



More Than Just a Lake!

By creating a map of the rivers flowing into your Great Lake, learn how rivers form a watershed.

BACKGROUND

All lakes and rivers have a set area of land that water drains into them from, called the “watershed” or “drainage basin.” Drainage basins are important environmentally because whatever happens within the basin of the lake can happen to the lake itself. Toxic substances spilled or placed on the land or in watershed rivers can end up in the lake. See the Great Lakes Watershed Fact Sheets for additional information about your local watershed.

PROCEDURE

1. All water flows downhill

The physical properties of water on Earth are the driving force behind watersheds. In liquid form, water always flows downhill. The following activity demonstrates this principle. The educator dons a raincoat to represent the land around the lake. Standing on a towel, invite a student to act as the rain and spray the raincoat. Ask all other students to make a prediction about where the water will end up. Students then observe the “rain” as it falls on the “land.” Where did the water travel? (Down your raincoat/downhill) This happens

around the lake as gravity pulls water to the lowest point. Water draining to the lowest common point is the simplest definition of a watershed.

2. Introduction to the model watershed

Students gather around the “shore” of the lake. Explain that the blue yarn represents rivers. With younger students, demonstrate how one river might look on the map as it flows into your Great Lake.

3. Laying out the rivers

Give each pair of students a piece of blue yarn. Younger students place their “river” somewhere on the map where it flows into the lake. Make sure that they do end up at the lake. Ask some students questions about their rivers, e.g. “Any waterfalls?” or “How’s the fishing?”

Older students should be given a river card (see river names at end of lesson). Students will have to use a Great Lake map, highway map, or an atlas in order to locate their river. Once a student, or a pair of students, has found their river, they should “map” it--by placing their blue yarn

TOPIC

Great Lake drainage basins

AUDIENCE

Grades 1-6; 10-30 students

SETTING

Large, open indoor space is required

GOAL

To understand the concept of a drainage basin or watershed, and how that concept relates to the local Great Lake watershed.

OBJECTIVES

- Students will understand the defining role that rivers have in watershed activity
- Students will be able to state whether they live inside or outside the drainage basin of their Great Lake
- Older students will be able to identify the river drainage basin in which they live

MATERIALS

- Large floor map of your Great Lake (or an outline on the floor made with masking tape, large enough for an entire classroom to sit around).
- 10-15 short lengths (2-3 feet) of blue yarn
- Ball of yarn colored other than blue, at least 50 feet long
- Long raincoat
- Towel
- Spray bottle filled with water
- Maps of Minnesota, Wisconsin, Michigan, Ontario, Illinois, Indiana, Ohio, New York, Pennsylvania, or a detailed North American atlas

in connection to the map, to model the actual river flow to the lake.

4. The boundary

Once all the rivers are in place, explain that the students will now create an imaginary line. Standing near one of the “rivers,” ask “If a raindrop falls here, where will it go/drain?” (To the lake). Then standing away from the river, ask the same question (it goes somewhere else, like Hudson Bay or down the Mississippi). So there is a line that separates the places where water will fall and drain into the Great Lake from the places where water will fall and drain somewhere else. Use a ball of yarn to mark this boundary; walk around the lake with the yarn asking students to hold the yarn at the top of their rivers.

5. Implications

For the younger students explain that they have created a model of what a watershed looks like. Show them a picture of the actual watershed; discuss how their model is similar to the actual. Ask the students if their school falls inside or outside of their Great Lake’s watershed.

With the older students, explain that their map marks a close approximation of the drainage basin of the Great Lake nearest them. Is their school inside or outside the drainage basin? If outside the basin, what drainage basin is it in? Could dump-

ing something on the ground here affect the Great Lakes? If not, what would it affect?

EXTENSIONS

- Give older students a map of the actual rivers of the closest Great Lake basin and have them duplicate the tributaries and branches of the rivers that flow into their Great Lake.
- Discuss associated environmental issues, such as the concept of an “airshed” (the area from which the lake draws airflow and thus air pollutants) and the potential demand for pumping water out of the Great Lakes for the arid southwest.
- Use the Great Lakes Watershed Fact Sheet to create comparisons, mathematical studies, etc.
- Discuss how the people in their town or city use the water in their everyday lives.
- The class can become experts on a nearby river or stream that is part of their Great Lake watershed. This could be done through research, talking to local scientists or water related organizations and taking a trip to visit the stream.

ASSESSMENT

- Ask students if they live in a Great Lakes watershed.
- Ask students what other watershed they live in.

Lake Superior Watershed Fact Sheet

Lake Length--350 mi (563 km)

Lake Breadth--160 mi (257 km)

Lake Depth--483 ft (147 m) average • 1333 ft (405 m) maximum

Volume--2900 cubic mi (12,100 cubic km) Enough to cover North, Central, and South America with one foot of water.

Water Surface--31,700 square miles (81,103 square km)

Watershed Area--81,000 square miles (209,000 square km)

% of watershed covered by lake--39%

Shoreline length--2726 mi (4385 km)

Water Retention Time--approximately 191 years

Average Water Temperature--approximately 40° F (4.4° C)

Average Winter Ice Cover--60%

Number of Tributaries--336

TRIBUTARIES

1. Nipigon (ONT)

2. Aguasabon (ONT)

3. St. Louis (MN)

4. Kaministikwia (ONT)

5. Michipicoten (ONT)

6. Pic (ONT)

7. Ontonagon (MI)

8. Montreal (ONT)

9. Tahquamenon (MI)

10. Sturgeon (MI)

11. Bad (WI)

12. Pigeon (MN/ONT)

13. Little Pic (ONT)

14. Batchawana (ONT)

15. Presque Isle (MI)

16. Montreal (WI/MI)

17. Black (MI)

18. Bois Brule (WI)

19. Iron (MI)

20. Sand (WI)

21. Baptism (MN)

22. Knife (MN)

23. Cranberry (WI)

24. French (MN)

25. Lester (MN)

Lake Michigan Watershed Fact Sheet

Lake Length--307 mi (494 km)

Lake Breadth--118 mi (190 km)

Lake Depth--279 ft (80 m) average • 925 ft (282 m) maximum

Volume--1180 cubic mi (4920 cubic km)

Water Surface--22,300 square miles (57,800 square km)

Watershed Area--45,600 square miles (118,000 square km)

% of watershed covered by lake--49%

Shoreline length--1600 mi (2575 km)

Water Retention Time--approximately 99 years

Average Water Temperature--approximately 66° F (19.1° C) Summer, 36.4° F (2.47° C) Winter

Average Winter Ice Cover--less than 50%

Number of Tributaries--511

TRIBUTARIES

1. *Manistique (MI)*
2. *Escanaba (MI)*
3. *Menominee (MI/WI)*
4. *Fox (WI)*
5. *St. Joseph (MI/IN)*
6. *Kalamazoo (MI)*
7. *Grand (MI)*
8. *Muskegon (MI)*
9. *Pere Marquette (MI)*
10. *Manistee (MI)*
11. *Root (WI)*
12. *Oconto (WI)*
13. *Peshtigo (WI)*
14. *Bear (MI)*
15. *Galena (IN)*
16. *Paw Paw (MI)*
17. *Black (MI)*
18. *Pigeon (WI)*
19. *Little Suamico (WI)*
20. *Pensaukee (WI)*
21. *Betsie (MI)*
22. *West Twin (WI)*
23. *East Twin (WI)*
24. *Kewaunee (WI)*
25. *Pike (WI)*

Lake Erie Watershed Fact Sheet

Lake Length--241 mi (388 km)

Lake Breadth--57 mi (92 km)

Lake Depth--62 ft (19 m) average • 210 ft (64 m) maximum

Volume--116 cubic mi (484 cubic km)

Water Surface--9910 square miles (25,700 square km)

Watershed Area--30,140 square miles (78,000 square km)

% of watershed covered by lake--33%

Shoreline length--871 mi (1402 km)

Water Retention Time--approximately 2.6 years

Average Water Temperature--approximately 71.8° F (22.1° C) Summer, 35.9° F (2.16° C) Winter

Average Winter Ice Cover--100%

Number of Tributaries--842

TRIBUTARIES

1. *Black (MI)*
2. *Thames (ONT)*
3. *St. Clair (MI/ONT)*
4. *Belle (MI)*
5. *Clinton (MI)*
6. *Rogue (MI)*
7. *Huron (MI)*
8. *Raisin (MI)*
9. *Maumee (OH/IN)*
10. *Sandusky (OH)*
11. *Cuyahoga (OH)*
12. *Grand (OH)*
13. *Ashtabula (OH)*
14. *Buffalo (NY)*
15. *Portage (OH)*
16. *Toussaint (OH)*
17. *Vermillion (OH)*
18. *Black (OH)*
19. *Detroit (MI)*
20. *Rocky (OH)*
21. *Canard (ONT)*
22. *Lynn (ONT)*
23. *Big Otter Creek (ONT)*
24. *Kettle Creek (ONT)*
25. *Talbot Creek (ONT)*

Lake Huron Watershed Fact Sheet

Lake Length--206 mi (332 km)

Lake Breadth--183 mi (245 km)

Lake Depth--195 ft (59 m) average • 750 ft (229 m) maximum

Volume--850 cubic mi (3540 cubic km)

Water Surface--22,300 square miles (59,600 square km)

Watershed Area--51,700 square miles (134,100 square km)

% of watershed covered by lake--45%

Shoreline length--3827 mi (6157 km)

Water Retention Time--approximately 22 years

Average Water Temperature--approximately 64.0° F (17.8° C) Summer, 36.0° F (2.22° C) Winter

Average Winter Ice Cover--95%-100%

Number of Tributaries--1761

TRIBUTARIES

1. *Mississagi (ONT)*
2. *Spanish (ONT)*
3. *Vermillion (ONT)*
4. *Magnetawan (ONT)*
5. *Muskota (ONT)*
6. *Severn (ONT)*
7. *Saugeen (ONT)*
8. *Cass (MI)*
9. *Flint (MI)*
10. *Shiawasse (MI)*
11. *Titabawasse (MI)*
12. *Au Sable (MI)*
13. *Thunder Bay (MI)*
14. *Black (MI)*
15. *Sturgeon (MI)*
16. *St. Mary's (MI/ONT)*
17. *Thessalon (ONT)*
18. *Blind (ONT)*
19. *Serpent (ONT)*
20. *Little Black (MI)*
21. *Trout (MI)*
22. *Little Trout (MI)*
23. *Au Gres (MI)*
24. *Rifle (MI)*
25. *Saginaw (MI)*

Lake Ontario Watershed Fact Sheet

Lake Length--193 mi (311 km)

Lake Breadth--53 mi (85 km)

Lake Depth--283 ft (86 m) average • 802 ft (244 m) maximum

Volume--393 cubic mi (1640 cubic km)

Water Surface--7,340 square miles (18,960 square km)

Watershed Area--24,720 square miles (64,030 square km)

% of watershed covered by lake--30%

Shoreline length--712 mi (1146 km)

Water Retention Time--approximately 6 years

Average Water Temperature--approximately 67.8° F (19.9° C) Summer, 36.8° F (2.66° C) Winter

Average Winter Ice Cover--less than 15%

Number of Tributaries--659

TRIBUTARIES

1. Trent (ONT)
2. Severn (ONT)
3. Oswego (NY)
4. Genesee (NY)
5. Tonawanda (NY)
6. Niagara (NY)
7. Credit (ONT)
8. Humber (ONT)
9. Rogue (ONT)
10. Cataraqui (ONT)
11. Napanee (ONT)
12. Salmon (ONT)
13. Moira (ONT)
14. Ganarasha (ONT)
15. Salmon (NY)
16. Bronte Creek (ONT)
17. Oakville Creek (ONT)
18. Bowmanville Creek (ONT)
19. Hopkins Creek (NY)
20. Golden Hill Creek (NY)
21. Oak Orchard Creek (NY)
22. Sodus Creek (NY)
23. Wolcott Creek (NY)
24. Red Creek (NY)
25. Mink Creek (NY)

Lake Superior River Cards

Nipigon River	Aguasabon River	St. Louis River
Kaministikwia River	Michipicoten River	Pic River
Ontonagon River	Montreal River	Tahquamenon River
Sturgeon River	Bad River	Pigeon River
Little Pic River	Batchawana River	Presque Isle River
Montreal River	Black River	Bois Brule River
Iron River	Sand River	Baptism River
Knife River	Cranberry River	French River
Lester River		

Lake Michigan River Cards

Manistique River	Escanaba River	Menominee River
Fox River	St. Joseph River	Kalamazoo River
Grand River	Muskegon River	Pere Marquette River
Manistee River	Root River	Oconto River
Peshtigo River	Bear River	Galena River
Paw Paw River	Black River	Pigeon River
Little Suamico River	Pensaukee River	Betsie River
West Twin River	East Twin River	Kewaunee River
Pike River		

Lake Erie River Cards

Black River (MI)	Thames River	St. Clair River
Belle River	Clinton River	Rogue River
Huron River	Raisin River	Maumee River
Sandusky River	Cuyahoga River	Grand River
Ashtabula River	Buffalo River	Portage River
Toussain River	Vermillion River	Black River (OH)
Detroit River	Rocky River	Canard River
Lynn River	Big Otter Creek	Kettle Creek
Talbot Creek		

Lake Huron River Cards

Mississagi River	Spanish River	Vermillion River
Magnetawan River	Muskota River	Severn River
Saugeen River	Cass River	Flint River
Shiawasse River	Titabawasse River	Au Sable River
Thunder Bay River	Black River	Sturgeon River
St. Mary's River	Thessalon River	Blind River
Serpent River	Little Black River	Trout River
Little Trout River	Au Gres River	Rifle River
Saginaw River		

Lake Ontario River Cards

Trent River	Severn River	Oswego River
Genesee River	Tonawanda River	Niagara River
Credit River	Humber River	Rogue River
Cataraqui River	Napanee River	Salmon River (ONT)
Moira River	Ganarasha River	Salmon River (NY)
Bronte Creek	Oakville Creek	Bowmanville Creek
Hopkins Creek	Golden Hill Creek	Oak Orchard Creek
Sodus Creek	Wolcott Creek	Red Creek
Mink Creek		