Worksheet 1

Waste and Climate Change

Waste and Climate Change

Climate change

Key terms:

Climate change

Greenhouse effect

Greenhouse gases

Fossil fuels

Mixed waste

Recyclable waste

Green waste

Climate change is a change in weather patterns over time. While there are natural causes of climate change, the most concerning is the effect of a process called the greenhouse effect. Various Gases that exist in the atmosphere, called Greenhouse Gases, have the ability to capture the sun's rays which heat up the Earth. Without greenhouse gases the Earth surface would be mostly glaciers. These gases include carbon dioxide, methane and nitrous oxide.

Our households, cars and most industrial processes are powered by burning fuels like oil, coal and natural gas. They are called fossil fuels because they are produced over millions of years from dead animal and plant matter buried in the ground. When we burn fossil fuels in oxygen, a chemical process occurs that produces water and carbon dioxide and other molecules.

Over the past 100 or so years, the amount of fossil fuels being used in the world along with other industrial processes has increased exponentially, and hence, so has the amount of carbon dioxide released into the atmosphere. See figure 1.1.

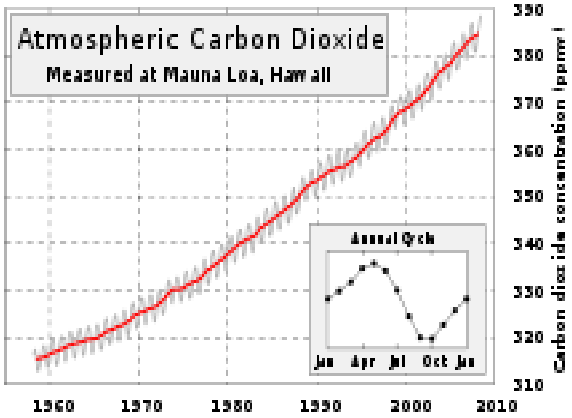

Figure 1.1: Rise in carbon dioxide levels
Source: Robert A. Rohde/Global Warming Art

Did you know:

- The waste industry produces more CO_2 than all registered heavy trucks and buses across Australia!
- This is equivalent to 39% of all emissions from cars for a year. That's 4 million cars!

Warming the Earth

The amount of carbon dioxide in the atmosphere has been measured over many years and is directly related to the average temperature of the Earth. The main concern of climate change is the risk of extreme weather patterns and rising sea levels caused by the melting of the polar ice caps. As can be seen in figure 1.2, as the carbon dioxide concentration in the atmosphere rises, so does the temperature. The variations shown have been naturally occurring, but the concern is that carbon dioxide levels have not been nearly as high as current levels in at least the last 600,000 years.

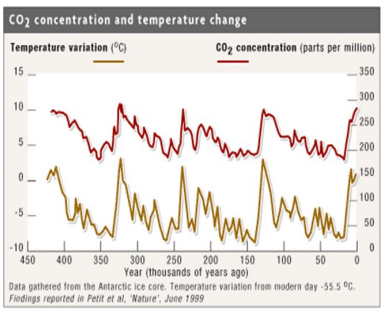

Figure 1.2: Average temperature vs. Carbon dioxide level
Source: 'Nature', June 1999

What is waste and what do we do with it?

Figure 1.3: A landfill
Source: www.landridge.gov.uk

There are three types of household waste that are collected by your local council. Mixed waste accounts for 55.3%, recyclable waste accounts for 31.1% and green waste accounts for 13.6% of the total amount of waste produced in households. Most organic waste that is collected is dumped in landfills.

A landfill is where we dump all of our waste into a hole in the ground and cover it up with clay. Put simply, we bury all of our waste. Over time, most materials will break down, or decompose. This is achieved when the substance has broken down or separated into its constituent parts.

Most food waste decomposes in a matter of months, however most of what we throw away takes much longer. These examples are taken from the Pocket Guide to Marine Debris from Ocean Conservancy:

Glass bottle: 1 million years
Plastic bottles: 450 years
Disposable diapers: 450 years
Aluminium can: 80-200 years
Boot sole: 50-80 years
Styrofoam cup: 50 years
Tin can: 50 years
Plastic bag: 10-20 years
Cigarette filter: 1-5 years
Waxed milk carton: 3 months
Apple core: 2 months
Newspaper: 6 weeks
Banana peel : 2-5 weeks
Paper towel: 2-4 weeks

So what's the problem?

Did you know:

Landfills contribute to our greenhouse gas emissions through decomposition of food waste

When organic waste breaks down carbon dioxide and methane gas is emitted into the atmosphere. The biggest source of greenhouse gas emissions worldwide is electricity and heat, at 24.1% of all emissions. The other biggest contributors are agriculture at 14.9%, transportation at 13.5% and waste at 3.6%.

It is estimated that 2.1 million tonnes of carbon dioxide equivalent greenhouse gas were emitted from Victorian landfills in 2006-07. Of this amount, 23% was estimated to have been captured. Some of this captured methane was used in energy generation but most of it is burnt, which creates carbon dioxide.

Landfills are still a crucial aspect of handling waste, and so must be treated as such. Separating organic material to be composted is one such way of reducing our reliance on landfills.

Over to you

1. List the three main types of fossil fuel. For each one, give an example of what it is used for.
2. Describe the relationship between carbon dioxide levels in the atmosphere and average global temperature.
3. Give two examples of each of the following types of waste: general waste (non-recyclable), recyclable waste and green waste (including food scraps).
4. Make a list of everything you put in the bin yesterday. Put the items into a table of general waste, recyclables and green waste.
5. Make a list of the ways you can reduce the amount of waste you dispose of.
6. Write a letter to your local council (imaginary) explaining the reasons that green waste and food scraps should not be taken to landfills.