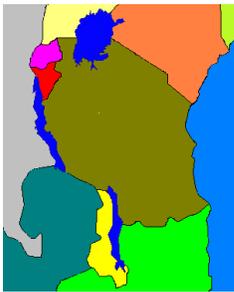


# Lesson Plan One – the Great Lakes of the World



## Reference to: Understanding Life Systems, Interactions in the Environment

- **3.8** describe ways in which human activities and technologies alter balances and interactions in the environment.

## Resources

- Class set of “North American Great Lakes Puzzle” printed in colour, preferably
- Class set of scissors
- Class set of glue
- Class set “Great Lakes of the World Worksheet”
- Class set “Freshwater of the World Worksheet”
- Coloured pencils
- Stop clock

## Vocabulary

- Cichlid
- Freshwater
- Polar ice cap
- Subtropical
- Urbanization

## Summary

Students colour in a pie-chart demonstrating how much of the world’s freshwater Canada possesses. They will complete a puzzle to learn the location of North America’s Great Lakes and they will carry out a memory activity to teach them facts about the two Great Lake regions of the world.

## Objectives

Students will:

- Understand how little of the water on Earth is readily available for human use.
- Identify the location of the North American Great Lakes.
- Learn facts and features about the Great Lakes of North America and the Great Lakes of East Africa.

## Starter Activity

### Where is all the Freshwater?

### Description

This activity illustrates how little of the Earth’s water is freshwater, readily available for human use. It also demonstrates how much of this water is located in Canada and encourages the students to think about why it is important to look after it. The activity begins with a short class discussion followed by the students completing a worksheet. The worksheet involves colouring in a pie-chart, showing how much of the world’s freshwater is located in Canada, and writing down their thoughts on why it is important to look after the Great Lakes.

## Instructions

1. Ask the students how much of the world’s water they think is salt water (97.5%).
2. How much do they think is freshwater readily available for human use? (surface water) (0.007%)
3. Give the students a copy of the “**Freshwater of the World Worksheet**” and discuss the statistics with them.
4. They are to colour in the pie-chart and key, representing where the world’s freshwater is located and answer the question.

## Main Activity 1

### North American Great Lakes Puzzle

### Description

This activity is designed to give the students a map of the North American Great Lakes, it is not designed to be a very challenging puzzle. It requires them to look at the different sections of the map and place them in the correct position. This will ensure that they are actually looking at the information presented and not just sticking it straight into their books!

## Instructions

- Students cut out the jigsaw pieces on the “North American Great Lakes Puzzle”, rearrange them, and then stick them into their notebooks.
- Remind them not to stick any pieces in until they have figured out the correct position of them all.

## Main Activity 2

### Facts and Figures about the Great Lake Regions of the World

#### Description

In this activity the students will work in small groups to memorize information given to them on a worksheet – **Facts about the Great Lake regions**. They will then be quizzed, as a group, on how much of the information they could remember. It is designed to be a fun challenge between the groups not an assessed activity.

#### Instructions

- Inform the students that there are another set of Great Lakes in East Africa.
- Give the students the information sheet on **The North American and East African Great Lakes**.
- Read through the information with them, ensuring they understand all of the content.
- They are now to get into pairs or small groups of up to 4.
- Tell them they have 10 minutes to read through the information again and memorise as much as they can, within their group. They can each read all of the information, or they can divide the information up and each try to memorize separate parts – however their group decides to do it is up to them (give them a few minutes to decide).
- It is also an option that the students be given the information sheet the day before, and told to read it as homework.
- When the ten minutes is over, the information sheet and any notes they have made need to be put away.
- Ask the students the “**Great Lakes of the world Quiz Questions**”. They may discuss the answers within their group.
- When all the questions have been asked the teams swap answers, and mark each others, as you inform them of the correct response. Each question is worth one point, unless indicated.
- The team with the most correct answers wins. The correct spelling of words can be crucial or not depending upon the ability of the class.

## Extension Activity

- Students could use the information on the North American and East African Great Lakes information sheet to list the Great Lakes in order of depth or surface area

### In order of average depth (deepest to shallowest)

1. **Tanganyika** (570m)
2. **Malawi** (273m)
3. **Superior** (145m)
4. **Michigan** (99m)
5. **Ontario** (90m)
6. **Huron** (76m)
7. **Victoria** (40m)
8. **Erie** (21m)

### In order of surface area (largest to smallest)

1. **Superior** (83,300 km<sup>2</sup>)
2. **Victoria** (68,800 km<sup>2</sup>)
3. **Huron** (59,510 km<sup>2</sup>)
4. **Michigan** (57,850 km<sup>2</sup>)
5. **Tanganyika** (34,000 km<sup>2</sup>)
6. **Malawi** (30,800 km<sup>2</sup>)
7. **Erie** (25,820 km<sup>2</sup>)
8. **Ontario** (18,760 km<sup>2</sup>)

## Plenary Activity

### Just a Minute

#### Description

This activity will allow students to share what they have learnt this lesson with the rest of the class. It exercises student's listening skills as they have to listen for repetitions and hesitations. As the students listen to each other's dialogues this activity will also reinforce what has been learnt in today's lesson.

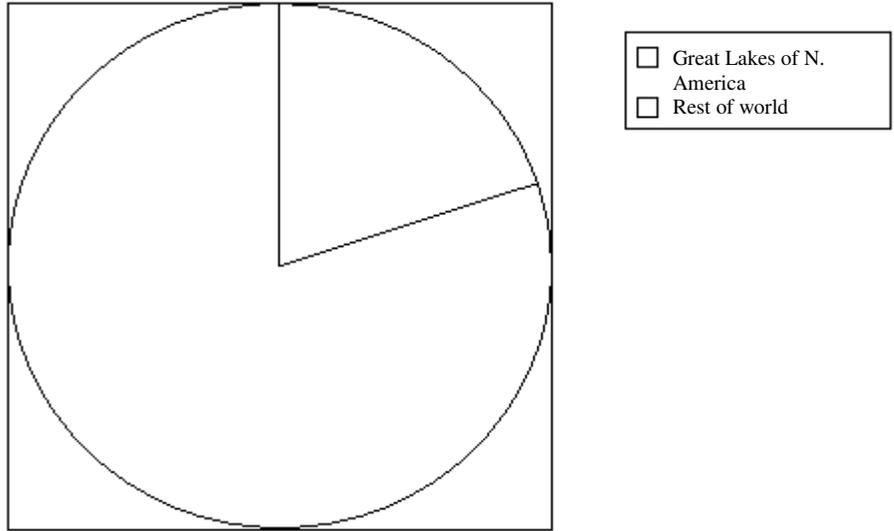
#### Instructions

- Choose a student who is to speak for a minute about the Great Lakes of the world. They are to speak without hesitation, repetition or deviation (this can be reduced to 30 seconds).
- It is up to the rest of the class to decide if there is hesitation, repetition or deviation, so they are to listen carefully at all times, (inform the students that the speaker is allowed to breathe, and that does not count as hesitation!), if any of these take place it is another student's turn.
- Once they have talked for a minute it is another student's turn (they are allowed to repeat what another student has already said).

# Freshwater of the World

## All living things need water to survive

- **97.5%** of all water on the Earth is **salt water**.
- Only **2.5%** of the Earth's water is **freshwater**
- Nearly **70%** of this **freshwater** is locked up in the **ice caps**.
- Most of the rest of the freshwater is in soil moisture or deep underground where we cannot get to it.
- Less than **1%** of the world's **freshwater** is **available** for human use (i.e. surface- water) that's only 0.007% of all water on Earth.
- If this circle is all the **freshwater** or drinking water in the world than **20%** of it is found here in our **North American Great lakes**. We are very lucky to live where we do because we have an abundance of freshwater, but living this close to this much of the world's drinking water means that we have a responsibility to **take care** of it.



**Diagram to show the amount of freshwater found in Canada compared to the rest of the world.**

1. Colour in the pie chart and the key, to show how much of the Earth's available freshwater is in the North American Great Lakes.
2. Why do you think it is important that we look after the water in the Great Lakes?

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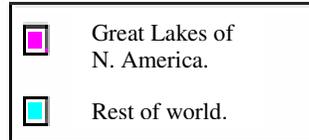
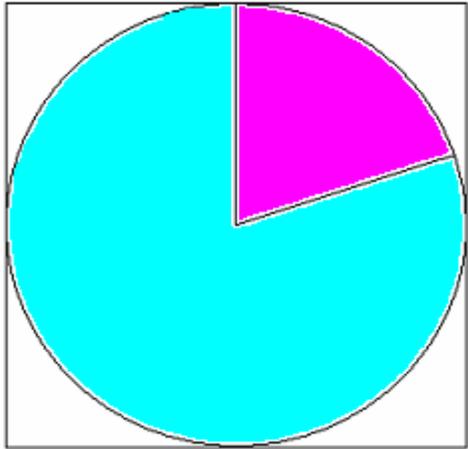
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# Answer Sheet

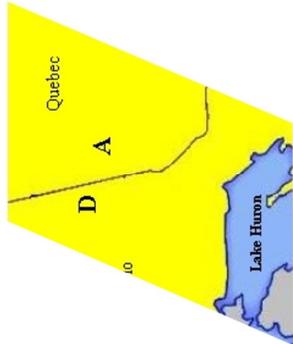
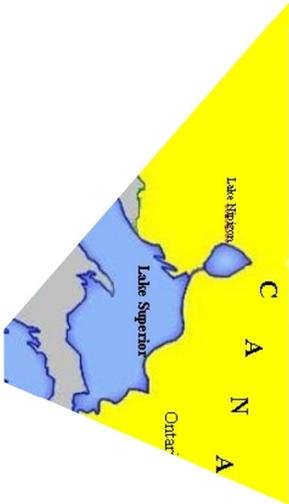
## Freshwater of the World





# North American Great Lakes Puzzle

Cut out the pieces of the puzzle below, they will make a map of the North American Great Lakes. Make sure you arrange all the pieces first before you stick any into your book!





## North American Great Lakes (NAGLs)

Lake	Notes	Surface Area (km <sup>2</sup> ) (1)	Average Depth (m) (1)	Surface Water Temperature Range (°C)
<b>Superior</b>	Largest freshwater lake in the world. Coldest and deepest Great Lake (GL).	83,300	145	0-17
<b>Michigan</b>	Only G.L. entirely within U.S.	57,850	99	1-23
<b>Huron</b>	Is the NAGL with the longest shoreline, counting 30,000 islands.	59,510	76	1-23
<b>Erie</b>	Shallowest NAGL. Has fertile soils surrounding it, so heavily farmed area. NAGL suffered the greatest effects from urbanization and agriculture.	25,820	21	0-26
<b>Ontario</b>	Contains 4x more water than Erie.	18,760	90	1-24

(1) G.E. Hutchinson (1975)

- The North American Great Lakes (NAGLs) - Superior, Michigan, Huron, Erie and Ontario and their connecting channels, form the largest fresh surface-water system on Earth, only the polar ice caps contain more fresh water.
- They are located in the United States of America and in Canada.
- From Lake Ontario, water from the NAGLs flows through the St. Lawrence River to the Atlantic ocean, about 1000 miles away.
- More than 33 million people live in the NAGLs region. Over one tenth of the population of the United States, and one quarter of the Canadian population live in the NAGLs region.
- To the north of the NAGLs region, the climate is cold with thin acidic soil; here the vegetation is mainly conifer trees.
- In southern areas of the NAGLs region, the climate is much warmer with deeper soils. Land is usually fertile (good for growing crops) and many of the original deciduous (trees that loose their leaves in the fall) forests have been cut down for farming and building of towns.
- The fish species found in the NAGLs include perch, trout, salmon, carp, bass and eels. The fishes here tend to be larger than the East African Great Lakes (EAGLs) cichlid fishes.
- Wildlife which can be found on the shores of these lakes includes: waterfowl, bald eagles, lynx, wolves and water snakes.

## East African Great Lakes (EAGLs)

Lake	Notes	Surface Area (km <sup>2</sup> ) (1)	Average Depth (m) (1)	Surface Water Temperature Range (°C)
<b>Victoria</b>	2 <sup>nd</sup> largest freshwater lake in the world. Recent loss of over 300 cichlid species greatest vertebrate species loss in the world.	68,800	40	23-27
<b>Tanganyika</b>	Longest lake in the world.	34,000	570	24-28
<b>Malawi</b>	Contains the largest number of species of cichlid fishes than any other lake in the world. Does not have currents.	30,800	273	24-29

(1) G.E. Hutchinson (1975)

- The East African Great Lakes (EAGLs) are a group of large lakes situated in Africa's Rift valley.
- The three largest lakes are: Victoria, Tanganyika and Malawi.
- The EAGLs are famous for their cichlid fishes. These are small perch like fish that are only found in tropical and subtropical freshwater.
- The EAGLs region is made up of many countries: Burundi, Rwanda, Democratic Republic of Congo, Uganda, Kenya and Tanzania. (The lakes also border the countries of Zambia, Malawi, Mozambique and Ethiopia, but these are not counted as being in the Great Lakes region).
- About 107 million people live in the EAGLs region.
- The climate of the EAGLs region is subtropical even though it is on the equator (you would expect it to be tropical). This is due to the high altitude of the region (height above sea level).
- In the highlands there is a lot of rainfall, with the average temperature being 18°C. The highland vegetation is mainly grasslands and savannah.
- In the lowlands the temperature is much higher, averaging at 95°C, the vegetation here is mainly forests with some desert like areas, where you will find nomadic farmers raising camels, sheep and goats.
- 10% of all the world's fish species live in these lakes.
- About 2,000 species of cichlids live in the lakes, as well as other fish including minnows, catfish, perch and tilapia.
- Wildlife which can be found on the shores of these lakes includes: egrets, cormorants, fish eagles, hippopotamuses, crocodiles, antelopes, giraffe, elephants, monkeys, and monitor lizards.

# Great Lakes of the World Quiz Question

## Key:

**NAGLs** = North American Great Lakes

**EAGLs** = East African Great Lakes

1. Name the 5 NAGLs (5)  
Superior, Michigan, Huron, Erie, Ontario
2. Name the 3 EAGLs (3)  
Victoria, Tanganyika, Malawi
3. Which is the longest lake in the world?  
Lake Tanganyika
4. Which lake is the largest freshwater lake in the world?  
Lake Superior
5. What, over all, contains more freshwater than the Great Lakes?  
Polar ice caps
6. What three Ws can be found on the shores of the NAGLs? (3)  
Waterfowl, wolves and water snakes
7. How many people live in the EAGLs region?  
107 million
8. What percentage of the world's fish species live in the EAGLs?  
10%
9. Name 2 of the countries which make up the EAGLs region. (2)  
Burundi, Rwanda, Democratic Republic of the Congo, Uganda, Kenya or Tanzania
10. The temperature of the EAGLs region is cooler than you'd expect, this is due to what?  
The altitude or height above sea level
11. How many species of cichlid fishes live in the EAGLs?  
2,000
12. Which is the only lake entirely within the U.S.?  
Lake Michigan
13. Lake Ontario contains 4x more water than which other lake?  
Lake Erie
14. Where is the land more fertile, in the north or south of the NAGLs region?  
South
15. How many people live in the NAGLs region?  
33 million (more than)
16. Which NAGL has an average depth of 145m?  
Lake Superior
17. Which Great Lakes have the warmest water- the NAGLs or the EAGLs?  
EAGLs
18. Which EAGL has a surface-water temperature range of 24-29°C  
Lake Malawi
19. Name 4 animals found on the shores of the EAGLs (4)  
Egrets, cormorants, fish eagles, hippopotamuses, crocodiles, antelopes, giraffe, elephants, monkeys, or monitor lizards.
20. Water from Lake Ontario flows to the Atlantic Ocean through which river?  
St. Lawrence
21. Which lake has seen the greatest loss of vertebrate species in the world?  
Lake Victoria
22. Do you find farmers raising camels in the highlands or the lowlands?  
Lowlands
23. Which lake does not have currents?  
Lake Malawi
24. Which NAGL is most affected by agriculture and urban development?  
Lake Erie
25. Which is the shallowest NAGL?  
Lake Erie
26. At an average depth of 570m which is the deepest EAGL?  
Lake Tanganyika

