

Properties and Uses of Energy

Heating and Cooling

44 slides, 10 Flash activities

This presentation is designed to teach:

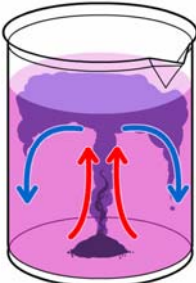
- that heat is a form of energy
- that heat transfer occurs by conduction, convection and radiation
- what the three types of heat transfer involve in the different states of matter
- that the existence of a substance as a solid, liquid or gas is dependent on its temperature, melting and boiling points
- the different ways to insulate a house against heat loss.

Convection current in a liquid

The movement of hotter areas in a liquid can be seen using potassium permanganate as a dye.

This cycle is called a **convection current**.

Can you explain how the convection current moves using the idea of **density**?



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Light

51 slides, 22 Flash activities


This presentation is designed to teach:

- that light carries energy and takes the form of a wave
- how we see, and how sight can be improved using concave and convex lenses
- what reflection and refraction are, and how they affect the behaviour of light rays
- how prisms allow us to split white light into the colours of the spectrum
- what gives objects colour.

How do we see different colours?

Seeing colours in white light

Why does a **red** object look **red** in white light?



A red object absorbs all the colours of the spectrum **except red**.

Only red light is reflected from the object into your eye, so the object appears **red**.

red green magenta black white

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Sound

36 slides, 10 Flash activities


This presentation is designed to teach:

- that sounds are made when an object vibrates
- that sound waves cannot travel in a vacuum
- that loudness is related to the amplitude of a sound wave and pitch is related to frequency
- how the speed of sound varies in air, solids and liquids
- the structure of the ear and how we hear.

Pitch and frequency


A sound can be high or low – this is the **pitch** of the sound.

low pitch



pause play

high pitch



pause play

On an oscilloscope trace, the pitch of a sound is shown by how many waves there are. This is called the **frequency**. Which word should be crossed out in this sentence:

The **greater** the number of waves across the oscilloscope trace, the ~~lower~~/**higher** the frequency and pitch.

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Electronic Circuits

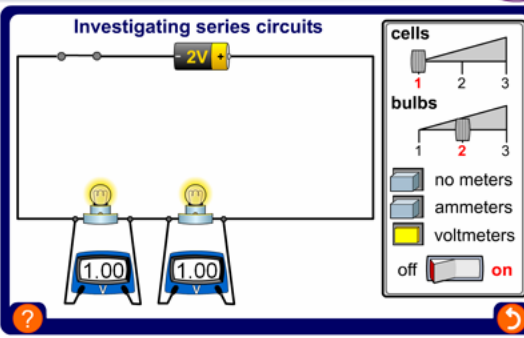
30 slides, 7 Flash activities

This presentation is designed to teach:

- how series circuits are constructed
- the effects of changing the number of cells and components in a series circuit
- how parallel circuits are constructed
- the effects of changing the number of cells and components in a parallel circuit
- what 'current', 'voltage' and 'resistance' mean.

Make your own series circuit

Investigating series circuits



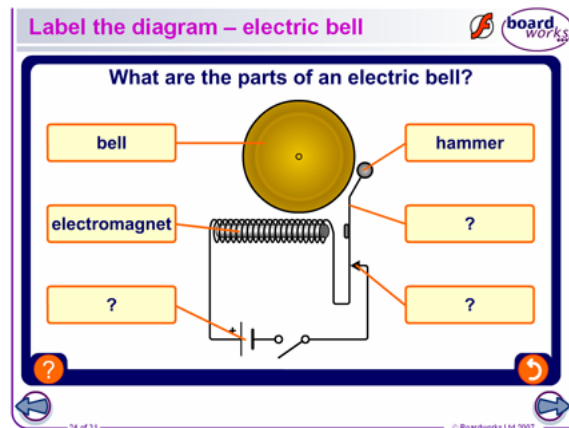
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Electromagnets

17 slides, 7 Flash activities

This presentation is designed to teach:

- how an electromagnet is made
- how the strength of an electromagnet can be varied
- how electromagnets are used in several everyday situations.



Conversion and Transfer of Energy

Energy and Energy Conversion

30 slides, 7 Flash activities

This presentation is designed to teach:

- what energy is and the different forms it comes in
- how energy can be converted from one form to another
- how gravitational potential energy is converted to kinetic energy.

The nature of energy

Match the types of energy to the examples

thermal	a wind-up toy, a rubber band
light	light bulbs, fireworks
sound	food, batteries, fuels
elastic	anything that is moving
gravitational	a book on a shelf, a bungee jumper
kinetic	talking, TV, radio
electrical	nuclear bombs, power stations
chemical	anything that uses electricity
nuclear	hot water, a hot radiator

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Electricity and Energy Resources

29 slides, 7 Flash activities

This presentation is designed to teach:

- how electricity is generated in power stations
- how electricity is distributed through the national grid
- about the different energy resources that can be used to produce electricity
- the difference between renewable and non-renewable resources.

Renewable energy sources

Renewable energy resources will not run out because they can easily be generated anew. The photograph shows a dam built for the generation of hydroelectric power.

Other examples of renewable energy resources are:

- wind power
- solar power
- tidal power
- biomass

Only 2% of the UK's energy comes from renewable sources. Why do you think this is?

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Forces and Their Effects

Forces

35 slides, 11 Flash activities

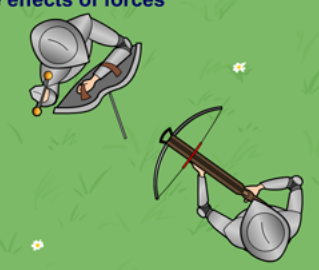
This presentation is designed to teach:

- what forces are
- that balanced and unbalanced forces exist
- that friction always opposes motion and that air resistance is a form of friction
- that weight is opposed by upthrust in a liquid or a gas
- that pressure is a force applied over an area and that high and low pressure can be of use.

Forces affecting objects

The effects of forces

Stage 2
When the bolt hits the knight's shield, the force that is applied causes the metal to crumple and change **shape**.



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Gravity, Mass and Weight

24 slides, 8 Flash activities

This presentation is designed to teach:

- what gravity is and its effects
- the difference between mass and weight and the units used to measure them
- how weight varies between different planets in the solar system due to different gravitational forces
- that natural and artificial satellites exist and that their orbits are affected by gravity.

Satellite orbits

Geostationary and polar orbits

Polar satellites have low orbits and pass over the poles. They are used for mapping and spying. The red light appears when the satellite is gathering intelligence. For whom do you think the satellite is spying?



geostationary polar

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