

**futureworld**  
*eco-technology centre*

**Student Worksheets**  
**Environments**

*Stage 2*

## Station 1 - The Greenhouse Effect

### Is the air getting too warm?

Keywords: **atmosphere, Sun, gases, greenhouse effect, Oxygen, Carbon Dioxide, Methane, temperature, Earth, petrol, coal.**

The thin layer of air surrounding the **Earth** is called the **a** \_\_\_\_\_  
The atmosphere is made up of a mix of **g** \_\_\_\_\_.

Some gas names:      We use **o**\_\_\_\_\_ when we breathe in.  
We breathe out **carbon dioxide**  
**methane** is a smelly gas from landfill and cow burps!

Just as the **S**\_\_ warms our skin, it warms the gases in the atmosphere. This is called the **g**\_\_\_\_\_ **e**\_\_\_\_\_. It is very important because it keeps the **Earth** at a comfortable **temperature**.

Some gases are better at holding the Sun's warmth than other gases. **carbon dioxide** and **methane** are both very good at this, which is why they are called **greenhouse gases**.

**If we get too much of these gases in the mix, our planet starts to warm up too much!**

How did we get too much **carbon dioxide** in the **atmosphere**?

When we burn **p**\_\_\_\_\_ to make our cars go, and when we burn **c**\_\_\_ to make our electricity, we release carbon dioxide that has been trapped underground for millions of years into the air.

**One of the ways we can reduce the amount of carbon dioxide we put into the atmosphere by saving energy.**

#### Pedal the Greenhouse Gas Bicycle

How many lights did you power?	What was the highest number on the red screen?
	WATTS

## **Station 2 - The Model Greenhouse**

How big is the sky? How much air is there? What is it made from?

What is the **atmosphere**? Our atmosphere is a thin layer of air surrounding the earth

Pretend the plastic bubble in the model is the **atmosphere**.

While the bubble is off, put one hand near the yellow wire in the middle and one hand near the yellow wire at the edge of the circle.

**Circle the answer that fits best**

**Edge feels warmer**

**Feels the Same**

**Middle feels warmer**

Put the bubble on and wait for **two minutes**. Get your hand ready, and as the volunteer lifts the lid, quickly put your hand in the same places as before.

**Circle the answer that fits best**

**Edge feels warmer**

**Feels the Same**

**Middle feels warmer**

Wait for 10 seconds and then feel the two spaces again.

**Circle the answer that fits best**

**Edge feels warmer**

**Feels the Same**

**Middle feels warmer**

Where did the warm air go when the lid was lifted? Why?

Would you like to live in a world that was as hot as it got under the bubble all the time?

The air is a mix of different kinds of gases. If too much of that mix is made up of **greenhouse gases**, the air temperature starts to increase. When we burn less coal, petrol, oil and other **fossil fuels** we release less **greenhouse gases** into the **atmosphere**.

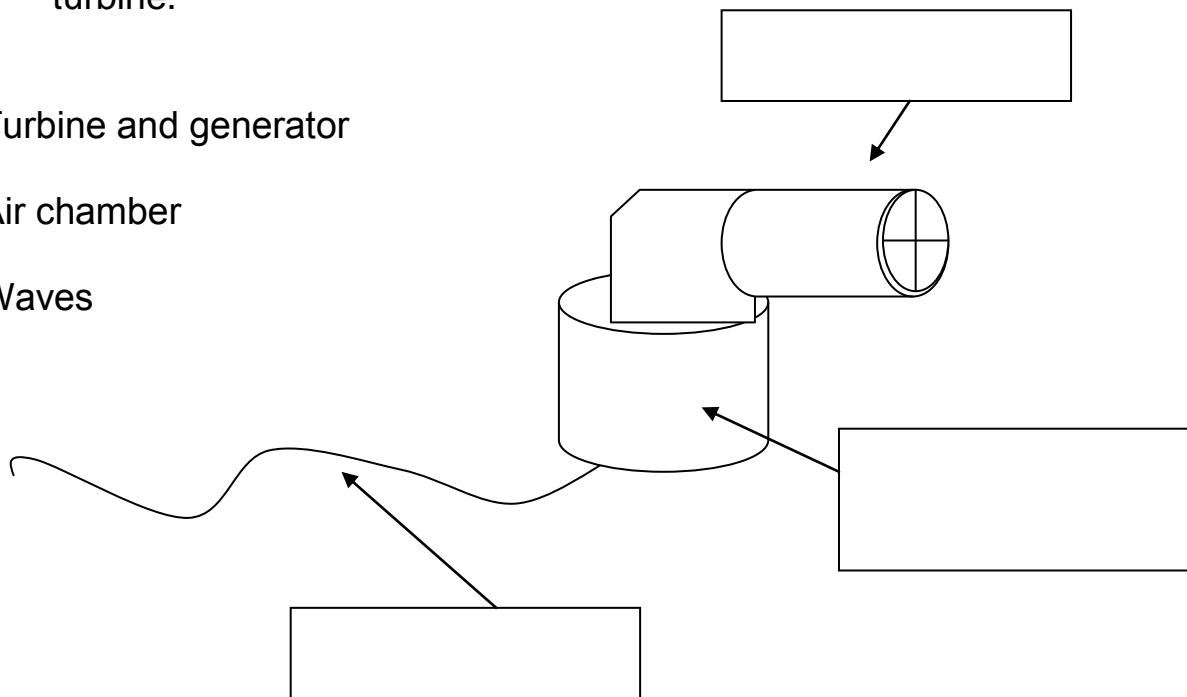
## Station 3 Wave Energy

**How can we move ourselves and our things around without ENERGY?**

Wave energy is a new technology that is able to produce electrical energy and does not produce greenhouse gases. The wave display includes a information on the wave power plant installed at Port Kembla by *Energetech(Oceanlinx)*, which will supply enough electricity to power **500 - 1000** homes

1. Fill in the blanks in the picture and label the correct parts of the wave turbine.

- Turbine and generator
- Air chamber
- Waves



2. How can using Wave Power help the environment and reduce greenhouse gas emissions?

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## ***Station 4 Sustainable Transport***

### **How do we use energy to move ourselves and our things around?**

What are some examples of fossil fuels?  
(ask your volunteer if you're unsure)

What are some ways we can choose to move ourselves around which use less fossil fuels (or even none at all)?

Draw a town which has 4 different kinds of environmentally friendly transport being used.

**Station 5**  
**Reducing our Impact on the Environment**

**What can YOU do to reduce waste at HOME and at SCHOOL?**

Draw 3 products you can see on display in the dollhouse

Product Name	How does this help the environment	Drawing of product

**How can we save energy and water at HOME**

3. Using ideas you have seen in the Eco-House list 10 ways you can save energy and water at home.

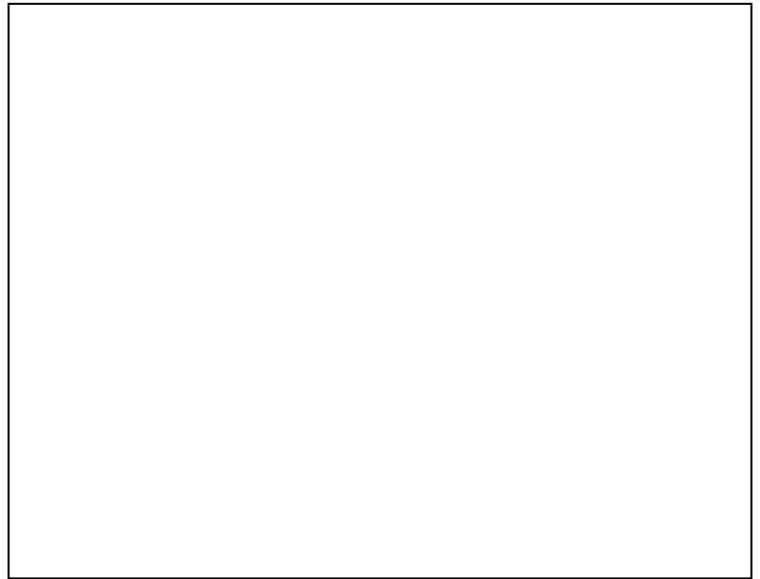
In the kitchen	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>
In the bathroom	<ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>
Other places	

## Station 6 – Sustainable Technologies - Wind Power

Wind turbines come in many different sizes. The bigger the *area* “swept” by the wind turbine blades, the greater the power output from the wind turbine. This means the longer the turbine blades, the more the energy that can be harnessed.

The higher the wind speed the greater the power generated.

1. Look at the picture on display, draw the parts of a wind turbine in the box.



2. Use the fan and the model of the wind turbine. Turn the handle and use the anemometer to record the maximum wind speed you produced and the number of kilowatts shown for that speed.

Maximum Wind Speed (grey numbers) (km/hour)	Number of houses powered (red numbers)

## Station 7 - Solar Investigation - Solar Powered Pump

Solar powered pumps can be used in remote areas without access to conventional electricity for pumping water to crops or for drinking water.

The solar photovoltaic panel converts sunlight into electricity. We can use solar electricity to power a water pump.

Working in your group, complete the following investigation..

**Objective:** When does the solar pump work best?

**Procedure:** Record how long it takes to fill the bucket with water from the solar pump in the following conditions.

**Results:**

Pump operating conditions	Time (seconds)
The solar panel pointing directly towards the sun.	
The solar panel held parallel to the sun's rays.	
The panel pointing directly at the sun with the bucket on the table.	
The panel pointing directly towards the sun with half the cells covered.	

From the experiment, The pump works best when \_\_\_\_\_

\_\_\_\_\_

What factors could affect how well the cells work?

\_\_\_\_\_

\_\_\_\_\_

**Conclusion:** The solar pump works best when

\_\_\_\_\_

\_\_\_\_\_