

A seven part series exploring the fantastic world of science.

CLIMATE AND CLIMATE CHANGE



Regions of the Earth.

Find out about different climates in different parts of the World.



Polar Regions

The Arctic at the North pole and the Antarctic at the South pole experience the harshest conditions on Earth. As well as freezing temperatures, the poles often experience hurricane force gales. The summers at the poles have 24 hours daylight, whilst the poles are in total darkness for the whole winter.

Did you know?

The only animal capable of surviving the harsh conditions in the South pole is the Emperor penguin. Breeding pairs of penguins lay 1 egg and incubate it, in temperatures as low as -50°C .

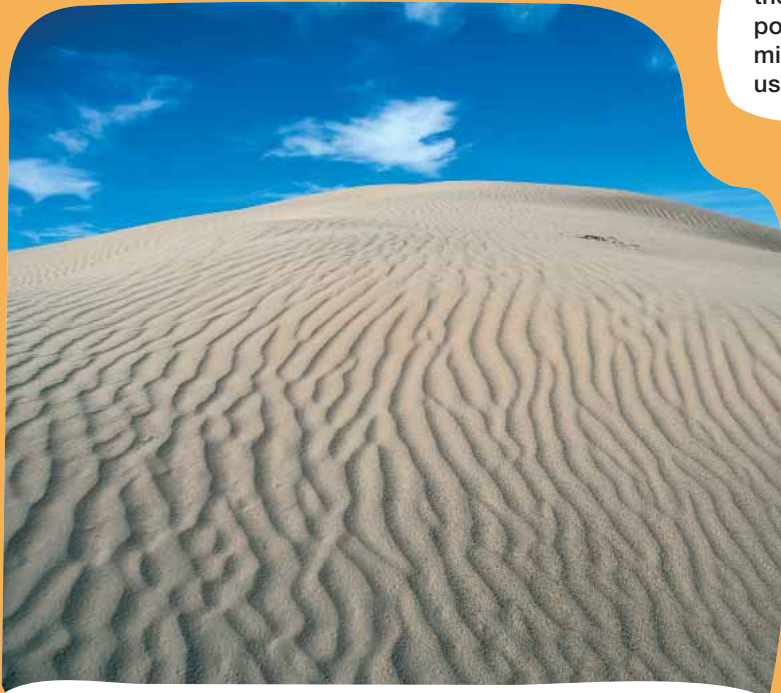


Did you know?

The lowest temperature ever recorded on Earth was -88°C at Antarctica. Whilst the highest temperature ever recorded was 58°C in Libya, Africa.

Temperate Climates

Britain, the rest of Europe, parts of America and Asia have a temperate climate. The temperature in these regions does not vary that much between seasons and they have rainfall all year round. 40% of the World's population live in temperate regions, mainly due to the mild temperatures and high rainfall creating fertile soil used for farming and agriculture.



Deserts

The daytime temperature in the desert can be very hot, whilst the nights can be much cooler. Deserts receive very little rainfall. Some deserts can go months, even years, without any rain. Plants and animals that live in the desert must be able to adapt to the dry conditions and store water efficiently.

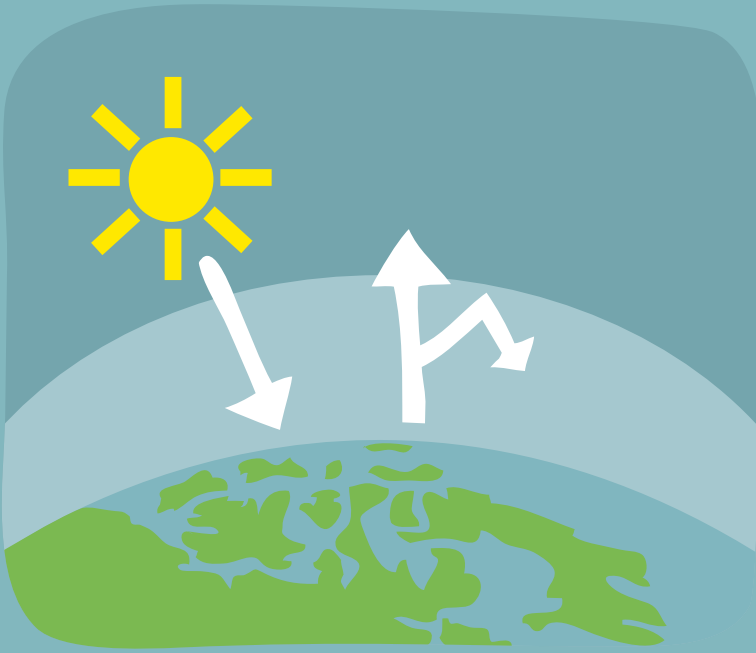


Tropical Rainforests

Temperatures in the rainforest usually range between $20 - 25^{\circ}\text{C}$ with very little seasonal variation. The most important characteristic of the rainforest is the large annual rainfall of between 2000 – 5000 cm. Despite only covering 2% of the planets surface area, the rainforests contain over 50% of all plant and animal species on Earth.

Climate change.

Find out how and why our climate is changing.



The Greenhouse Effect

Carbon dioxide, methane and water vapour are all greenhouse gases. These gases are vital to our planet, as they act as a blanket around the planet that traps heat from the Sun, which is called the Greenhouse Effect. However, as the level of carbon dioxide produced by humans increases, so too does the amount of heat trapped in the Earth's atmosphere. As the Greenhouse Effect increases there is an increase in global temperature.

Global Climate Change

The average temperature of the Earth is 14°C. This average temperature has increased by 0.6°C over the past century and is predicted to continue to rise by between 1.4 – 5.8°C by 2100. However, this increase in temperature will not mean warmer summers. Even an increase of 2 – 3°C over the next 100 years will mean that 3 billion people will face water shortages, while another 100 million people will be at risk of flooding.

Did you know?

That plants help to reduce levels of carbon dioxide but, every second an area of rainforest the size of a football pitch is burned and destroyed.

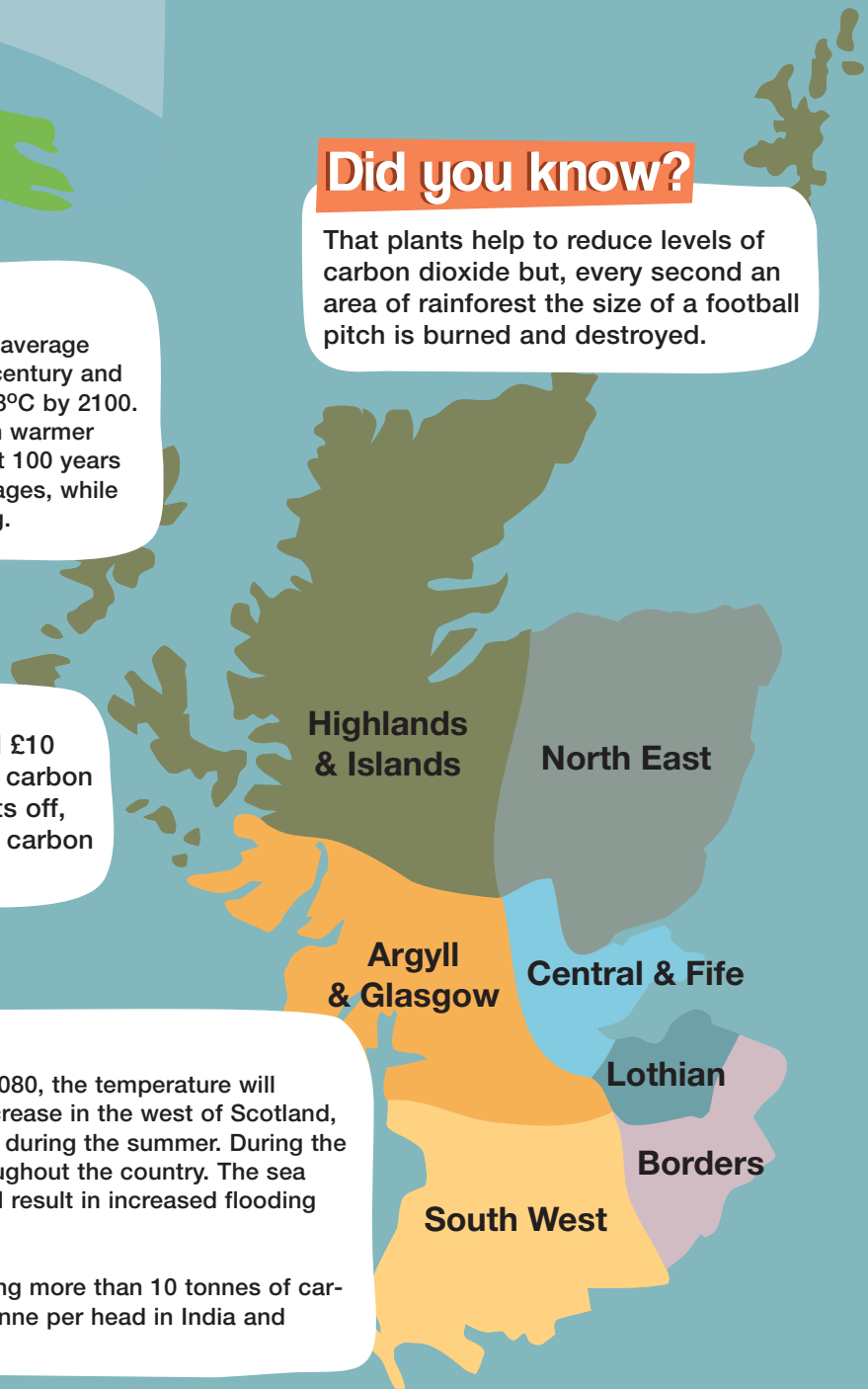
Did you know?

Energy saving light bulbs can save you around £10 a year and save the environment 0.8 tonnes of carbon dioxide. If 10 households switched their TV sets off, instead of leaving them on standby, 1 tonne of carbon dioxide would be saved every year.

Changes in Scotland

The Scottish climate is set to become warmer. By 2080, the temperature will have increased by 1-3°C. Rainfall is expected to increase in the west of Scotland, whilst the east coast will experience more droughts during the summer. During the winter, rainfall is predicted to increase by 40% throughout the country. The sea level is forecast to rise by 80 cm by 2100, which will result in increased flooding in low lying areas.

In Scotland, each person is responsible for producing more than 10 tonnes of carbon dioxide emissions each year. Compared to 1 tonne per head in India and 0.2 tonnes per head in Kenya.



Clouds.

Learn about the different types of clouds.

The name given to a cloud is based on three different properties: the shape, the altitude and whether or not it is a rain cloud.

The altitude, or height, of a cloud is used to classify different types.

High clouds start with cirro- or are called cirrus.

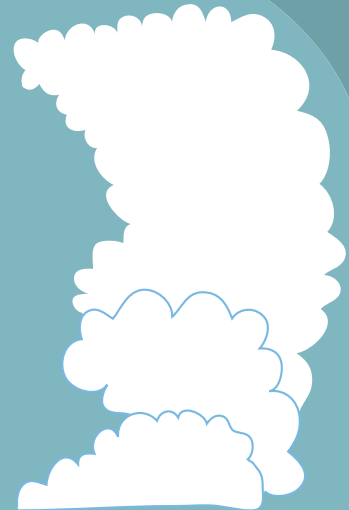
Middle clouds start with alto-, for example altocumulus.

Low clouds do not start with any particular prefix.

Low clouds include nimbostratus, stratocumulus and cumulonimbus.

Cirrus

Cirrus clouds are wispy, thin clouds. Cirrus clouds are formed at high altitudes.



Cumulus

Cumulus clouds are heaped clouds that often have flat bottoms and lumpy tops.



Stratus

Stratus clouds are thin clouds that form layers. Stratus clouds form close to the ground.

Did you know?

Not all clouds bring rain. Nimbus means rain, so clouds such as cumulonimbus bring showers of rain, hail or snow. In contrast, cumulus clouds are associated with fine weather.

Have a go!

What shapes can you see in the clouds? Next time it is a cloudy day, look up and see what pictures you can make out of the clouds.

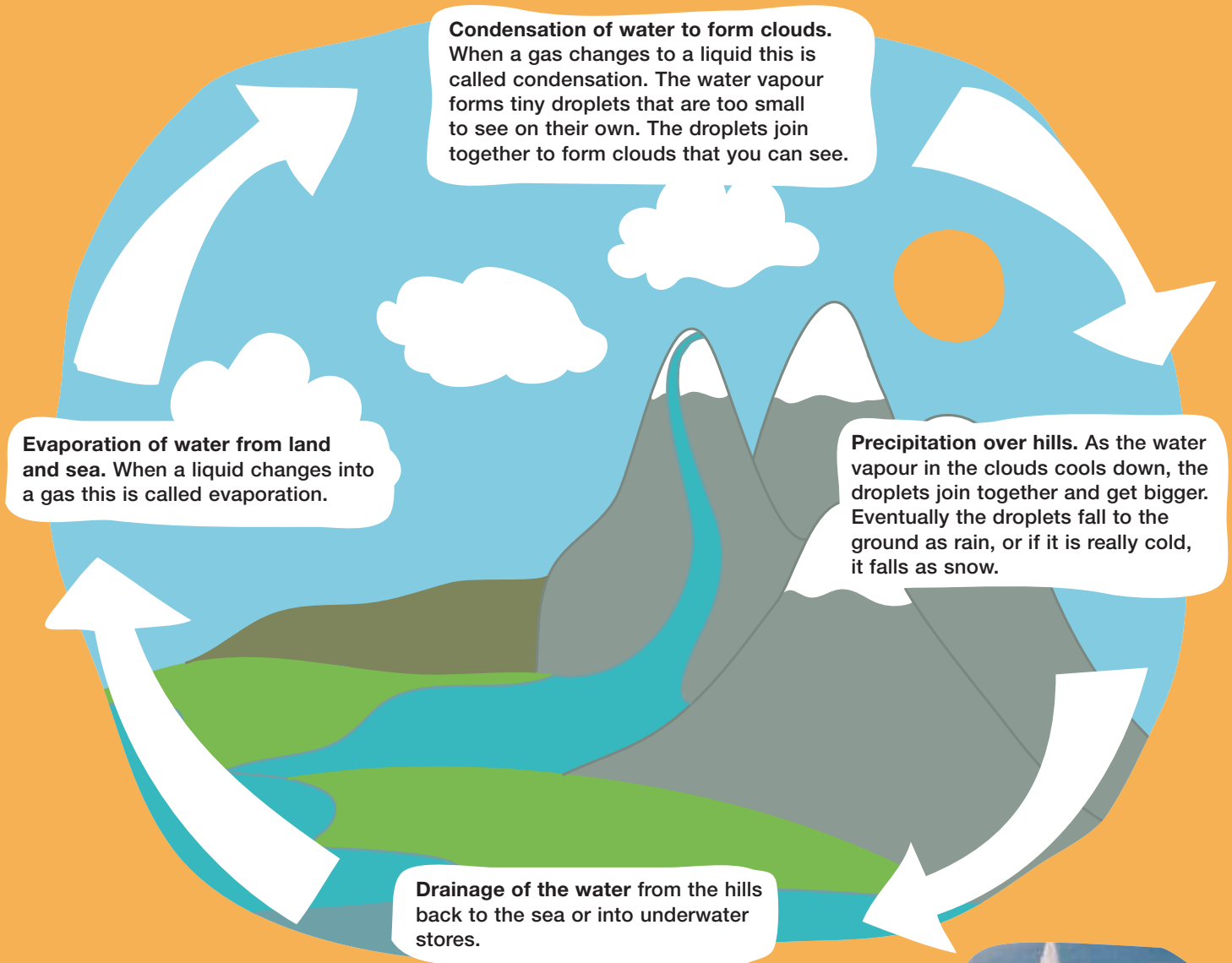
The water cycle.

Discover how water is recycled.

70% of the surface of the Earth is covered by water. The majority of this water is salty, with only a small amount of fresh water. This fresh water is used by all the plants and animals that live on Earth. The fresh water is recycled in a process known as the Water Cycle.

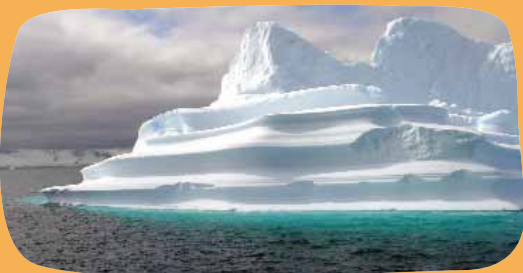


Stages of the Water Cycle.



Solid, liquid or gas?

Water can be found in different forms, or states on Earth. There are 3 different states: solid, liquid and gas. Water is unique because it can be found naturally occurring in all 3 states on Earth. Glaciers are made of solid ice. Liquid water fills all the rivers and streams. Finally, water vapour (gas) can be found in geysers.



Weather stations.

Discover how to measure the weather.

Measuring the weather

There are lots of different instruments used to measure and record different aspects of the weather. It is important to take all these measurements so that scientists can try to spot trends and patterns in our weather. Scientists can then use this information to make predictions about the type of weather we are likely to experience in the future.

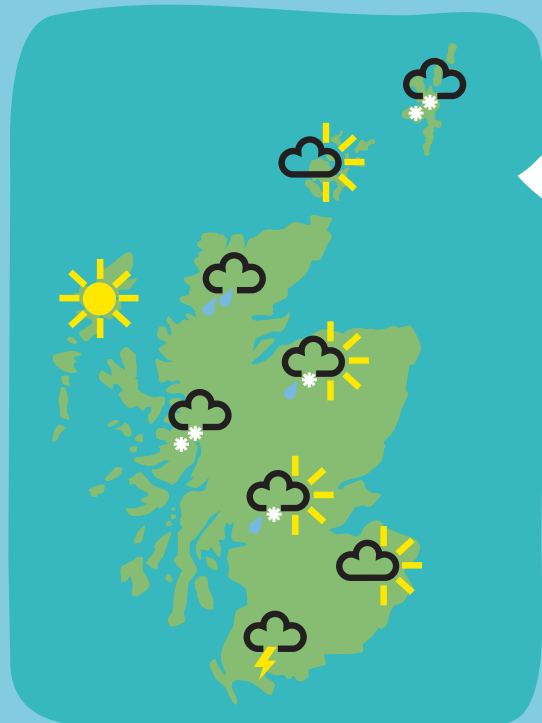


Weather balloons

Balloons are useful for investigating and recording information about the Earth's upper atmosphere. By measuring changes in the temperature and taking samples of the air, scientists are hoping to understand more about the effects of climate change on our planet.

Stevenson Screen

A Stevenson screen is the name given to a white box that houses several different types of thermometers. It contains thermometers to record the maximum and minimum air temperatures. As well as special thermometers to record the amount of water vapour (humidity) present in the air.



Weather Forecasts

Having information about the weather can be extremely useful. It allows you to know whether or not you need to take an umbrella out with you or, if you can have a BBQ at the weekend.



Weather Satellites

Weather satellites collect data about our weather from higher in the atmosphere than weather balloons. Satellites travel at between 800 – 35,000 kilometres above the Earth and collect information about cloud formation and development of intense storm clouds, which allows meteorologists to make accurate weather forecasts.

Did you know?

The direction and speed of the wind can be measured. If the wind is blowing from the North it generally brings cold air from the Arctic, but if the wind is blowing from the South it brings warm air from North Africa.

Have a go!

Keep a weather diary for a week. You could record the temperature, measure the rainfall and observe the different types of clouds and the amount of cloud cover in your local area.

Have a go!

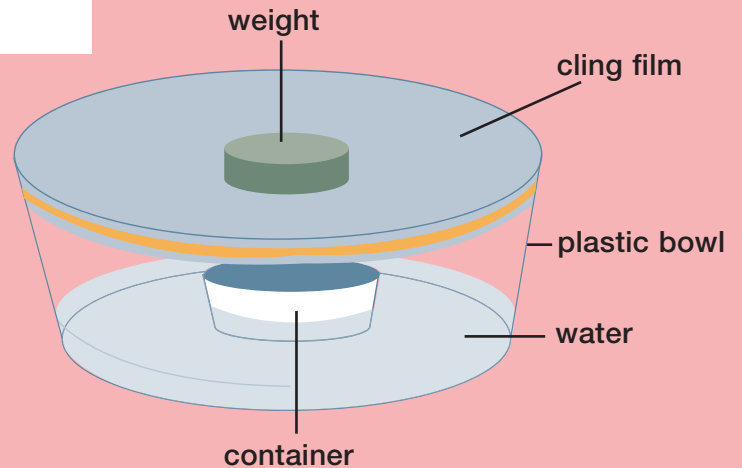
The water cycle.

Copy this activity sheet and make your own indoor water cycle.

Name:

What you will need:

- A large plastic bowl
- A small container (cut down yoghurt pot)
- Some cling film
- A weight
- Elastic band or piece of string

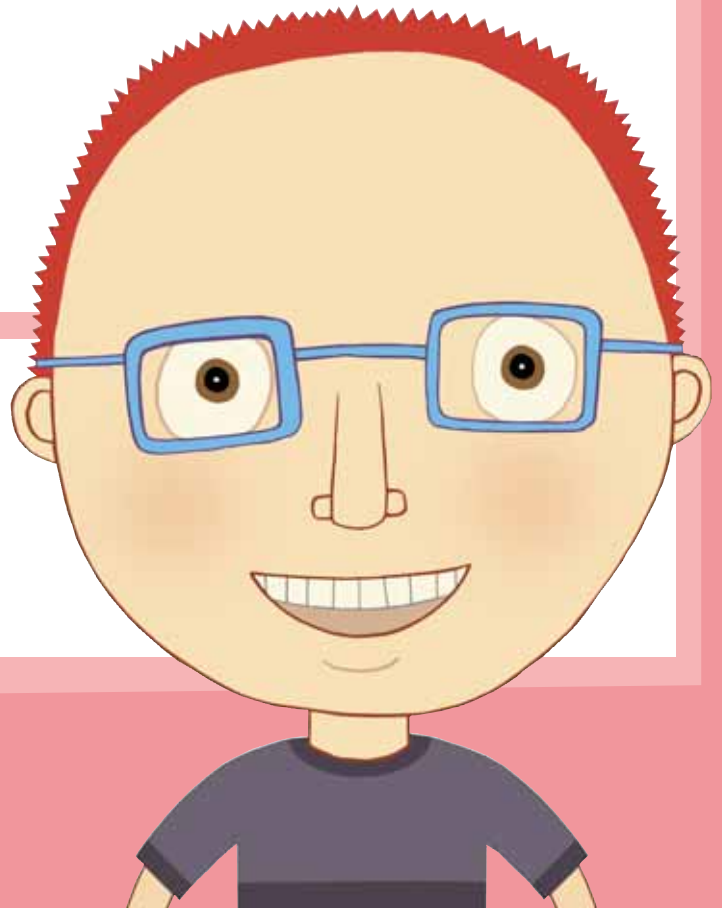


What you will need to do:

1. Place the small container in the centre of the large plastic bowl.
2. Fill the large bowl with a small amount of water. The water level should not be high enough to fill the small container.
3. Cover the bowl with cling film and secure with an elastic band or some string.
4. Place a weight on the centre of the film, so that the water can drip into the small container.
5. Leave the bowl on a sunny windowsill and observe what happens to the water.

What did you see happen to the water?

How long did the water cycle take?



Have a go!

Weather diary.

Make a copy of the sheet and complete your own weather diary for a week.

Name: _____

Day of the week	What is the weather like today?
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	