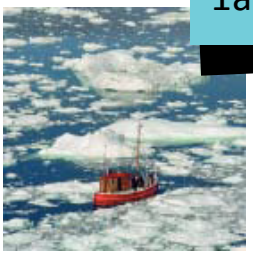
Awesome Experiments

Arctic Climate Change

What causes the sea level to rise?

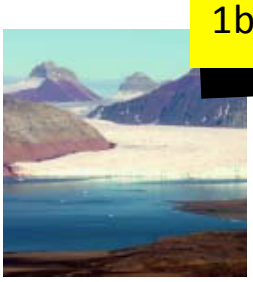
You will need:

A metal pet food dish or other metal dish/pan, with a flat rim if possible.
Cold water.
Ice cubes.
Magic marker pen, ball point pen/pencil and paper.
Something to heat the water – e.g. hot water bottle, a heat pack.



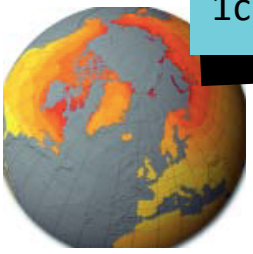
1a) Does **melting sea ice** lead to sea level rise?

Take the metal dish and half fill it with water.
Put ice cubes in the water.
Using the magic marker pen, draw a line on the side of the pet dish to show the level of the water. This line represents the sea level.
Allow the ice cubes to melt completely, without heating the water!
Check the 'sea level'. Has it gone up?



1b) Does **melting ice on land** lead to sea level rise?

Fill the same metal dish/pan half full.
Using the magic marker pen, mark the level of the 'sea'.
Put ice cubes on the rim.
Allow them to fully melt without heating the water!
Check the 'sea level'. Has it gone up?
NB: If you can't find a metal dish with a flat rim, allow the ice cubes to melt through your fingers. It will have the same effect!



1c) Do **warmer oceans** lead to rising sea levels?

Fill the metal dish/pan three quarters full.
Heat it with a hot water bottle / heat-pack. If you are using a pan you can heat it on a stove but you **must** be accompanied by an adult.
What happens to the water?

The science behind the results

What causes the sea level to rise?

Climate change raises the level of the sea. Increasing global and Arctic temperatures cause the sea level to go up for two reasons:

1: Hotter air melts ice on the land, such as glaciers and the Greenland Ice Sheet. The hotter the air is, the more ice melts and the faster it melts. The melted ice turns into flowing water and runs off the land into the sea, adding more water to the ocean.

2: Water expands (gets bigger) as it gets warmer. When we cook food in a pan, we don't fill the pan to the top as the water overflows when it gets hot. In the same way, warm seawater takes up more space in the ocean basin, causing the sea level to rise (go up).

Sea ice that melts does not cause the sea level to go up. This is because ice is just frozen water and if it melts when it is already in the water then the volume (amount) of water stays the same, and the sea level stays the same.

From our experiments we know that:

1a) Melting **sea** ice **does not** lead to sea level rise. In the first part of the experiment, the water level (sea level) **did not go up**.

1b) Melting ice **on land does** cause sea level rise. In the second part of the experiment, the water level (sea level) **went up**.

1c) Warmer Arctic seas **increase** sea level. In the final part of the experiment, the water level (sea level) went up / **spilt out over the edge** of the metal dish.

Why does this matter?

Even a small increase in sea levels could affect tens of millions of people across the globe living along the coast, and the landscapes around them. Higher sea levels would flood some low-lying areas, forcing people to abandon their homes and move to another area and low-lying islands could be completely covered by water. As seawater goes inland it can cause freshwater fish, birds, and plants to lose their habitats. Higher sea levels also mean that storm surges – the rise in seawater level during a storm – will be bigger and happen more often, reaching farther inland and causing more frequent flooding.

More information and Awesome Experiments:
www.wickedweatherwatch.org.uk

Advanced resources on the science:
www.eu-interact.org