

<b>Date</b>	<b>Class level</b> Fifth Class and Sixth Class	<b>Subject</b> Science
<b>Strand</b> Materials	<b>Strand Unit</b> Materials and Change	
<b>Title</b> Materials and Change - Exploring Desalinating Saltwater		
<b>Objective(s)</b> The aim of the lesson plan is for the children to explore the effects of heating liquids and materials contained within liquids. Desalinating saltwater to create fresh water is used as an example.		
<b>Skills Required</b> Working scientifically: questioning, observing, predicting, investigating and experimenting, estimating and measuring, analyzing and communicating. Designing and Making: exploring, planning, making and evaluating		
<b>Learning objectives</b>	<b>Learning activities</b>	
<p>The child should be enabled to:</p> <p>Explain the water cycle- how much water is on earth? How much of this water is available to drink?</p> <p>List the methods of desalination of seawater.</p> <p>Describe the thermal process of water desalination.</p>	<p><b>Talk and Discussion:</b> The lesson begins by alerting the children to how often in the day they utilise fresh water. An effective technique is to bring up a child to the top of the room and ask them about their daily routine: get up, shower, brush teeth, wash dishes, drink water etc. The rest of the class is encouraged to clap every time water is mentioned. This shows the class how dependent our society is on water.</p> <p>Draw the children's attention to the fact that 1.5 million people worldwide lack access to fresh water.</p> <p><b>Talk and Discussion:</b> Discuss places where we could find large volumes of water e.g. rivers, lakes and of course the ocean. 97% of the earth's water is salt water. 3% of the earth's water is fresh-icebergs and rivers and lakes. This means that the earth's fresh water resource is incredibly precious.</p>	

The children are made aware that drinking large amounts of sea water is dangerous as it can result in dehydration due to high quantities of salt. The salt needs to be removed from water in order to make it drinkable. This is called desalination.

Desalination is the most common form of removing salt from water. Approximately 85% of the world's water suitable for human consumption, or irrigation (e.g. for farming or agriculture purposes) uses this process. Elicit from the children who may use this process and what countries may use it more than others.

Desalination is used on many seagoing ships and submarines. It is also important for countries which have low rain fall such as Australia, United Arab Emirates. The largest percent of desalinated water used in any country is in Israel, which produces 40% of its domestic water use from seawater desalination.

Due to the high costs of desalinating sea water, remind the children how it is important to conserve and use fresh water (fresh water from rivers or groundwater, water recycling and water conservation) wisely.

Discuss what bi-products come from desalination of salt water.

**Talk and Discussion and Guided and Discovery Learning:**

The children will learn about thermal desalination through experimentation. It involves heating the water until it evaporates and then forcing the evaporated water to condense.

A diagram of the water cycle may be shown to show how this occurs in nature.

Next the children could desalinate sea water. This can be done by using actual sea water or by adding salt (iodized salt is available) to water.

1. Pour the drinking water into the mug ensuring that there is five centimetres of water in the mug.
2. Mix some of the salt into the water. Add enough so the water tastes salty. Refill any water which you have tasted.
3. Transfer the salt water from the mug to a bowl.
4. Wash the cup removing any salt residue.
5. Place the cup in the middle of the bowl.
6. Wrap up the bowl and mug tightly in cling film ensuring that no air can get in.
7. Put the bowl in a very sunny area of the classroom.
8. Put a small rock on top of the clingfilm in such a way that it causes the plastic to sag in the centre.
9. Leave overnight.
10. The water will have condensed under the rock and have collected in the mug.
11. The children can now test the water. It should be free of salt.

	<p><b>Collaborative Learning:</b>                  A game of vo-back-ulary could be played to ensure that the children have a keen understanding of the terms such as evaporation, condensation, collection, thermal distillation and desalination.</p> <p>The words on flashcards will be stuck on a child's back one by one and classmates will give them clues as to what the word is. They must guess.</p> <hr/> <p><b>Resources</b></p> <p>Bowls</p> <p>Cups</p> <p>Water</p> <p>Salt (iodized if possible)</p> <p>Cling Film</p> <p>Small rocks or weights</p>
<p><b>Differentiation</b>                  Higher and Lower order questioning. Differentiate group activities and roles to account of individual needs, by support, task. Mixed ability pairing.</p>	
<p><b>Assessment</b>                  Teacher Observation and Questioning.</p>	
<p><b>Linkage and Integration</b>                  Geography:</p>	