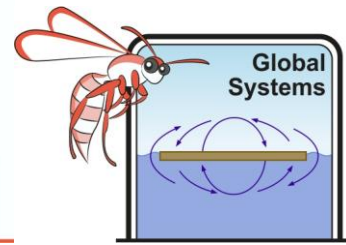


Sea Ice & Heat - Teacher Notes



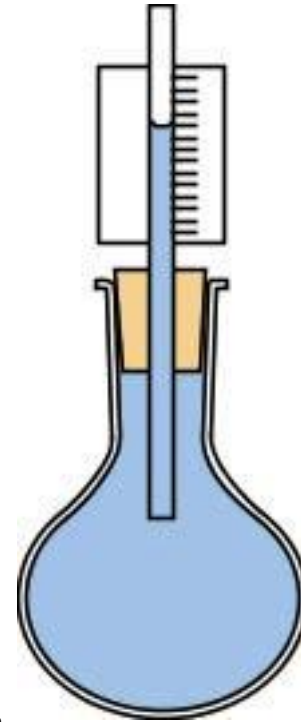
AIM To find if heat can raise water level

Materials per group

- A Florence flask or conical flask
- Stopper with hole for glass tube
- Glass tube
- Bunsen burner or gas stove and match
- Wire gauze
- Tripod
- Stand and clamp if necessary
- Marking pen (or masking tape)
- Water and food colouring if preferred
- Internet access

Method

1. Gently push the glass tube through the rubber stopper
2. Fill the flask to the top with cold water
3. Gently press the stopper with tube into the mouth of the flask until it is sealed. (Water displaced by the stopper should rise within the tube)
4. Mark the height of the water level in the tube with a marker pen (or masking tape)
5. Light the burner and adjust to create a blue flame.
6. Heat the base of the flask and mark any changes in water level until the water nears boiling, then cease the activity.
7. Let the equipment cool before disassembling it.



Safety Considerations

What safety considerations do we need to take before and during this experiment?

General Lab rules.

Care pushing the tube through the stopper. This can be prepared earlier for a boisterous class.

Making sure the tube is the right length to fit into the flask without touching the bottom.

Knowing the correct sequence in which to light a burner and how to attain a blue flame.

Leaving glassware until it is cool.

Leaving the tripod until it is cool and only holding it by the base of one leg.



Results/Observations

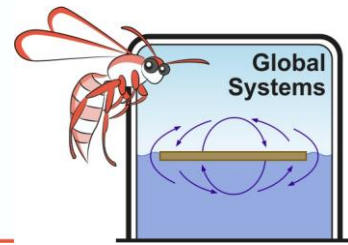
What did you observe as the water in the flask heated. **The water level rose**

Conclusion

To what conclusion can your results lead? **The water level rose as it was heated.**

Discussion

Why did the water level rise? **Kinetic energy from heat accelerated movement of molecules of water and they took up more space/increased volume.**



Sea Ice & Heat - Teacher Notes

What happens to the sea if global temperatures rise? **It will expand and sea levels will rise**

As a result of global warming, the greatest increase to sea level comes not from melting ice but from thermal expansion

Visit <http://www.climatechange.gov.au/climate-change/climate-science/climate-change-impacts/western-australia> and answer the following questions

Which state has the longest coastline? **WA**

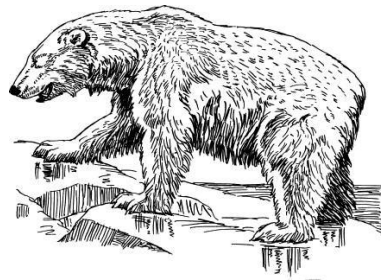
How will accelerated global warming impact on our coastal zone? **Sea level rise will lead to more storm surges impacting on coastal settlements, infrastructure and ecosystems**

Over the twentieth century what has the average sea level rise been? **1.7mm per year**

What has this increased to over the last 15 years? **3.2 mm per year**

Extension

How can these findings be used to help with planning for dealing with an increasing rate of global warming? **Higher temperatures will make sea levels rise all over the world. Planning for roads, railways, commercial infrastructure and housing will have to take this rise into account.**



What effect would a few degrees rise in temperature have on a polar bear?

Polar bears feed on fish that live in warm water insulated under sea ice. Melting sea ice means they would lose their food. Loss of sea ice would mean they would have to swim from land. Rising sea levels would flood low-lying coastal land. They would have to travel farther to find a decreasing food source

People living in high mountainous areas well away from our poles are also going to be affected by rapidly increasing temperatures. How can this be?

These people are dependant on melt water from glaciers. As the glaciers melt away faster than the ice is replaced then their agriculture could be severely impacted.



Possible Extension

In Australia, the majority of people live within the coastal zone and are at risk of rising sea levels. The Australian government has developed a series of sea level rise maps to illustrate the potential impacts. Students may wish to visit this site and find out how they themselves may be affected. These can be viewed at the following site: http://www.ozcoasts.gov.au/climate/sd_visual.jsp