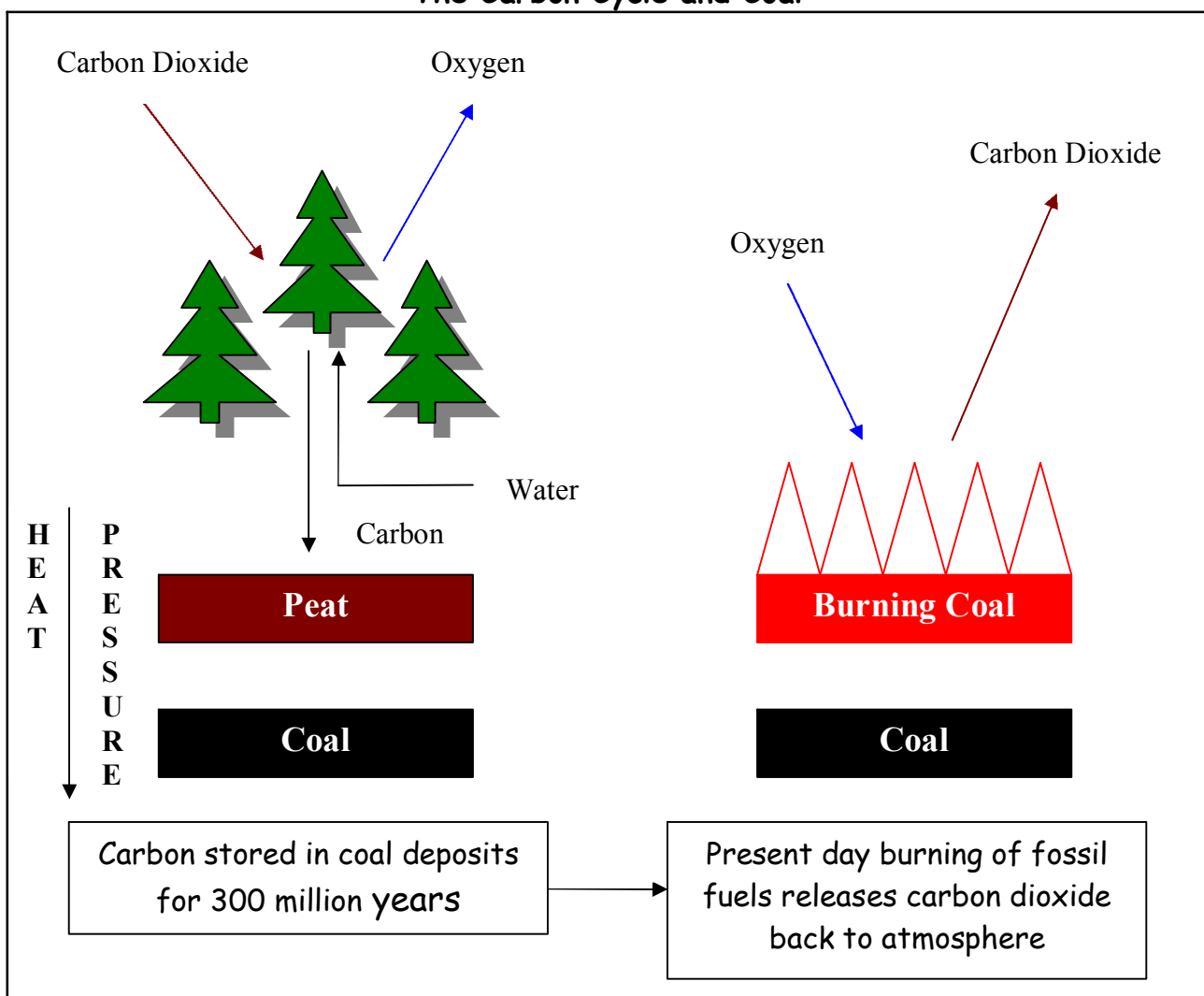


Fossil Fuels and Renewable Energy

These exercises can be used as preparation for a visit to Castlecomer Discovery Park or as a follow up to a visit to expand on some of the themes introduced on the day.

The Carbon Cycle and Coal



At a time when Ireland's climate was much hotter than it is today, a large part of the Earth was covered in huge swamp forests similar to a modern rainforest. When these trees died they fell down to the wet ground below and eventually formed peat deposits similar to the bogs we see today. Over millions of years, this peat was covered with layers of sand and mud and pushed further down into the Earth. The

heat and pressure from these layers in the Earth dried and squashed the peat and turned it into coal.

See if you can complete the paragraph below by using the following words to fill in the blanks.

oxygen	coal	plants	carbon	renewable
non-renewable	fossil	wind	wood	carbon dioxide

Fuels like coal, oil and gas are called _____ fuels because they are made from the preserved remains of dead _____ or animals. The trees of the ancient forests took in _____ from the air and used it to grow and produce _____. Wood is made from a substance called _____. When the trees became fossilised into _____, this carbon was stored inside the Earth for millions of years. When coal is burned, carbon mixes with _____ from the air and releases Carbon Dioxide back into the atmosphere.

Energy produced from fossil fuels is called _____ energy because these fuels take millions of years to form. When they are used up, they cannot be replaced. _____ energy can be produced from water, sun or _____ which will not be used up. Wood can be burned to produce renewable energy. When wood is burned, it releases carbon dioxide, but if a new tree is planted each time one is cut down, this carbon dioxide is taken up by the new tree.

Classroom Activity 1

To show how burning carbon uses up oxygen

You will need:

A box of matches

A nightlight

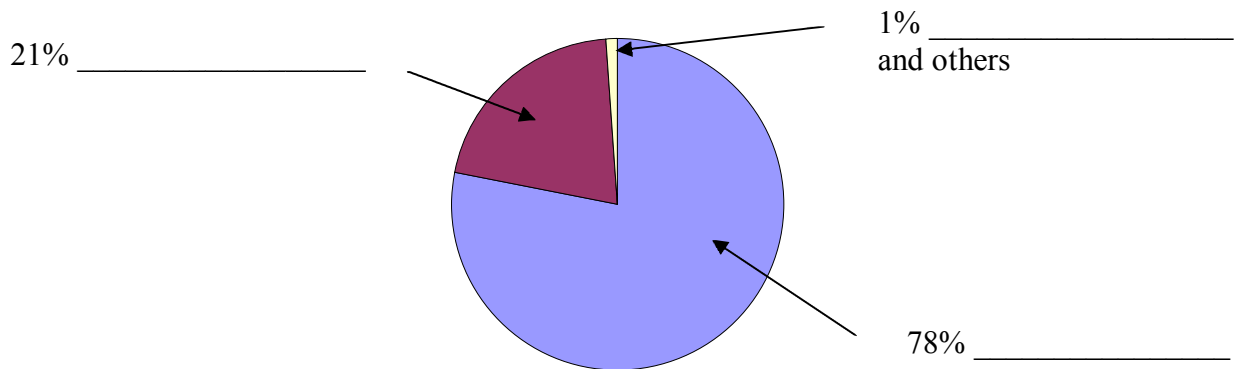
An empty jam jar with the label removed

Light the nightlight and let it burn for a few minutes. Turn the jam jar upside down and watch what happens.

As the candle burns, it takes oxygen from the air to help it burn. The oxygen mixes with the carbon in the candle wax and releases carbon dioxide and other gases. As the oxygen is removed from the glass, the candle flame goes out.

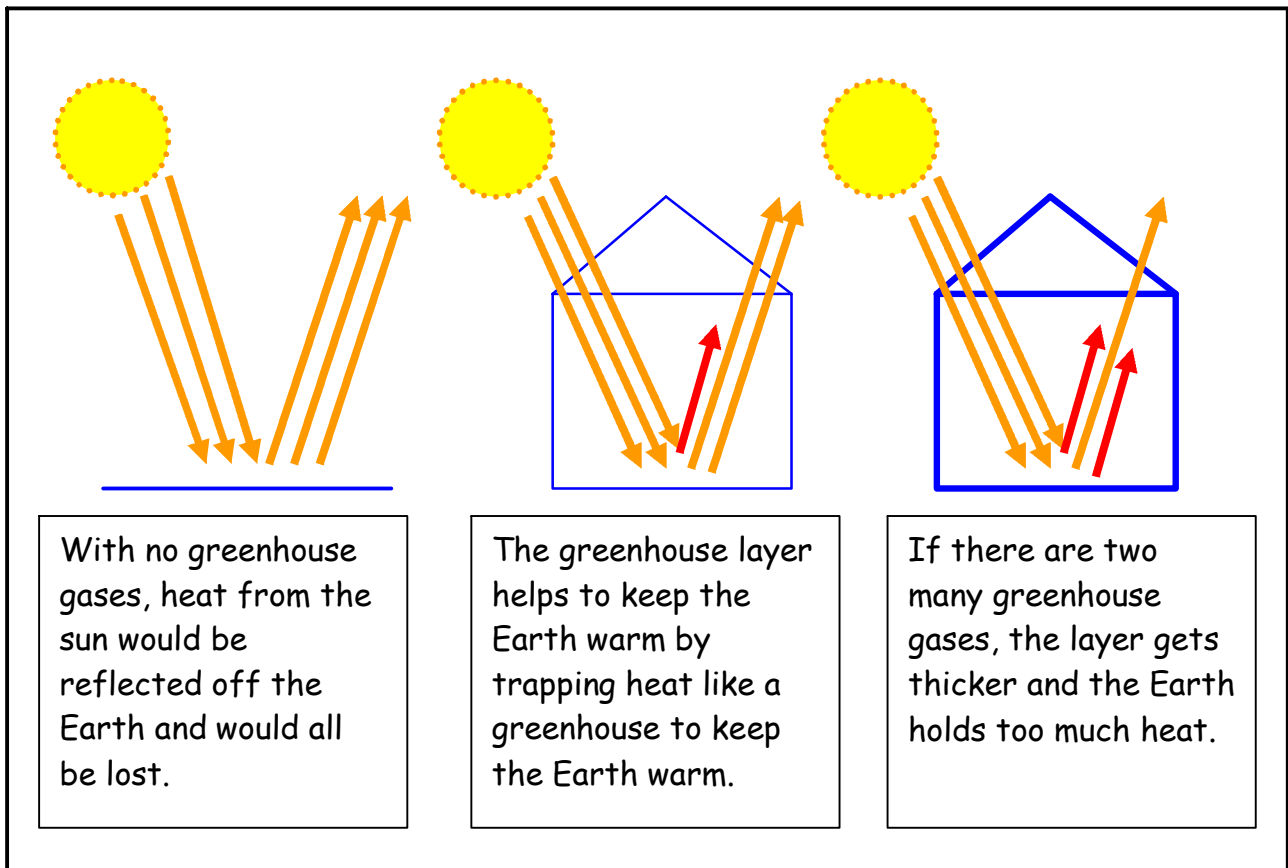
Greenhouse Gases

The air that we breathe is made up of a number of gases. The main gases are nitrogen, oxygen and carbon dioxide. Can you fill in the blanks to show the percentages of these three gases in the air.



In the past, these percentages were not always the same. Changes in the amounts of different gases in the air can affect the climate.

Carbon dioxide is known as a greenhouse gas. Greenhouse gases in the air form a barrier that helps keep the Earth warm.



Classroom Activity 2

To investigate the greenhouse effect.

You will need:

Large clear plastic drinks bottle

Two thermometers

This activity should be done outside on a sunny day. Place one thermometer inside the plastic bottle and leave in a sunny place where it will not be disturbed. Place the second thermometer close to the plastic bottle so that each thermometer will get equal amounts of sun. Leave the thermometers for an hour or so and then check the temperature on both.

The plastic of the bottle acts in a similar way to the greenhouse gases surrounding the air and traps the sun's heat. The temperature on this thermometer should be higher than on the one that was left outside.

See if you can complete the paragraphs about climate change by using the words below to fill in the blanks.

oxygen	global warming	ice	temperature	recycling
energy	methane	hot	cooler	greenhouse gases

Ireland has a mild moist climate. This means that we don't get very hot summers or very cold winters and we have quite a lot of rain. The plants and animals in Ireland are suited to our climate and are able to survive well here. However, our climate was not always the same. In the past Ireland's climate was sometimes very _____ and at other times, most of the country was covered in snow and _____. Because of the way trees and plants take in carbon dioxide and release _____, the number of trees on the Earth can affect the temperature. More trees mean more oxygen and less carbon dioxide, so the more trees we have, the _____ the Earth will be.

Carbon dioxide and _____ are examples of _____. We create these gases by burning fossil fuels, driving cars and burying our rubbish in landfills. These greenhouse gases create a layer around the Earth which traps the sun's energy. If this layer gets too thick, it can increase the _____ of the Earth and change the climate. This is known as _____ or climate change. We can help to prevent climate change by using less _____ in our homes, using less packaging, _____ our waste, walking or cycling more instead of always taking the car and by planting more trees.

Classroom Activity 3

To investigate climate change

You will need:

Rectangular plastic basin

Two rocks

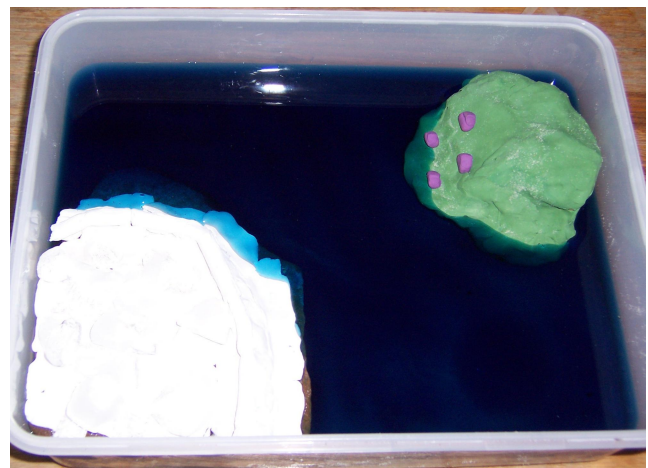
Green, white and one other coloured plasticine

Ice cubes

Water

Blue food colouring

Table lamp



Cover the two rocks with plasticine, one green and one white and place in opposite corners of the basin. Add a few drops of blue food colouring to the water and partly fill the basin. This is to represent the sea. Build small houses of coloured plasticine and place on the green rock at different heights above sea level. Create a wall of plasticine around the top of the white covered rock and fill with ice cubes to represent the polar ice caps. Switch on the lamp.

The lamp represents the sun and global warming. As the trapped energy from the sun melts the polar ice caps, the sea levels will rise around the world. This will cause flooding in some parts of the world where people are living on the coast.