

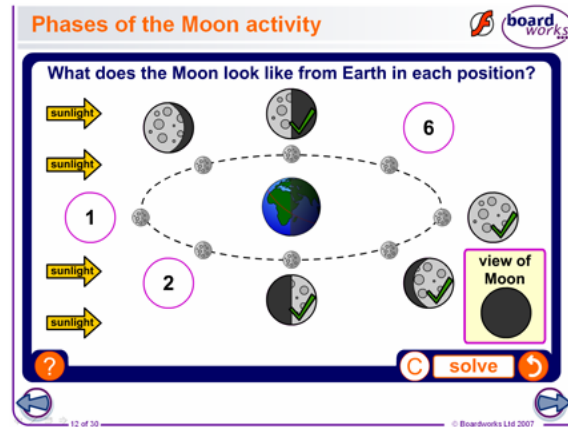
Earth in Space

The Solar System and Beyond

30 slides, 7 Flash activities

This presentation is designed to teach:

- how the Earth's movement determines days and years
- what causes the seasons to change
- how the moon moves around the Earth and the phases of the moon
- some approaches to space exploration
- arguments for and against the existence of life on other planets.

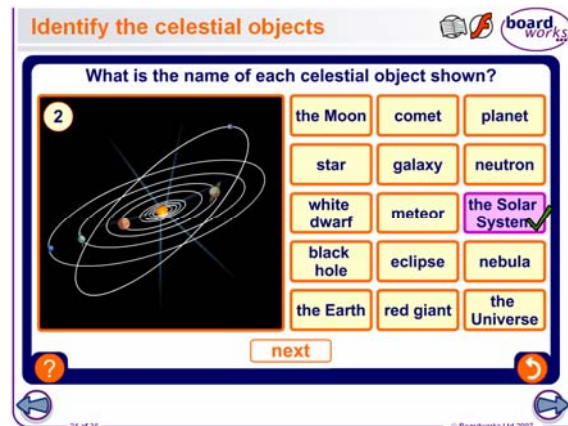


The Evolution of the Universe

36 slides, 16 Flash activities

This presentation is designed to teach:

- what the Universe, the Solar System, the Sun and comets are
- that nuclear fusion powers a star and the stages in the lifecycle of a star
- how a black hole can be observed
- which celestial bodies make up the universe and their relative sizes
- some of the theories surrounding the Universe's evolution.



Materials from Earth

Solids, Liquids and Gases

23 slides, 7 Flash activities

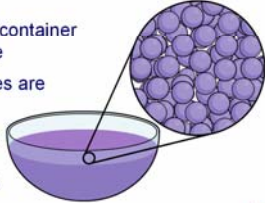
This presentation is designed to teach:

- the properties of solids, liquids and gases
- that all substances are made up of particles
- what diffusion is and what happens to particles during diffusion
- that different particles have different rates of diffusion.

What are the properties of liquids?

A liquid:

- has a fairly high density as the particles are close together
- cannot be compressed as there is very little empty space between particles
- takes up the shape of its container as the particles can move
- can diffuse as the particles are able to change places
- can exert some pressure as the particles are able to move and hit the sides of the container.



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Classifying Elements

30 slides, 11 Flash activities

This presentation is designed to teach:

- that all substances are made up of the atoms of elements and that elements are the simplest substances
- the standard chemical symbols of the elements
- the chemical symbols for simple molecules of elements
- how the elements fit into the periodic table and their arrangement according to similar properties
- the properties of metals

Arranging elements

Click a symbol for more information about the element

H	31 phosphorus																He				
Li	Be	• non-metal														B	C	N	O	F	Ne
Na	Mg	• solid														Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr				
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe				
Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn				
Fr	Ra	Ac*	Rf	Db	Sg	Bh	Hs	Ms	Ds	Rg	?	?	?	?	?	?	?				

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Atoms

17 slides, 6 Flash activities

This presentation is designed to teach:

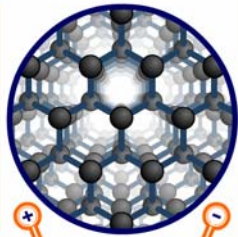
- that each element is made up of atoms and that elements are the simplest substances
- how atoms are structured and how to label the parts
- the different properties of protons, neutrons and electrons
- how atomic structure was discovered.

What are atoms made of?

board works

The Amazing Atomic Zoom

diamond	0.0000001cm
atoms	Each carbon atom is bonded to four others to form a giant lattice structure.
lattice	
one atom	
nucleus	This makes diamond very hard.



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Changing Materials

Chemical Reactions

30 slides, 6 Flash activities

This presentation is designed to teach:

- the differences between elements and compounds
- that compounds usually have different properties from the elements that make them
- what a chemical reaction is and how to distinguish reactants and products
- that chemical reactions are usually difficult to reverse
- how to write word equations
- that combustion is a reaction involving a substance burning in oxygen.


Non-useful chemical reactions

Some chemical reactions are a nuisance, or can even be dangerous.

Chemical reactions in food cause it to breakdown and decay, making it unsafe to eat.

The reaction between iron and oxygen can cause metal to become rusty over time, weakening the structure and making it dangerous to use.

Factories that produce chemicals often produce gases that pollute the atmosphere, increasing the greenhouse effect and causing acid rain.



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Reaction Rates

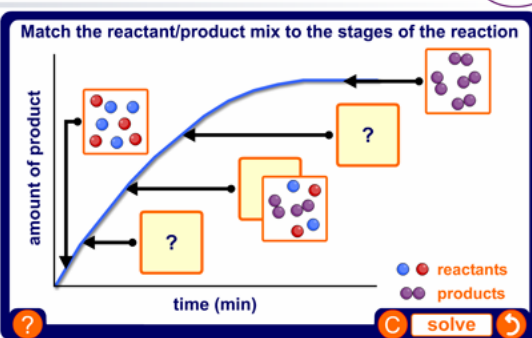
38 slides, 13 Flash activities

This presentation is designed to teach:

- what rate of reaction means and its dependence on the frequency and energy of particle collisions
- that temperature, concentration, pressure, surface area and the presence of a catalyst are all factors affecting reaction rate
- how to measure and graph the reaction rate of an experiment
- the effects of increasing temperature, pressure, concentration and surface area on particle collision
- that the presence of a catalyst lowers activation energy.

The reactant/product mix

Match the reactant/product mix to the stages of the reaction



amount of product

time (min)

reactants

products

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Solubility

24 slides, 9 Flash activities

This presentation is designed to teach:

- the difference between mixtures and solutions
- what solubility is
- how to separate soluble solids from mixtures by evaporation and insoluble ones by filtering
- that distillation is needed to collect the solvent of a solution
- that solubility occurs until saturation and that this is affected by temperature.

Does a solid keep dissolving?

The amount of sugar that can dissolve in the tea is limited. When no more sugar can dissolve the solution is **saturated**.

Can other substances become saturated?

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pH and Neutralization

30 slides, 9 Flash activities

This presentation is designed to teach:

- about acids and alkalis
- the difference between strong and weak acids and alkalis
- what indicators like litmus and universal indicator do and how they relate to the pH scale
- that neutralization is a chemical reaction between an acid and an alkali
- about acids and alkalis in everyday life, e.g. acid rain.

What is the pH?

Is the pH value higher or lower?

lemon juice pH 2.5

water pH 7

1 2 3 4 5 6 7 8 9 10 11 12 13 14

strong acid weak acid neutral weak alkali strong alkali

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The Reactions of Metals

28 slides, 7 Flash activities

This presentation is designed to teach:

- what happens when metals react with water
- what happens when metals react with oxygen
- what happens when metals react with different acids
- the word equations for the reactions of metals
- how to use reactions to assess the relative reactivity of different metals.

Reacting metal with acid

How will these metals react with acid?

Watch carefully what happens when each metal is placed in the acid. Note down your observations.

Which is the most reactive metal?
Which is the least reactive metal?

Na Mg Fe Pb Cu

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Extracting Metals

27 slides, 8 Flash activities

This presentation is designed to teach:

- why metals are extracted
- that reactivity affects the extraction method
- that some metal oxides can be reduced using carbon
- that aluminium and copper can be extracted by electrolysis
- how iron ore is extracted in industry using a blast furnace
- how extraction affects the environment and what can be done to minimise its impacts.

What is electrolysis?

Electrolysis is a process that uses electricity to separate the elements in a compound. The word electrolysis means 'splitting with electricity'. Electrolysis is expensive and so it is only used to extract reactive metals that cannot be extracted in other ways.

Aluminium is a reactive metal that is found in the ore **bauxite**. It is combined with oxygen as aluminium oxide. Electrolysis is used to remove the oxygen and extract aluminium, which means that reduction takes place.

What is the word equation for the extraction of aluminium?

aluminium oxide → aluminium + oxygen

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