St Ninian's High School

S1 Science Homework

ENERGY - PHYSICS

1.

a. 

b. 

c. 

d. 

e. 

f. 

Copy and complete the following table for these pictures

Picture	Description	Forms of energy shown
A	Lighted match	
		Light
	Water stored behind dam	
E		
	Wall plug socket	

2. What type of energy is stored in food?

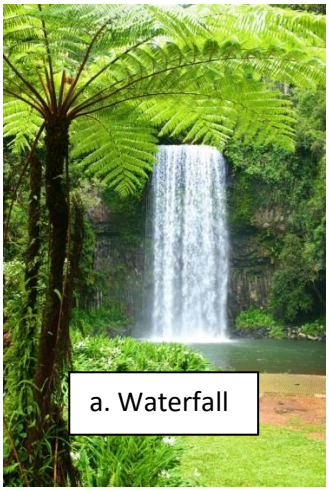
3. What is the useful form of energy produced in each of the following:

a. Buzzer b. Fossil fuels
c. Motor d. Loudspeaker

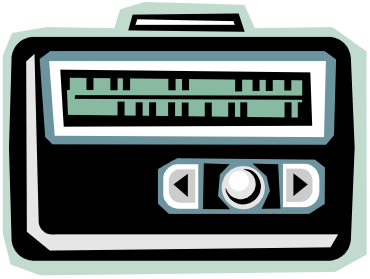
4. What is the unit of measurement for energy?

5. (a) Write down 5 things in your house which use electrical energy.
(b) For each of these things, write down the kind of energy that each one gives out e.g. a radio gives out sound energy.

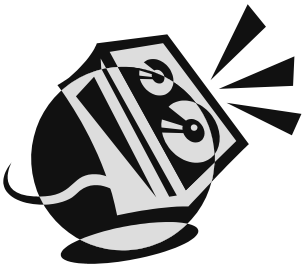
1. State the energy change which occurs in each of the pictures shown below.



a. Waterfall

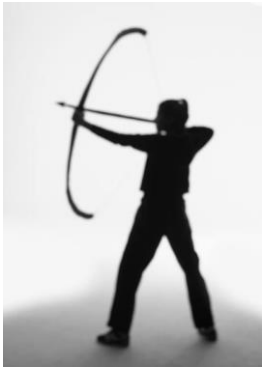


b. Radio



c. Loudspeaker

d. Food Mixer



e. Stretched Bow

2. Food contains energy, for each of the foods in the table below change the energy stated in kilojoules to Joules.

Food	Energy per 100g (kJ)	Energy per 100g (J)
Tomato Soup	244	244000
Soft Cheese	1015	
Biscuits	2038	
Baked Beans	337	

Add four more rows to the table, use food packages to find the energy in other foods. Make sure to record the energy per 100g.

3. What is the energy change in :

(a) burning coal (b) a dynamo

(c) a battery (d) a bulb

In class you have seen the Van De Graaff Generator to show electrical energy being generated.

Read the following information about Robert Jemison Van de Graaff then answer the questions about the passage in full sentences.

Robert Jemison Van de Graaff was an American Physicist. He was Born in Alabama on December 20, 1901, and died in Massachusetts on January 16, 1967 (age 65).

He received his BSc and Master's degrees from The University of Alabama. After a year at the Alabama Power Company, Van de Graaff studied at the Sorbonne. In 1926 he earned a second BSc at Oxford University on a Rhodes scholarship, completing his PhD in 1928.

Robert Jemison Van de Graaff, designed and constructed his first device in 1929 at Princeton University with help from colleague Nicholas Burke.

Van de Graaff applied for a patent in December 1931, which was later granted.

The American Physical Society awarded him the T.Bonner prize (1965).

The largest air-insulated Van de Graaff generator in the world, built by Dr. Van de Graaff in the 1930s, is now on permanent display at Boston's Museum of Science.

a. What year was Van de Graaff born?

b. What Nationality was Van de Graaff?

c. Name two universities that Van de Graaff studied at.

d. What award did Van de Graaff receive?

e. Where would you need to go to see the largest generator in the world.

f. Explain how the Van de Graaff Generator works?

Choose a famous Physicist and produce a piece of information about that Physicist. The information can take the form of a fact file or a written paragraph and can be completed in your jotter or on the computer and printed out.

Below are a few examples of famous physicists however you can choose any other famous physicist.

Use the information given on the previous homework as a guide.

Sir Issac Newton

Albert Einstein

Michael Faraday

Ernest Rutherford

Stephen Hawking

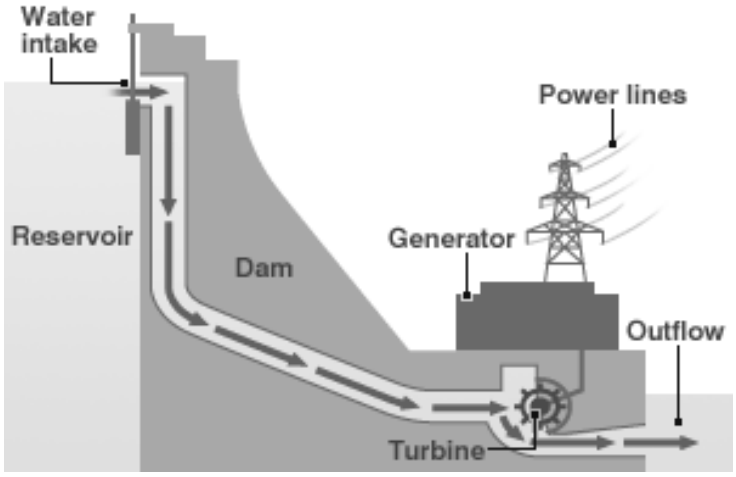
Edwin Hubble

Pierre & Marie Curie

1. A school installed 48 solar cells on its roof to help meet the electricity needs.

(a) State the energy change that takes place in a solar cell.
(b) If each solar cell costs £2000 what would the total cost be to buy the solar cells?
(c) What are the advantages of the school using solar cells?
(d) What are the disadvantages of the school using solar cells?
(e) What changes could be made in the school to reduce the daily electricity usage?

2. The diagram below shows a hydroelectric power station.



(a) What form of energy does the water behind the dam have?

(b) What form of energy does flowing water have?

(c) In which part of the power station does kinetic energy change to electrical energy?

3. Give two reasons why people are concerned about wind turbines?

4. Examples of energy sources are:

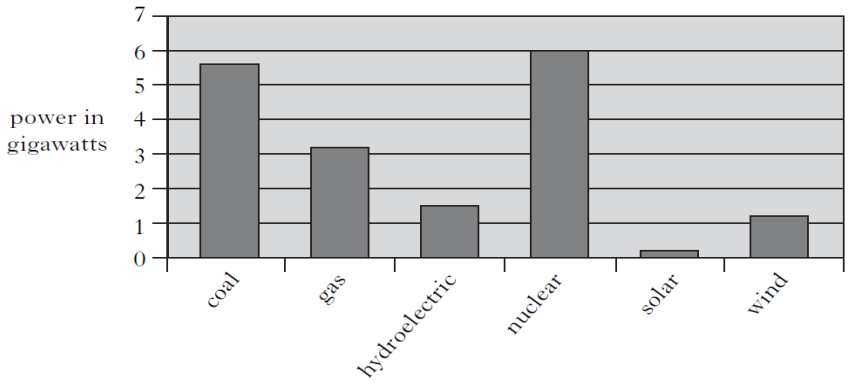
gas wind oil solar wave hydro nuclear

These energy sources can be classified as renewable or non-renewable.

Complete the table below to show which of these examples are renewable and which are non-renewable.

Renewable	Non-renewable

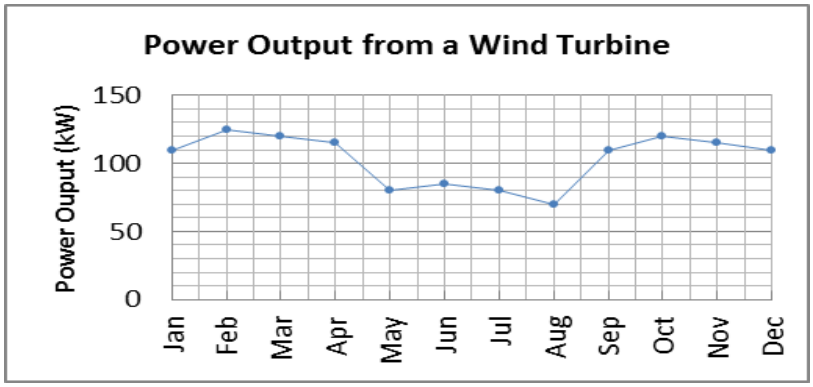
5. The bar chart shows the main energy sources used in Scotland.



(a) Which energy source provides the most power in gigawatts?

(b) How much power does hydroelectricity produce?

6. The line graph shows the power output from a wind turbine over the course of a year.



(a) What is the power output in kW in March?

(b) What happens to the power output between April and September? Give a reason why this may happen.

1. In a shop cans and bottles of soft drinks are stored in the same fridge at the same temperature. Joe picks up a metal can and a plastic bottle of his favourite fizzy drink. He notices that one feels cooler than the other.
   (a) Which one will feel cooler?
   (b) Explain your answer to part a.

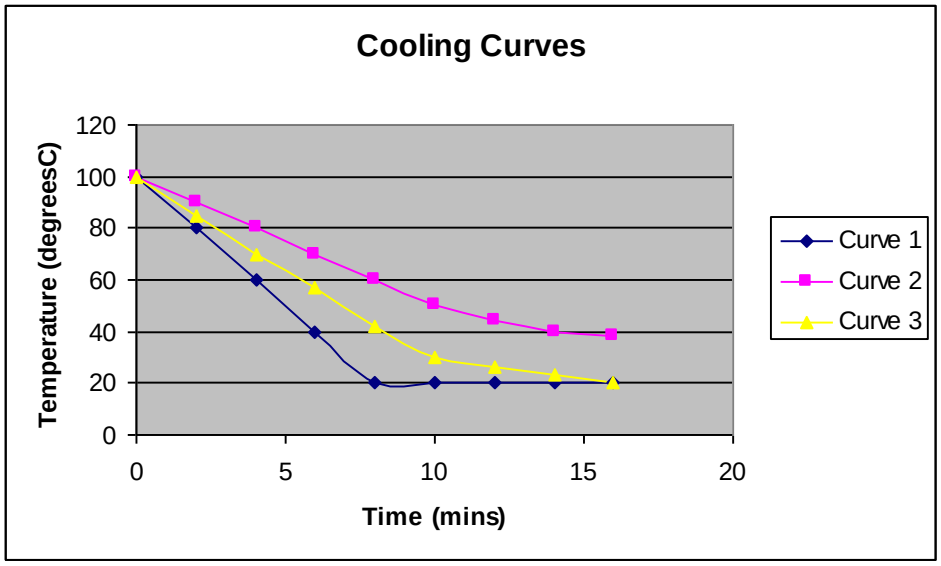
2. (a) Why are saucepans usually made of metal?
   (b) Why are saucepan handles usually made from wood or plastic?

3. The materials below can be classified as **conductors** or **insulators**

Wool	Plastic	Aluminium foil	Wood Paper
Copper	Air	Winter jacket	Glass

Place these materials in a table under the headings, **conductors** and **insulators**

4. Three containers of water are heated and left to cool. Look carefully at the three cooling curves for water on the graph below.

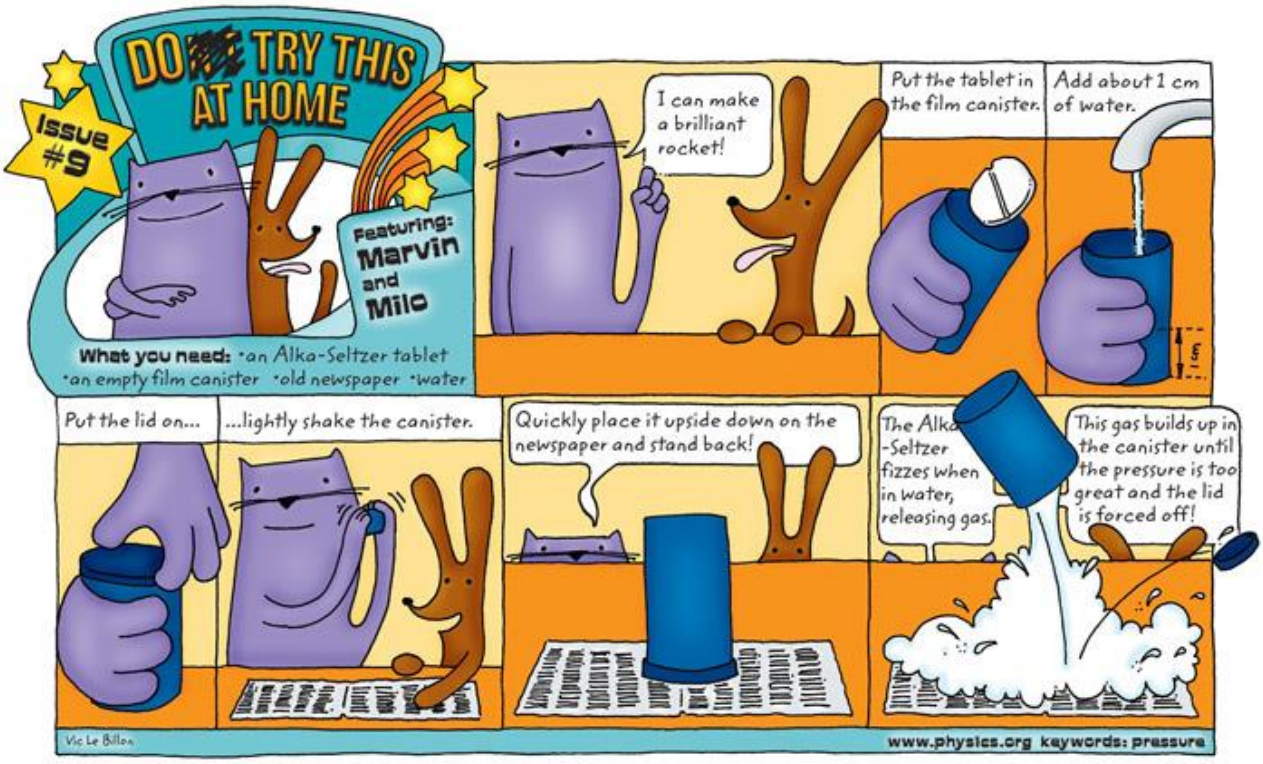


(a) Which cooling curve do you think shows the water cooling the slowest?

(b) Which curve(s) shows the water cooling down to room temperature?

(c) Which curve represents the container that was the most insulated?

Experiments Film Rockets



Method

1. Put the tablet in the film canister. Add about 1cm of water.
2. Put the lid on, lightly shake the canister.
3. Quickly place it upside down on the newspaper and stand back!

Results & explanation

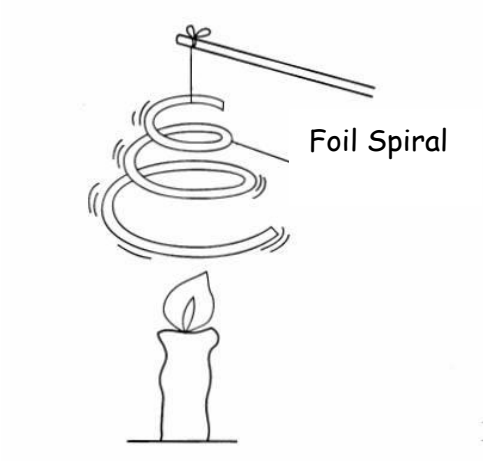
The Alka-Seltzer fizzes when in water, releasing gas. This gas builds up in the canister until the pressure is too great and the lid is forced off!

Write up your experiment. Remember to include:

- A diagram of your experiment
- A method (set of instructions) of your experiment
- An explanation of what happens
- An energy change equation showing the main energy change

Experiment **Twisting spirals**

Hold the foil spiral above the Bunsen flame.



Tasks

1. Describe what you see happening.
2. Try to explain what you have seen.

Teacher Demonstration

Laser Light

Aim:

To highlight common misconceptions with lasers and to reinforce light travels in straight line

Learning Outcomes:

1. I can state travels in a straight lines.

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