

Introductory Presentation



Energy

- Energy is a vital to our way of life. Here are a some examples of where energy is used:
- Homes: central heating, powering electrical appliances, and heating water
- Public buildings: schools, shopping centres
- Industry: factories and offices
- Transport: cars and commercial vehicles, aeroplanes, boats and trains

Fossil Fuels

- The majority of our energy is generated by burning fossil fuels: oil, coal or gas
- Fuel is burnt directly or used in power stations to produce electricity
- We are consuming our natural resources of fossil fuels very rapidly, and soon they will run out
- We need to use less energy to make our remaining fossil fuel supplies last longer
- We need to look at alternative ways of producing power using renewable energy
- We need to change our behaviour and attitudes towards our energy usage

Nuclear Power

- Nuclear power is sometimes seen as a solution to our energy needs
- However, the uranium required to produce nuclear power is running out
- The radioactive waste produced by nuclear power stations will remain lethal for thousands of years

Global Warming

- There is compelling scientific evidence that the Earth's temperature is rising, and that this is caused by human activity
- This temperature rise is known as 'Global Warming'
- Global warming is caused by 'greenhouse gases' in the Earth's atmosphere
- They are named greenhouse gases because they trap heat in the same way that a glass greenhouse traps heat
- Global warming is a huge danger to the world because of the potential impact it may have on our climate

Climate Change

- Global warming will lead to unpredictable and potentially dangerous changes in the Earth's climate
- Scientists predict that even if we were to cease all CO₂ output today, global warming would continue beyond the year 2100 •
- Climate change will almost certainly have a severe impact on us and the world we live in

Dangers of Climate Change

- Rising sea levels
- Glaciers will melt
- Extreme weather
- Change in rainfall
- Extinction of species
- Diseases may spread

1 - Why Renewable Energy?

- What is renewable energy?
- Why is renewable energy important?
 - Security of supply
 - Climate change
- Record meter readings to monitor the school's energy usage
- Play the LogiCity climate change game

2 - Introduction to Wind Power

- Learn how a wind turbine functions, and its component parts
- Experiment with the Wind Turbine Kit
- Connect the wind turbine to motor, fan or LED modules
- Connect the wind turbine to a voltmeter and measure the output

3 - Number and Pitch of Blades

- Experiment with different numbers of blades on the wind turbine and measure the voltage
- Experiment with different blade angles on the wind turbine and measure the voltage
- Discuss why 3 blades are typically used on large commercial wind turbines

4 - Width and Length of Blades

- Experiment with different size blades on the wind turbine and measure the voltage
- The students will make blades of varying width and length and attach these to the wind turbine

5 - Wind Speed and Direction

- Use the wind turbine kit to measure the voltage at different wind speeds and different directions
- Observe how the wind turbine changes direction to face into the wind, should the wind direction change

6 - Performance Under Load

- With the wind turbine set at optimum efficiency, investigate what happens when an electrical load is applied.

7 - Introduction to Solar Photovoltaics (PV)

- What is solar photovoltaic technology?
- Experiment with the Photovoltaic Kit
- Connect the PV cell to motor, fan or LED modules
- Connect the PV to a voltmeter and measure the output
- Experiment by covering varying proportions of the PV cell's surface and record results

8 - Solar Photovoltaics (PV) Uses and Applications

- Discuss applications of photovoltaic technology
- Discuss the advantages and disadvantages of photovoltaic power
- Design an electrical appliance powered by PV

9 - Introduction to Solar Thermal Heating

- What is solar thermal heating?
- How do solar thermal heating systems work?
- Discuss the advantages and disadvantages of solar thermal energy
- Experiment with the Solar Water Heater Kit
- Observe how the sun's energy can be used to heat water

10 - Solar Thermal Insulation

- Experiment with the Solar Water Heater Kit
- Observe what effect the foam insulation block has on the efficiency of solar thermal water heating

11 - Solar Thermal Cover

- Experiment with the Solar Water Heater Kit
- Observe what effect opening or closing the plastic case has on the efficiency of solar thermal water heating.

12 - What have you learnt?

- Synopsis of previous lessons
- Revise and summarise all aspects of renewable energy and energy conservation
- Discuss experiments with the renewable energy kits, and the results of the school energy monitoring
- Produce a poster, poem or rap promoting renewable energy and energy conservation
- Group presentation