

## Overview

Do you know what energy is?

Energy is the ability to do work.

We need energy for:



Energy is power that results from physical, chemical or natural resources to provide light and heat. Energy enables machines and systems to work.

Renewable energy comes from resources that are never used up, or can be replaced by new growth. Renewable energy comes from natural resources like the sun, water, wind or wood.

A non-renewable resource will run out one day, as it cannot be replaced once it has been extracted. Fossil Fuels are non renewable sources of energy which include coal, oil, nuclear and natural gas.

Fossil fuels are made up of plant and animal matter. When plants and animals died, their bodies decomposed and were buried under layers of earth.

## Activity 1: Energy Explorers

- Petrol and diesel are made from oil and oil is an example of a non-renewable energy resource. Some examples of non-renewable energy are fossil fuels such as oil, coal and natural gas.
- Renewable resource is never used up, or can be replaced by new growth. Renewable energy comes from natural resources like the sun, water, animal waste, wind and wood.
- Fill out the activity on the next page to explore renewable and non-renewable energy.

## Activity 2: Energy Audit

- An energy audit can help you find out where your energy is going in your home.
- Check off the lists on page 3 and see how energy efficient your home really is.

## Activity 3: Natural Gas Experiment

- Try an experiment to demonstrate that when vegetation decays in the absence of oxygen, it can release gas.

## Activity 1: Energy Explorers

Put the sources of energy in the table below as either renewable or non-renewable:



**Coal**



**Solar Energy**



**Natural Gas**



**Nuclear**



**Hydropower**



**Oil**



**Geothermal**



**Renewable  
fuels**

Renewable Energy	Non-Renewable Energy



## Activity 2: Energy Audit



*Does your house make the most of natural light? Are the windows uncovered to maximise the light coming in?*

*Are the windows clean?*

*Do we turn off the lights when not needed e.g. when we are going out on sunny days?*

*Are electrical appliances turned off when not in use e.g. the computer monitor?*

*Are timers used on appliances or water heaters, so they are not left on all the time?*

*Are the radiators turned off when not needed?*

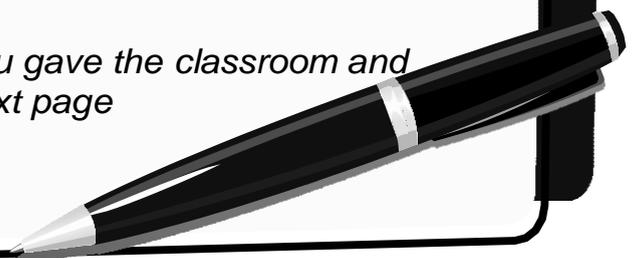
*Do we avoid opening windows when the heating is turned on?*

*Are the windows free from draughts?*

*Is the door free from draughts?*

*Are the taps free from leaks?*

*Count the number of ticks you gave the classroom and record your results on the next page*



# Overall Findings

Rate your house's energy efficiency and explain in the space below what improvements, if any, could be made to make your classroom more energy efficient.

**7-10**

Yay –  
Energy Efficient 😊

**4-7**

Ok -  
More efficiency  
Needed

**1-4**

Eek -  
Could do  
much better 😞

Comments:

## Energy Efficiency at Home

Things that help reduce energy use and costs:

- Insulated Attic?
- Clothes Line vs Tumble Dryer?
- A-rated energy efficient appliances?
- Kettle filled only with the amount of water needed?
- Curtains closed to keep cold air and draughts out?
- Lower your heating thermostat by 1°C?



## Activity 3: Natural Gas Experiment

This experiment demonstrates that when vegetation decays in the absence of oxygen, it can release gas.

Our experimental conditions are very different from those that produce natural gas underground, but this activity gives you an idea of how the process works.

### Materials

- 1-Litre see-through plastic bag and Tape for sealing the bag (if needed)
- Leafy green vegetables, lettuce, cabbage, or spinach, at room temperature
- Large clear measuring jug
- Measuring tape
- Thermometer
- Notebook and Pen

1	Take out your leafy green vegetables and let them come to room temperature.	Note: Tear them into pieces no larger than your hand
2	Add the greens to the measuring jug and pack them down as much as possible. Keep adding additional greens, pushing them down until the level of the greens is at 250 ml mark.	
3	Fill the plastic bag with the greens from the measuring cup.	
4	Distribute the greens evenly along the bottom of the bag. Then roll up the bag from the bottom to press all of the air out and seal tightly.	Note: If the bag is not re-sealable, use tape to seal the bag. This removes most of the oxygen and sets the stage for something similar to anaerobic decay, or decay in the absence of the oxygen.
5	Use the measuring tape to find the circumference of the rolled-up bag. Record this information in your notebook. Write a description of your greens—how they look and feel. Then record the temperature of the room.	
6	Unroll the bag and place it on a table or shelf where they can remain at room temperature. Make a table in your notebook to record your observations.	Note: Be sure it is not in sunlight, because this will heat the air inside the bags, causing them to expand and give a false reading.
7	Once a day for the next ten days, gently roll the bag and measure the circumference. Measure the room temperature, which should stay about the same.	Record this information in your notebook.
8	After taking your measurements, look at the greens and write down your observations of their appearance. On the tenth day of the experiment, measure a final distance around the rolled bag. Record the final measurements and the room temperature.	Note: What changes do you see? How do these changes relate to what you know about how decaying material produces natural gas?

