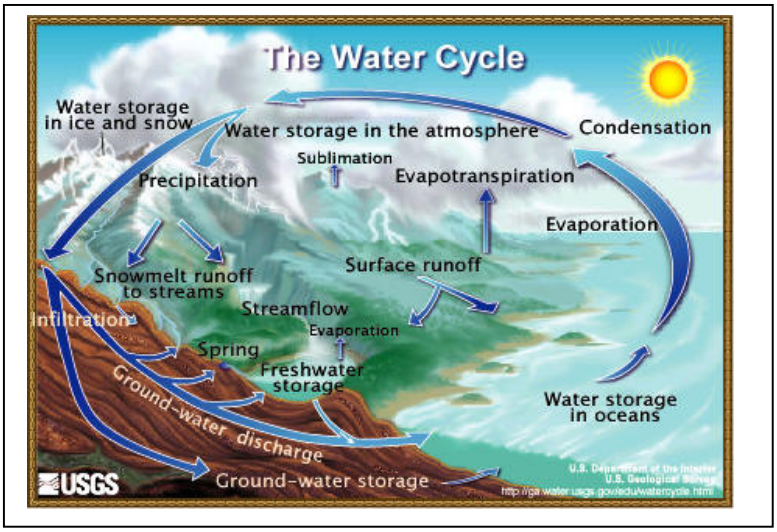
Lesson Plan: OCEANS ALL AROUND US - DEMONSTRATING A MINIATURE WATER CYCLE
Class: 3rd to 6th Class
Subject: Science
Strand: Environmental Awareness and Care
Strand Unit: Caring for my locality/ Environmental awareness/ Science and the environment



Aim / Learning Objective:
Looking at the world through science, students can learn about the marine elements of our natural environment and the importance of the water cycle. Students can look at and compare the marine environment to other places locally, nationally and internationally.

Skills:
Students should be able to identify aquatic and marine features of our environment such as lakes, streams, rivers, oceans and seas - locally, nationally and internationally. They should be familiar with the names of aquatic and marine feature. From this lesson plan they should be able to understand the effects of the water cycle - heating and cooling of water and understand the importance of conserving water.
The students should develop skills by working scientifically:

- Questioning, observing and predicting
- Investigating and experimenting
- Recording and communicating
- Analysing

Materials:
For discussion

- Globe or Atlas
- Map of Ireland – showing the Atlantic Ocean, Irish Sea, Celtic Sea and Rivers.

For demonstrating

- Ice
- Bowl
- Clingfilm
- Heat source – sun

For documenting

- A4 Paper, string, pencil
- A3 poster paper, recycled items (bottle caps, string, tinfoil, cotton wool etc), art and craft materials (scissors, glue, paints, crayons etc).

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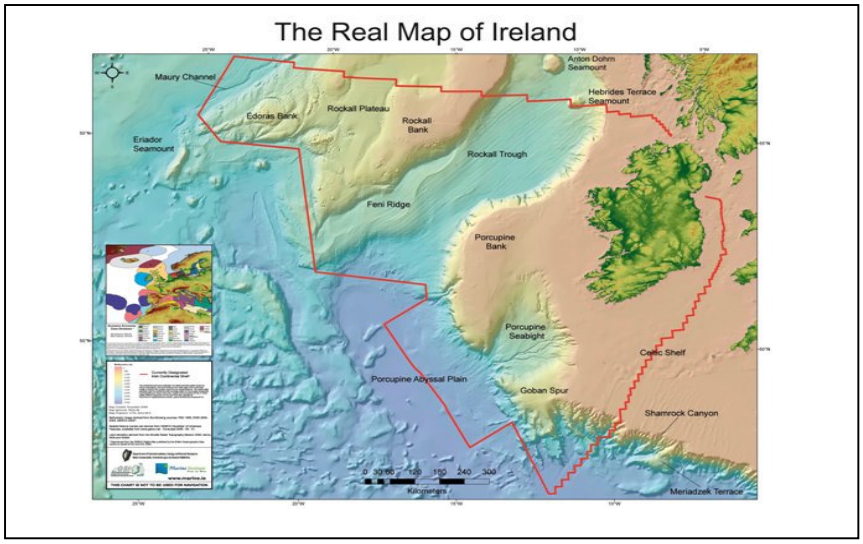
Preparation / Background Information:

How much Water is there in the World?
Over 70% of the earth's surface is covered by water. The world's ocean contains 97% of all the water on the planet, which is salt water. The world ocean is interconnected by five oceans. These include the Atlantic Ocean, Pacific Ocean, Arctic Ocean, Indian Ocean and Southern (Antarctic) Ocean. The oceanic waters are interspersed by many smaller seas and other bodies of water.

Three percent of the water is aquatic (fresh) water. Approximately two percent of this is frozen ice, which is found in the polar ice caps. The rest of the aquatic water is found in lakes, rivers, streams, ponds, rain and underground in aquifers.

The world's ocean is the largest habitat on the planet. There are a variety of animals, large and small living in it. Where animals live in the ocean depends on the waters temperature, salinity (saltiness) and depth. Some animals can only live in local regions, where others can roam all around the world's ocean.

What Oceans and Seas surround Ireland?
Ireland is an island nation and has the Atlantic Ocean, the Irish Sea and the Celtic Sea surrounding it. Ireland has a marine territory of up to 220 million acres (approximately 880,000 km_2
There are over 130 rivers in Ireland, the longest of which is the river Shannon at 386 km (240 miles).
There are over 35 Loughs in Ireland. The word Lough comes from the Irish word Loch, meaning lake. The three largest Loughs in Ireland are Lough Neagh (388 km_2), Lough Corrib (200 km_2) and Lough Derg (118 km_2).



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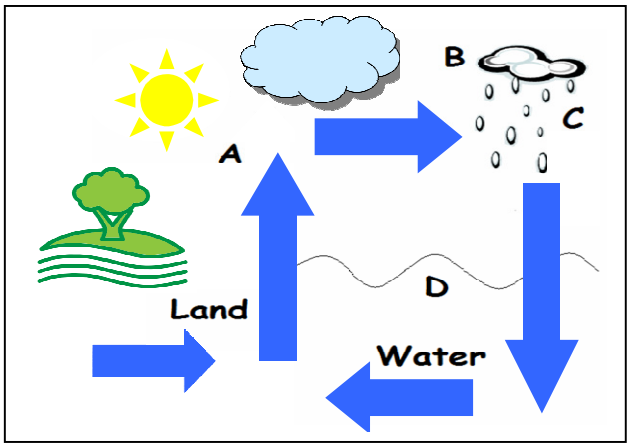
What is the Water Cycle?



The water cycle is the journey water takes from the sky, to the ocean and back up to the sky again. It goes around and around in a continuous cycle.

In the water cycle, water goes around and around.

A. Evaporation: The sun heats the surface of the land and ocean. The heat causes the water to evaporate upwards in an invisible vapour.
B. Condensation: The water vapour forms into clouds.
C. Precipitation: The clouds form water droplets, which fall to the land and ocean as rain.
D. Storage: Some of the rain runs into lakes, streams and rivers. This flows back into the ocean.

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Why is it important to conserve water?

Animals on land and humans need water to drink. Plants take moisture from the soil.

There is a limited amount of fresh water for human beings. Therefore, without the water cycle there would be no water for animals, plants and humans to grow and live.

Humans use fresh water in the development of agriculture and industry. They also use it domestically in homes. Inefficient uses of water caused by human's can result in water pollution.

Water pollution means that water is unfit for use.

If polluted water enters the water cycle it creates problems for animals to survive both in fresh water and in the ocean.

See the following examples of the amount of water used in everyday by humans.

Brushing teeth with the tap running	6 litres per minute
Brushing teeth with the tap off	1 litre

Bath	80 litres

5 min Shower	35 litres

Flushing a standard toilet	9 litres

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Activity:

Experiment Demonstrating a Miniature Water Cycle

1. Discuss our natural environment and generate ideas from the students of where there is water on earth.
   - Use the globe, atlas and map of Ireland to show features (e.g. river, lake, the ocean or sea)
   - Where is the closest water to where the students live? Is the water fresh or salty?
   - What ocean and seas surround Ireland?
   - How much water exists on the planet?
   - What is the water cycle? (e.g. start by asking where does the rain come from?)

2. Create a logbook and get the students to predict and document what they think will happen to water based on the following questions:
   - What happens to ice when it is heated? (solid - liquid)
   - What happens to water when it is heated (liquid - gas / vapour)
   - What happens to water when it is frozen? (liquid - solid)

3. Place blocks of ice into a bowl. Place cling film over the top of the bowl and seal tightly. Place the bowl in the direct sunlight or over a heat source. Ask the students to record their observations in a logbook:
   - of ice melting
   - water heated by sun
   - formation of droplets on the cling film
   - water droplets going back into water
   - How does the miniature water cycle compare to what happens in the environment?

   The students should record their conclusion in their logbook of the water cycle. To show their understanding of the water cycle the students should each draw a diagram demonstrating: Evaporation; Condensation; Precipitation and Storage.

4. Create a collage of the water cycle using recycled items. The materials used should show texture and colour to indicate the different stages of the water cycle. Students should also discuss and highlight why it is important to conserve and maintain clean waters.

Worksheet: OCEANS ALL AROUND US: DEMONSTRATING A MINIATURE WATER CYCLE
Subject: Science

Instructions for Students:

Logbook

1. Predict what you think will happen to water based on the following questions:

- What happens to water when it is frozen?

  _____

- What happens to ice when it is heated?

  _____

- What happens to water when it is heated

  _____

2. Place blocks of ice into a bowl. Place cling film over the top of the bowl and seal tightly. Place the bowl in the direct sunlight or over a heat source. Record your observations in a logbook:

- What happens to the ice when it melts?

  _____
  _____

- What happens to the water when it is heated by sun?

  _____
  _____

- What happens to the formation of droplets on the cling film?

  _____
  _____

- How does the miniature water cycle compare to what happens in the environment?

  _____
  _____

- Record your conclusion.

  _____
  _____
  _____
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3. To show your understanding of the water cycle the students should each draw a diagram demonstrating: Evaporation; Condensation; Precipitation and Storage.
   Once you have drawn your diagram, create a collage of the water cycle using recycled items.

4. Discuss and highlight why the ocean is important in the cycle of water.

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5. Look up on the internet and find out about how clean Ireland's marine environment is in comparison to other places locally, nationally and internationally.

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6. Discuss why it is important to conserve and maintain clean waters.

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