

Great Lakes Literacy: Great Lakes Physical Attributes

Overview

In this lesson, students will plot various physical attributes of the Great Lakes on a map template and analyze their maps.

This document contains activities from lesson 2.B of the Groundswell Creating Meaningful Outdoor Experiences Curriculum Unit. See the complete version of the lesson on pages 14-20 of the unit.

Curriculum Connections

Michigan K-12 Science Standards

- 5-ESS2-1, 5-ESS2-2, MS-ESS2-4

Michigan K-12 Social Studies Standards

- 6 - G1.1.2, 6 - G1.2.3

Key Questions

- What are the identifying physical characteristics of the Great Lakes?
- What causes water to flow through the Great Lakes system?
- What is retention time, and how does it relate to the volume of water in a lake?

Student Objectives

- Students will gather information on the physical attributes of the Great Lakes from multiple sources.
- Students will plot physical attributes of the Great Lakes on a map, following symbols from a legend.
- Students will make inferences about relationships between attributes of their mapped data.

Materials List

- Great Lakes Mapping student worksheet (1 per student)
- Great Lakes Map Template worksheet (1 per student)
- Chromebook or other device with internet
- Copies of Great Lakes System Profile graphic (1 per student)

Lesson Activities

2. Explore

a. Materials

- i. Great Lakes Mapping student worksheet (1 per student)
- ii. Great Lakes Map Template (1 per student)
- iii. Chromebook or other device with internet

b. Procedure:

- i. Students will follow the directions to map the physical characteristics of the Great Lakes onto the map outline.

3. Explain:

a. Materials

- i. Copies of Great Lakes System Profile graphic (1 per student)

b. Procedure

- i. Students will work independently or in small groups to answer the map analysis questions on their worksheets.
- ii. Distribute the graphic and use it as a visual to explain how water movement through the Great Lakes is a classic example of watershed dynamics, showing how water flows from areas of high elevation to low elevation.
- iii. Discuss answers as a class. Share this quote to explain the concept of retention time:
 1. A well-known scientist named Jack Valentine was involved in Great Lakes science during the development of Areas of Concern. He tells a story to explain retention time. When his great-great-great-great grandfather was working hard one day and saw Lake Superior, he jumped in to cool off. The retention time for water in the lake is so long that his sweat is probably still in Lake Superior!

Great Lakes Mapping

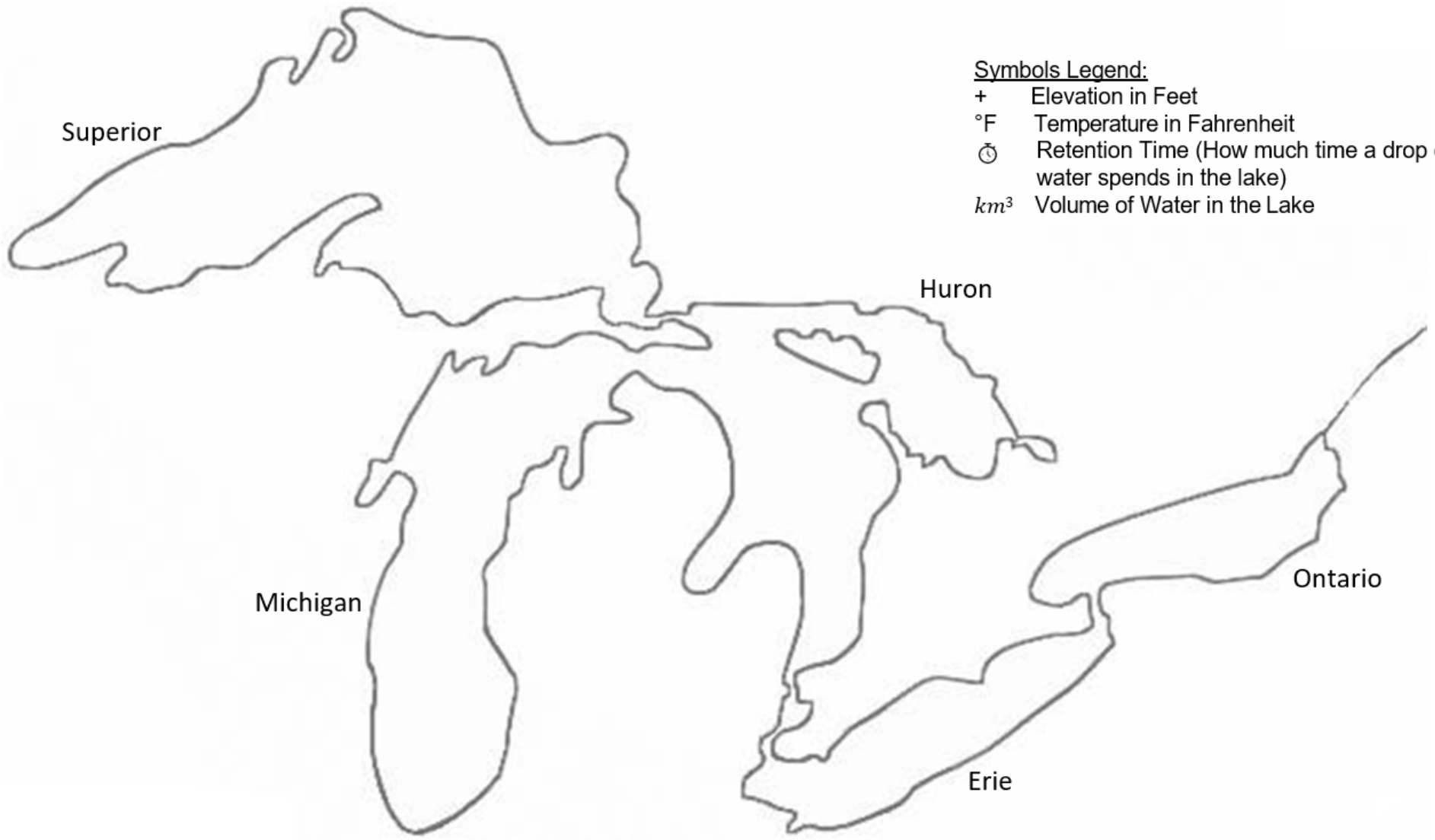
Directions: Creating your map

1. From the Great Lakes Facts Website (EGLE) <https://www.michigan.gov/egle/public/learn/great-lakes>, find the following characteristics of each Great Lake and record it on that lake on the map. Make sure to follow the symbols legend!
 - a. Elevation
 - b. Retention Time (i.e., How much time a drop of water spends in the lake)
 - c. Volume of Water in the Lake
2. From the NOAA Great Lakes Portal website, <https://www.weather.gov/greatlakes/globs?sort=4&lake=Michigan&trends=f>, find the current temperature of each Great Lake and record it on that lake on the map.

Directions: Analyzing the map data

1. We know that in a watershed, gravity causes water to flow from areas of higher elevation to areas of lower elevation. The same movement applies to water moving between the Great Lakes. **Using this concept and the Great Lakes Systems Profile graphic, draw arrows on your map in red demonstrating the direction of water flow within the Great Lakes.**
2. Which lake has the largest volume? The smallest volume?
3. Which lake has the longest retention time? The shortest retention time?
4. How would you define the relationship between retention time and volume?
5. Based on your map data, what factor(s) do you think impact the temperatures of each of the Great Lakes?

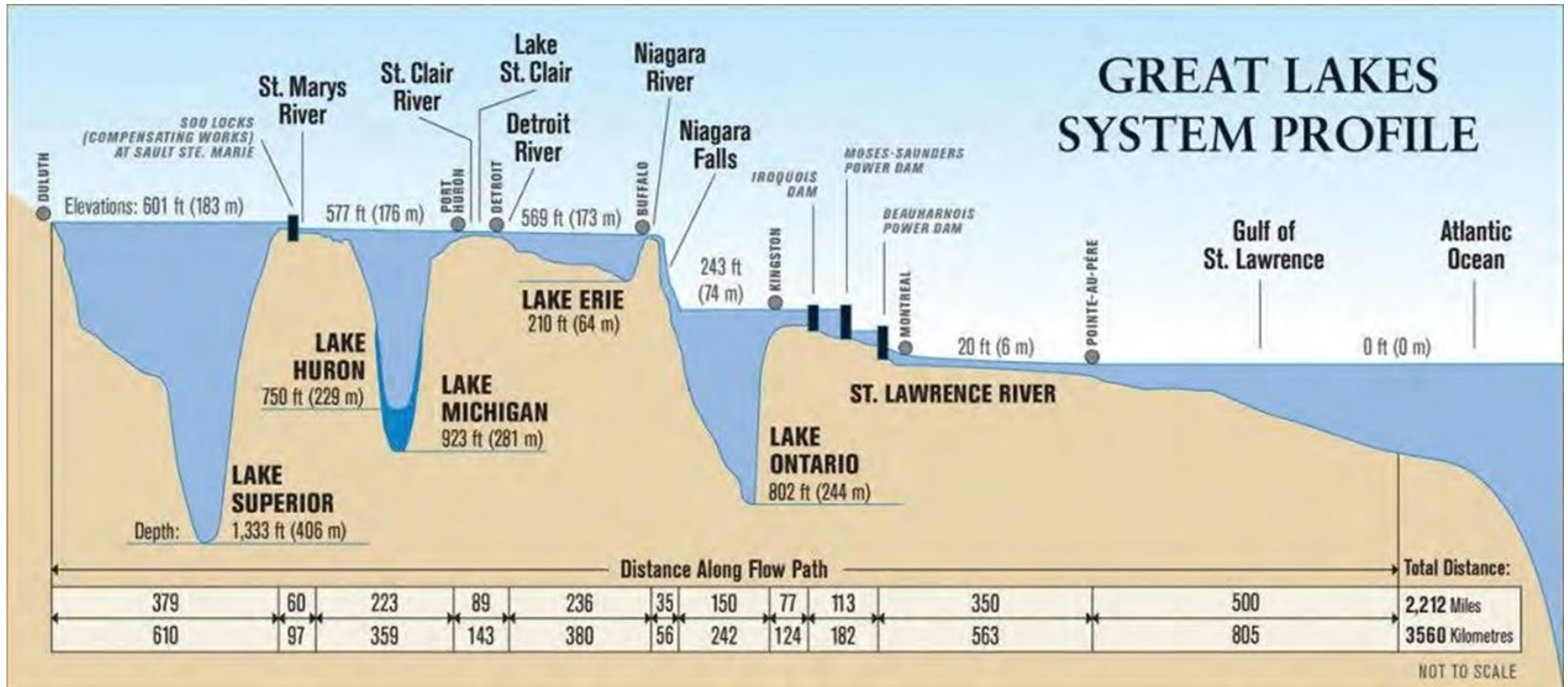
Great Lakes Map Template



Symbols Legend:

- + Elevation in Feet
- °F Temperature in Fahrenheit
- 🕒 Retention Time (How much time a drop of water spends in the lake)
- km^3 Volume of Water in the Lake

Great Lakes System Profile



Source: Great Lakes System Profile graphic, courtesy of Michigan Sea Grant, *The Great Lakes Basin*, map/poster.