Outcome(s) of Lesson:

Overview: Earth is sometimes described as the water planet: over two-thirds of Earth's surface is covered by oceans and freshwater features. By exploring examples of aquatic systems, students come to appreciate the dynamic nature of these systems and learn about the interaction of landforms, sediments, water and climate. Students also investigate factors that affect the distribution and health of living things in aquatic environments and the supply and quality of water for human use.

Students will:

4. Analyze human impacts on aquatic systems; and identify the roles of science and technology in addressing related questions, problems and issues
    a. analyze human water uses, and identify the nature and scope of impacts resulting from different

    uses *(e.g., identify pollutants in ground water and surface water systems resulting from domestic and industrial use; analyze the effects of agriculture and forestry practices on stream flow and water quality)*

    b. identify current practices and technologies that affect water quality, evaluate environmental costs and benefits, and identify and evaluate alternatives *(e.g., research and analyze alternatives for ensuring safe supplies of potable water; research, analyze and debate alternatives for a specific water quality issue, such as the location and design of a landfill, the protection of a natural waterway, the use of secondary and tertiary wastewater treatment, the salinization of soils due to irrigation, the eutrophication of ponds and streams due to excess use of phosphates in fertilizers and detergents, or a proposal to export water resources)*
    c. illustrate the role of scientific research in monitoring environments and supporting development of appropriate environmental technologies *(e.g., describe a local example of aquatic monitoring, and describe how this research contributes to watershed management)*
    d. provide examples of problems that cannot be solved using scientific and technological knowledge alone *(e.g., the need to prevent pollutants from entering aquatic environments, the need to avoid damage from ice sheets and icebergs)*

How will I know the students have achieved the learning outcome?

- I will be able to identify the importance of water and how valuable it is to all living and non-living things.
- I will be able to identify certain objects that are polluting our water.

HOOK:
• Read the book- As Big as the Sky, as Tall as the Trees

Learning Opportunities:

Time	Learning Opportunity	How do I check that students understand what to do?
0-8mins	**Introduction/ Hook-** Read the book. Ask students to think about the connections to water.	When checking to make sure the students have a clear understanding, I will be sure to demonstrate before doing the task. Then I will ask students to tell me what they are required to do. If students seem lost I will have to stop and bring it back to the front of the class. When it comes to the content I will know if students understand what is expected of them with the constant check-ins this lesson encompasses. The chart paper brainstorming, the worksheet, the activity, and the sticky note river. This lesson is full
8-16mins	**Chart Paper**- Have students in their table groups answer the question: What things rely on water? Students can draw, write, they are free to express this however they wish (model on the board). Follow this up with a gallery walk, allowing students to expand on the ideas they have generated, or it will help them think of new ideas. Bring it back to the front as a group. Ask some students to give examples and write them on the white board (this allows the instructor to know if they are on the right track).	
16-20mins	**Cooperative Learning:** What things do not rely on water? (most likely nothing is the answer) Snowball- students write their answer on a piece of paper and throw it around the room. Quickly go over expectations. No throwing at others, no fighting over paper, if we are not capable of doing fun things like this they will not continue. Ask students; what did you come up with? Debunk any things that students may have come up with. Such as cell phones, or rock, in the formation of these things there is still water involved in the building process, or erosion to form the rock.	
20-24mins	**Mini Lesson-Water is life (indigenous connection to water):** Talk about how aboriginal people believe that everything had a purpose, living and non-living. The state of the world reflects how humans are doing, it is our job to take care of mother earth. Water is the life source of the world; it is the blood of the land, the rivers its veins, the ocean its heart. Water makes up about 60% of a human's mass. Furthermore, water covers approximately 70% of the earth's surface. Is water something we sound be grateful for? Is it something we should protect?	

24-30mins	**Mini-Lesson cont'd (pollution):** Humans have had a significant impact on fresh and salt water systems, especially over the last few centuries. Human waste has caused some of our water to go to waste. Pollution is when contaminants are introduced into a natural environment (forest, oceans, rivers, air). Ask students: • What things do you think pollute our water? • Why is this occurring? • What can we do to prevent this? The most common pollutants to water are industrial waste, sewage, chlorine, pesticide, these all can occur due to run off from the land or dumping. Tell them about some more recent events, such as the BP oil spill. Plastic epidemic killing fish, etc. What are the effects of this water pollution? It is killing our water ecosystems (the great barrier reef), killing animals and limiting fresh water supply. It might not seem like a big deal here in Canada however water is essential to life, Canada has a huge fresh water reserve. Which can be a huge asset for our country if we protect it.	of Assement all of which is formative, non-invasive and fairly free of judgement. All of which are very important. **Materials Needed** ✓ Chart Paper ✓ Markers ✓ 8 dishes ✓ 8 jugs of water ✓ Dirt 1 bag ✓ Shredded paper ✓ Gas 1L ✓ Coke 2L ✓ Oil ✓ Plastic drink holders ✓ Fur- 8 small pieces ✓ Sand 1 bag ✓ Worksheets 1 per student
30-32mins	**Thank the Water:** Aboriginal cultures thank the natural elements they use. Here in Canada we take water for granted it is something that for most of us is clean and readily available. We should be thankful that we have this access to water, and are able to perform this activity.	
32-37mins	**Introduce Activity**: The aboriginal people believed that water flowed through everything the living and the non-living. We are going to put this to the test! There are 8 stations that have different objects/ materials on them we will add water to these objects and see what happens. The objects/materials include: -Dirt -Gas -Paper -Coke -Plastic -Oil -Fur -Sand	
37-70mins	**Perform Activity:** They will have 4 mins at each station to perform the experiment, document their results, and clean up for the next group. Explain to students that they must work together in their groups. There cannot be a hog who does everything nor can there be a log who does nothing. You are a team and you must work together to perform your tasks: • Recorder- documents what they see • Experimenter- performs the experiment and helps gather supplies • Janitor- cleans up the station and helps gather the supplies	

70-75mins	Students can rotate jobs or assign these roles, however they must figure something out together. Students will use the worksheet attached to document their results. • What they see? • What is happening? • How much water has been displaced? • Is the water similar or different than before it was poured over the object? • Do you think the water has been polluted? • If yes, what can we do to prevent or reserve this pollution **Assessment**: Sticky note river. I want to make a sticky note mosaic, where we show our learning in an artistic form. We will use blue to document our salt and fresh water objectives. I want students to tell me their lightbulb moment. What did you learn about water? Things to consider: What is currently happening to water? What can we do to protect? Why is it so important. **Water is invaluable:** This lesson will lead into a project about how we can protect our salt and fresh water systems: Students will be required to research and come up with a strategy that can either protect current water systems or renew dirty water.	

How do I differentiate the learning opportunity for all learners?

Bodily-Kinesthetic- students will perform a snowball Kagan strategy, which requires them to throw paper and converse with their peers.
Auditory- direct instruction
Logical-Mathematic
Interpersonal- Students will be working in groups to perform various tasks.
Visual- Demonstrations, also students will be required to observe what is occurring.

TRANSITION: *(what will students do when they are finished?, how will we move to the next learning opportunity?)*

- Transition time is only for in-between stations, where students will properly dispose of the item they used, and clean up for the next group. Students will also record. If groups are waiting for too long I will shorten the time at the stations, conversely if they do not have enough time I will lengthen it.
- I do realize this lesson will be fairly time consuming, it can be stretched over multiple days or multiple periods. This lesson plan is not time sensitive, however set-up and clean-up times need to be accounted for.

CLOSURE:
• **Water is invaluable:** This lesson will lead into a project about how we can protect our salt and fresh water systems: Students will be required to research and come up with a strategy that can either protect current water systems or renew dirty water.

Lesson Plan Analysis: Using your lesson above, describe the following: (This information must be in your learning opportunities)	
Accommodations	Having them in groups of 3-4 based on ability. Giving students roles. (Janitor, recorder, scientist) This allows for students to all play a role. Chart paper activity allows students to record what they know in a pressure free environment; students can expand on ideas from other people within their group.
Cooperative Learning Strategies used	Snowball- students throw paper around the room and pick up the nearest note to them and share with someone. Chart paper- Stations- students will work together and be assigned roles
Movement Breaks	Snowball Gallery Walk Stations
Modes of Learning (Differentiation)	**Bodily-Kinesthetic-** students will perform a snowball Kagan strategy, which requires them to throw paper and converse with their peers. **Auditory-** direct instruction **Logical-Mathematic** **Interpersonal-** Students will be working in groups to perform various tasks. **Visual-** Demonstrations, also students will be required to observe what is occurring.
Higher Order Question(s)	What should we do for those who do not have clean water? Water is something that we take for granted, however it has become a precious resource. What can we do to protect this precious resource?