superior rock
6. The lake and all its associated plants and animals
7. Birch trees are a common _____ in the Lake Superior region
8. A small, edible fish that people catch by the hundreds in spring
9. Often covers large portions of Lake Superior in winter
10. The lower portion of a wave
11. A city on the shores of Lake Superior
12. Don't forget to ____ an anchor to your boat
13. Especially in fall, you might see a _____ along the North Shore
15. One of the commercial fish species in Lake Superior
16. Someone who exchanges one thing for another
20. Lake Superior's temperature
21. The study of fresh water lakes
23. A state bordering Lake Superior
24. A wind-caused rocking of lake water
27. An exotic species that swam into Lake Superior
29. Lake Superior is the _______ Great Lake
30. The coastal area of Minnesota
31. The Edmund Fitzgerald was a famous ship ____
32. Creatures that swim in Lake Superior
33. Lake Superior is an inland ____

18. Tiny plants at the base of Lake Superior's food web
19. Type of tree that has needles instead of leaves
22. Birds build them and so do fish
24. The most popular season for visiting the North Shore
25. Lake Superior is exceptionally _____
26. A tree with white bark that grows along the North Shore
27. Minnesota's state bird
28. The wind makes these on the surface of the lake
29. It is fun to ____ a flat rock along the surface of the water
Minnesota Sea Grant is part of the University of Minnesota Duluth and the National Oceanic and Atmospheric Administration’s National Sea Grant Program. Can you find the following in this picture?

2 mosquitoes  3 zebra mussels  5 ring-billed gulls
1. Racing Across Some Very Large Lakes

2. Anchors Aweigh to the Atlantic!

3. Great Things About the Great Lakes

Answer: Pie D, Lake Huron, Lake Ontario, Lake Michigan, Lake Erie, Lake Superior. HOMES

4. A Swim in Superior

5. Wandering Water
6. Find Things to Do on the North Shore

7.Skipping Rocks:
   Answer: The Girl

8. Agate Gazing

9. All Hands on Deck!

10. Zebra Mussel Madness
11. Attack of the Vampire Fish

12. Tangled Lines: Angler 1 caught the Lake Trout, Angler 2 caught the boot, Angler 3 caught the Round Goby

13. Surgin' Around a Sturgeon

14. Food Web Frolic

15. Break out of the Rip
16. Storm Chaser

17. A Duck in the Wind

18. Flying for Fries

19. Migration Time
Answer: Bald Eagle: Offshore island
Broad-Winged Hawk: Flying south
Peregrine Falcon: In town
Red-Tailed Hawk: In the tree

20. The Tracks We Leave
21. Tracking Wildlife
Answer: Moose
Black Bear
Grey Wolf
American Crow
Raccoon
Snowshoe Hare
Ring-Billed Gull

22. Sam’s Bad Day

23. Break the Fish Code
LAKE TROUT
SISCOWET
BROOK TROUT
COHO SALMON
BURBOT
SEA LAMPREY
LAKE STURGEON
LAKE WHITEFISH

YELLOW PERCH
LAKE HERRING
WALLEYE
LONGNOSE SUCKER
NORTHERN PIKE
SLIMY SCULPIN
RAINBOW SMELT

24. Lured to the Lighthouse
25. Sink, Sank, Sunk
The Edmund Fitzgerald, the Great Lakes most famous shipwreck, lies in Lake Superior.

26. A Trashy Race
Anna and Erik tied; 15 seconds worth of trash remains.

27. Balancing on Ice

28. Lake Superior Crossword

29. Minnesota Sea Grant Unplugged
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