

Lesson Plan six - Great Lakes of East Africa, Lesson 2



Reference to: Understanding Life Systems, Interactions in the Environment

- **2.5** use a variety of forms (*e.g., oral, written, graphic, multimedia*) to communicate with different audiences and for a variety of purposes.
- **3.8** describe ways in which human activities and technologies alter balances and interactions in the environment.

Resources

- Droplet's journey locations sheet (only one required per class)
- Droplet's journey cards (only one required per class)
- Questions from East African students – each group will need their own set of questions
- Internet-optional

Vocabulary

- Endangered
- Pollutant
- Sub-Saharan Africa

Summary

Students will take an imaginary trip as a water droplet through a river's course encountering pollution along the way. They will then use their knowledge about the North American Great Lakes ecosystem to answer questions from East African students. Students design water conservation slogans.

Objectives

Students will:

- Learn what pollutants enter a river throughout its course.
- Answer questions sent from the East African students regarding the North American Great Lakes.
- Use their creativity to come up with a catchy slogan regarding water conservation.

- III. farm
- IV. large town
- V. suburbs
- VI. sewage outlet
- VII. factory
- VIII. flows into lake

3. Cut out the Droplet's Journey Name Card Locations and Droplet's Journey Pollution Cards. Keep the pollution cards in the correct location group.
4. Give a student in each section a "Droplet's Journey Location Name Card" to hold up and show the rest of the class the name of that section (the first and last section are not involved in the game so maybe these sections should not have any students in them, instead the name of that location could be stuck on the board etc.) **See – Droplet's Journey Location Name Cards.**
5. Give students in locations 2 – 7 one card each from the pollution cards, associated with the location they are in. **See Pollution Cards for Droplet's Journey.**

Starter Activity

Droplet's journey

Description

This is a kinaesthetic activity where a droplet of water (a student) will move from a cloud, into a mountain stream and make its way through a river to a lake. What pollution will it encounter on its way?

Instructions

Setting up the room

1. **Designate a path** which your water droplet will take through the classroom, around desks etc.
2. **Divide the path into 8 sections**
 - I. mountain top stream
 - II. enters river along a highway

The Activity

1. Discuss the water quality at first location – mountain stream (water would be fresh, clean, full of oxygen, little or no pollutants – maybe the odd dead animal fallen into it!)
2. As the water droplet (student) passes through each location it will stop at each person with a pollution card and play a game of rock, paper scissors.
3. If the droplet wins it will move on to the next student with a card along the path, leaving the previous card with the student it just beat in the game.
4. If the droplet loses it will pick up the card. Each time the droplet picks up a card the class is to discuss what effect this will have on the river and the life living in it (**see teacher notes**)
5. The student playing the droplet could be changed at each new location, giving all the cards collected so far to the new Droplet.
6. At the end of droplet's journey – entering the lake, look at all of the cards the droplet has gathered – how much pollution occurs in just one river? Discuss the fact that many rivers may enter the same lake, what effect will this have on the water and life in the lake?
7. If many of the pollutants were not picked up by the droplet, the game could be replayed, perhaps as a plenary activity.

Main Activity

Answering questions from East Africa

Description

This activity involves the students receiving sets of questions from the East African students about the North American Great Lakes. They are to work in their groups to answer these questions.

Instructions

1. Students are to work in 10 groups (the same 10 groups they were in while creating questions for the East African students).
2. Print out and distribute the African students' questions (which they have prepared for the Canadian students).

3. The students are to answer the questions to the best of their ability. The groups can help each other if they are struggling. The internet would be a useful resource for them, if available.
4. When they have completed their answers, they need to be typed into a word document.
5. Ensure that the information they have provided is correct and then return to the African students.

Plenary Activity

Designing a slogan

Description

This is an activity where students get to be creative and use their language skills to come up with a catchy logo for water conservation.

Instructions

1. Share with the students some example slogans for water conservation.
2. Students are to work individually or in small groups to design a slogan to help protect the world's water.

Example slogans:

- If it's brown flush it down, if it's yellow let it mellow
- 4 minute shower, not a quarter hour!
- C'mon guys, get water-wise
- Waste water today - Live in a desert tomorrow
- Stop the drop

Droplet's Journey Location Name Cards

<u>1</u> Mountain top stream	<u>2</u> Enters river along a highway
<u>3</u> Farm	<u>4</u> Large Town
<u>5</u> Suburbs	<u>6</u> Sewage outlet
<u>7</u> Factory	<u>8</u> Flows into lake

Pollution Cards for Droplet's Journey

Cut out the cards below into individual pollutant cards – keep them, in the correct location group.

Location 2 – River along a high way

Anti freeze runoff (very toxic to wildlife)	Fast food packaging thrown out of car window
Old tire from tire blow out	Runoff from road surface – car oil

Location 3 – Farm

Fertiliser runoff	Herbicide runoff
Pesticide runoff	Cow manure runoff

Location 4 – Large Town

Storm sewer water form large storm (litter, etc)	litter
Shopping cart	Soil – trees lining river bank removed and soil erosion took place

Location 5 – Suburbs

Dog waste	Water from hand washing car
Weed killer runoff from gardens	Unwanted pet turtle

Location 6 – Sewage outlet

human waste	Microbes from human waste
Dead goldfish, flushed down toilet	Unused antibiotics flushed down toilet

Location 7 – Factory

Warm water, used in cooling tower released back into river	Water removed for manufacturing processes
Colouring dye	Toxic metal

Teacher Notes for Droplet's Journey

- **Fertilizer runoff** – increases nutrients in river, causing plants to flourish. As the plants eventually die, decomposers feeding on them will use up lots of oxygen. Lowering the amount of oxygen in the lake.
- **Herbicides** – (weed killer) may kill aquatic plants.
- **Pesticides** – (used to kill crop pests) may kill aquatic invertebrates.
- **Cow manure** – acts as fertiliser.
- **Soil** – makes the water “murky” interferes with some fishes’ breeding habits – they can’t find each other! May also affect the depth of the lake, if lots of sediment builds up.
- **Dog waste** – acts as fertiliser may also contain disease.
- **Water from hand washing car** – chemicals can affect pH of river. Some substances in detergents, such as phosphorus can cause algal blooms. Can also cause soap suds in the river.
- **Unwanted pet turtle** – may become an invasive species if it finds another one to breed with. May feed on local organisms.
- **Human waste** – act as fertiliser and may contain disease causing microbes e.g. cholera.
- **Dead goldfish** - may contain disease which could infect native fish.
- **Unused antibiotics** – could kill good bacteria in the river.
- **Warm water** – increases river temperature, may kill some organisms.
- **Water removed for manufacturing processes** – reduce water level.
- **Colouring dye** – chemicals may kill organisms.
- **Toxic metal** – e.g. mercury may build up in the food chain and cause problems for the top predators (concentration of metal increases each level up the food chain, as the organisms higher up need to eat a large number of the organisms below).

