

Year 8 Physics



Keyword List

Permanent magnet – a object with a permanent magnetic field

Magnetic field – region around a magnet showing magnetism force

Longitudinal wave – a wave vibrating in a direction of motion

Transverse wave – a wave where the medium vibrates at right angles

Amplitude – how high one wave is

Frequency – number of waves per second

Crest – peak or top point of a transverse wave

Trough – bottom point of a transverse wave

Electromagnet – a magnet made using current/power source

Reflection – the bounce back of light without absorption

Refraction – change in direction of wave through a medium

Incidence ray – the ray of light coming into an object

Reflected ray – the ray coming off an object

Physics term 1 checklist



To understand properties of a permanent magnet

Name magnetic materials

State that magnets have both north and south poles

Be able to draw a magnetic field around a magnet

Describe how to make an electromagnet

State ways we can increase the strength of an electromagnet

State how sound travels

Label a transverse wave

Describe how to show reflection using a ray diagram

Describe how refraction works using a ray diagram

Be able to show the composition of white light using a glass prism and ray box

Physics – Magnets

Magnets

Magnetic materials (Not all metals). Only three metals (**Iron, Cobalt, Nickel**) can be used in making magnets and be attracted by a magnet. Alloys containing iron are also magnetic (**Steel**).

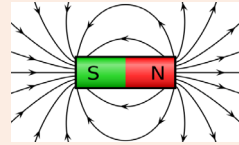
Magnets have two ends called the **North** and **South Poles**. Magnets also produce a force field which means they can produce a force on something without touching it. Called a non-contact force



North + North = Repel
South + North = Attract

Magnetic fields and the Earth

Magnetic field lines show where magnetic forces act as well as the strength of the field. It always goes from **North to South** and strongest where the lines are closest.



The **Earth** is a giant magnet with a core made of **Iron** and **Nickel** with north and south pole opposite that of the geographic north and south.

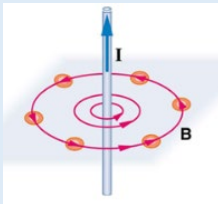


Magnetic field lines can be produced using **plotting compasses** or **iron fillings**



Electromagnets

When current passes through a wire it creates a magnetic field which can be detected using a plotting compass.

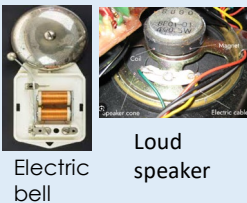
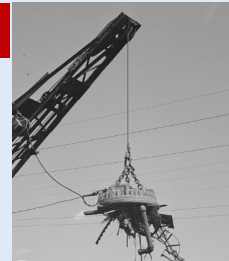


The strength of the electromagnet depend on a number of factors:

- the **number of turns** of the coil
- The **magnetic material** in the coil
- The **amount of current** flowing through the wire

Uses of Electromagnets

Electromagnets have found many uses in industry and our homes. It has been used in **scrap yards** to pick engines and vehicles and bit of iron.



It's also found applications in electric / magnetic doors, loud speakers, microphones and electric bells.

Physics – Waves



The Speed of Light

Light travels fastest in a vacuum – a vacuum doesn't contain anything.

Speed of light = **3×10^8 m/s**

White light

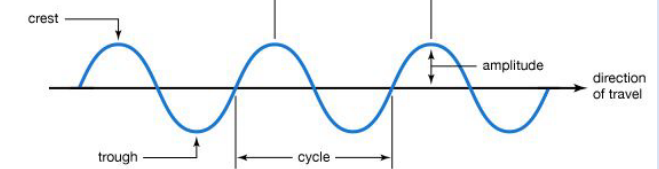


Rainbow spectrum

Longitudinal waves



Transverse waves



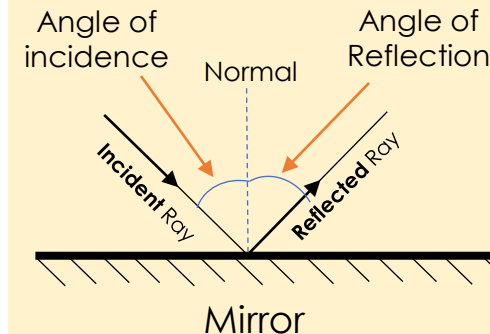
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Reflection

Light rays reflect of different surfaces:

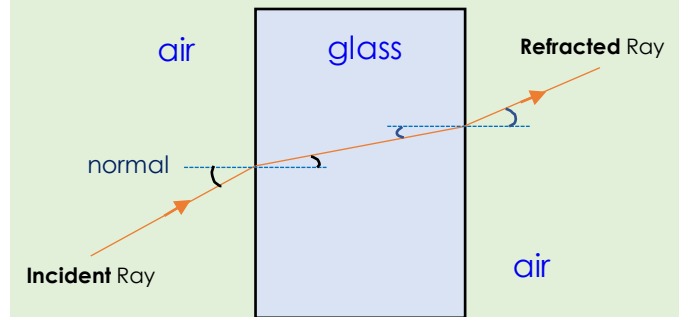
Angle of incidence = Angle of reflection

We use a protractor to measure angles.



Refraction

REFRACTION – when a wave changes direction (bends) as it crosses a boundary between one medium and another.



Light travels through transparent materials e.g. glass

Year 8 Chemistry



Keyword List

Malleable – the ability to bend a material into shape

Conductor/insulator – to be able to/no be able to transfer heat or electricity

Sonorous – an object which makes a ringing sound when hit

Acid - a substance which has a pH ranging from 0-6

Base – a substance which can neutralise an acid

Alkali – are bases which can dissolve in water

Neutral/ Neutralisation – a substance which has a pH of 7

Concentrated – a substance which has more water particles than solute

Dilute – a substance which has less water particles than solute

pH – ranges from 0-14 to show if a substance is an acid, alkali or neutral

Indicator – a substance to show the pH of another substance

Chemical change – a reaction which cannot be reversed

Physical change – a reaction which can be reversed

Conservation of Mass – the law that the mass of a reaction is the same at the start and at the end

Exothermic – a reaction which releases energy

Endothermic – a reaction which takes energy in

Combustion – a reaction which burns fuel with oxygen to give carbon dioxide and water

Oxidation – a reaction where oxygen is added

Decomposition – when a substance breaks down into smaller substances

Thermal decomposition - when a substance breaks down into smaller substances using heat

Chemistry term 1 checklist



Position of metals and non-metals on the periodic table

Properties of metal and non-metal elements

Describe the reactivity of Group 1 alkali metals

Describe the reactivity of Group 7 the halogens

Describe the properties of oxides

State the difference between an acid, alkali and base

Understand parts of the pH scale and give some examples of items

Define a neutralisation reaction

Name different salts

Describe the differences between chemical and physical changes

Be able to write equations for acid reactions

Define the terms exothermic and endothermic reaction

State what is meant by conservation of mass

Describe reactions for thermal decomposition, oxidation and combustion

Chemistry – Metals and non-metals

Most elements in the periodic table are metals and these are found on the left-hand side of the periodic table

Property	Metals	Non-metals
Appearance	Shiny	Mostly dull
Melting/boiling point	High (solid at room temp. except mercury)	Generally low (about half are gases)
Density	High	Low
Strength	Strong and malleable (can bend)	Weak and brittle (shatter when hit)
Conduction	Good conductors of heat and electricity	Poor conductors (good insulators) except carbon
Sound when hit	Ringing sound (sonorous)	Non-sonorous

Metal oxides are bases.
Group 1 – alkali metals
Soft, shiny, low density (some float on water) and very reactive.

More reactive as you move down the group.
React with water to form metal hydroxides.

Non-metal oxides are often gases and make acidic solutions.

Group 7 – the halogens.

Less reactive as you move down the group. Low melting and boiling points.

Chemistry – Acids and Alkalis



What are acids and bases?

Acid – Corrosive substance with a pH lower than 7.

Base – A substance that reacts with an acid to neutralise it and produce a salt.

Alkali – A base that dissolves in water.

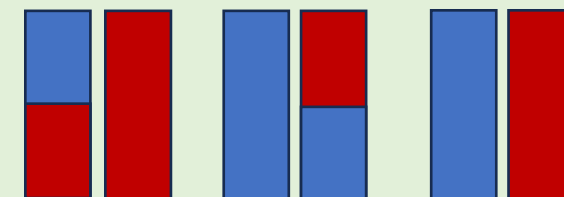
Neutral – A substance that is not acid or alkaline.

Acids	Alkalis	Neutral
Vinegar	Soap	Water
Fruit Juice	Oven Cleaner	Cooking oil

Indicators

Indicators – A substance that will **change colour** depending on if a substance is **acid** or **alkali**.

Litmus paper can be red or blue.



Acid

Alkali

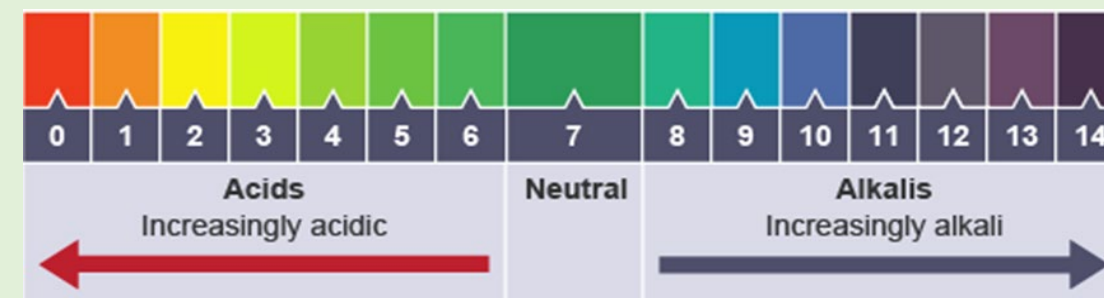
Neutral

Blue litmus turns red in acid

Red litmus turns blue in alkali

pH Scale and Universal Indicator

Universal indicator solution show what colour a certain pH is:



pH Scale – number scale from 0-14 telling us how acid or alkaline a substance is. Neutral substances are exactly pH 7 | Acids have a pH of less than 7 | Alkalis have a pH of more than 7. The further from 7 the stronger the acid or alkali.

Chemistry – Acids and Alkalis

Rules for Naming Salts

Salts always have **two** names.
First name – metal taken from the **base**.

*E.g. Salts made with **sodium** hydroxide will always start with **sodium**.*

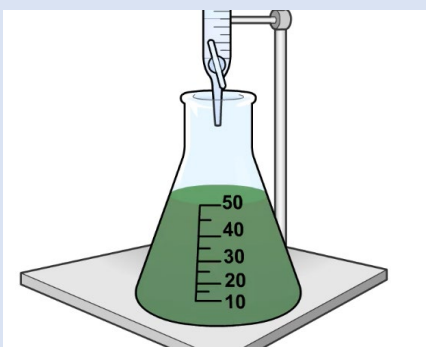
Second name – comes from the type of **acid** used.

*Hydrochloric acid – chloride
Sulfuric acid – sulfate
Nitric acid – nitrate*

Making a Neutral Solution

To make a neutral solution you need to mix together **exactly** the right amount of acid and alkali.

An indicator is needed to know when we have added the right amount. Universal indicator will turn **green**.



Neutralisation Reactions

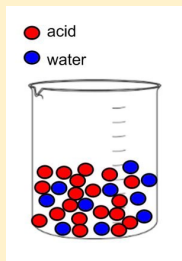
If you mix an acid and base together a **neutralisation** reaction occurs. A **neutral** solution is made.

Acid + Base → Salt + Water

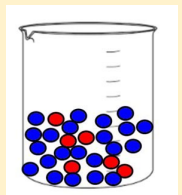
Acid + Metal → Salt + Hydrogen

Acid + Carbonate → Salt Water + Carbon dioxide

Concentrated and Dilute



Concentrated
Many acid particles to few water particles.
Often corrosive



Dilute
Many water particles to few acid particles.
Often irritant



Chemistry – Types of Reaction

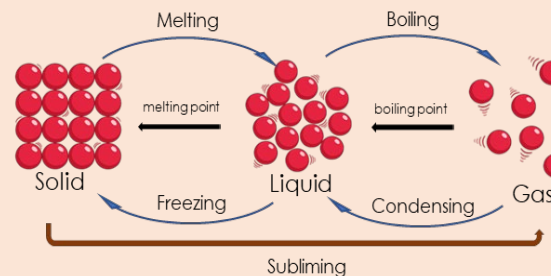


Chemical and Physical Reactions

Physical Changes

In a physical reaction the atoms are simply moved or their pattern is rearranged. They are reversible changes.

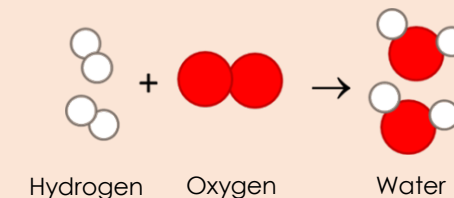
Example:
State changes



Chemical Changes

In a chemical reaction, the bonds between the atoms are broken and the atoms put back together differently. This produces something new. This is not easily reversible.

Example:



Conservation of Mass

CONSERVATION – something is being saved and is not lost

Conservation of Mass

We cannot create mass and we cannot lose mass, so whatever we start with must be there at the end.

This is called Conservation of Mass.

Example:
Iron + Oxygen → Iron oxide
0.52g + 1.14g → 1.66g

Thermal Decomposition

DECOMPOSITION – when something is broken down into smaller pieces

Thermal Decomposition

Thermal decomposition reactions are when a compound is broken down using heat.

You start with a compound and end with 2 or more products.

When a metal carbonate decomposes under heat, it produces a metal oxide and carbon dioxide.

Metal carbonate → Metal oxide + carbon dioxide

Keyword List

- Diet** – the combination of food and drink an organism consumes
- Protein** – a biological molecule which help growth and repair
- Fats** - a biological molecule which is used as an energy store
- Carbohydrates** - a biological molecule used for energy, growth and repair
- Vitamins** – nutrients which help overall health
- Minerals** - nutrients which help overall health
- Fiber** – helps the digestive system
- Digestive system/Digestion** – the process of breaking down food
- Oesophagus** – the organ which carries food to the stomach
- Liver** – organ responsible for break down substances and storing glucose
- Pancreas** – organ responsible to control sugar
- Small intestine** - organ responsible for absorbing nutrients from food
- Skelton** – the basic unit which makes up most living organisms
- Muscle** – cover the skeleton and function to contract and relax
- Ligaments** – connect one bone to another bone
- Femur** – a human thigh bone
- Pelvis** – bone which makes up the hip
- Ulna** – lower arm bone
- Humerus** – upper arm bone
- Rib cage** – bones which protect the heart and lungs
- Tendons** – connect bones to muscle

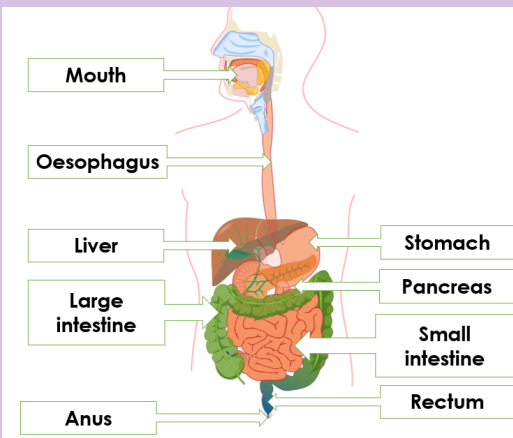
Biology – Digestion



Healthy diet and food groups

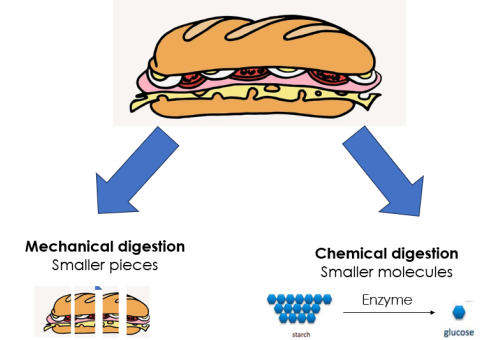


The digestive system



Digestion

Food is broken down (digested) by two actions



Journey of food

Mouth → oesophagus → stomach → small intestine → large intestine → rectum → anus

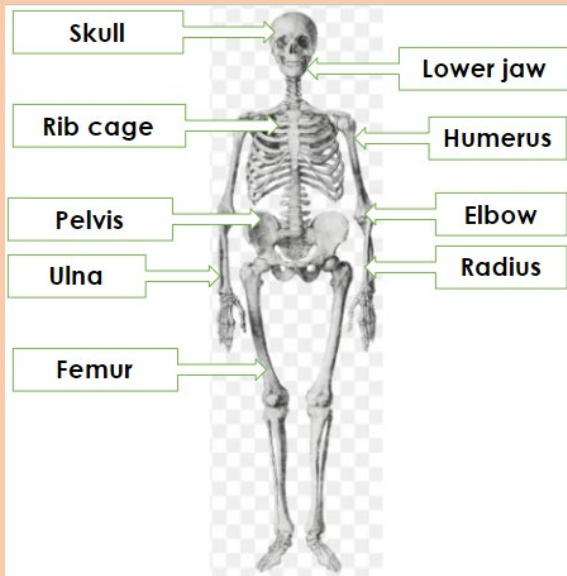
Biology – Movement

The skeleton

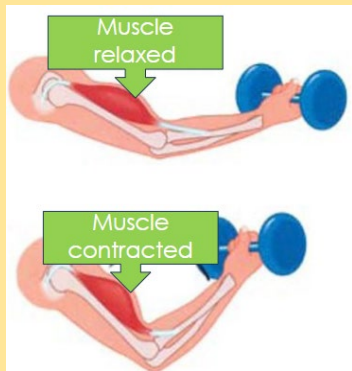
The skeleton has 4 main functions:

- Support
- Protection of the organs
- Movement
- Making blood cells

Where bones meet there are joints such as **hinge joints**, **ball and socket joints** and **fused joints**.

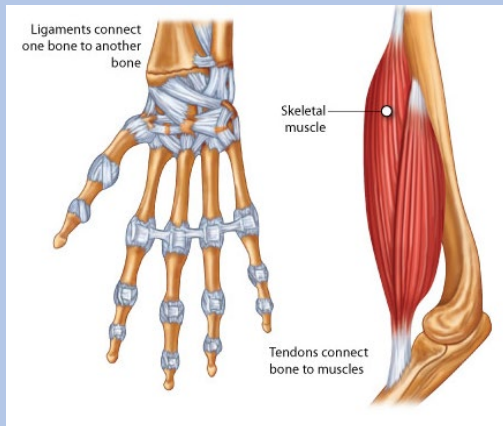


Muscles



Muscles move the bones in the skeleton by contracting and relaxing

Ligaments and tendons



4 R's And Scientific Vocabulary

Revision is a very important part of education and here at Highfields we break it down into the 4 R's:

1. **Revisit** – after a set time, come back to review past content
2. **Reduce** – summarise content learnt into smaller pieces
e.g. mind map, flashcards, abbreviation and acronyms
3. **Rehearse** – practice learning the information
4. **Retrieve** – bringing back and remembering content learnt in the past

Key scientific vocabulary which is important throughout all years of Science and during practical work:

- ✦ **Independent variable** → variable which is purposely changed in an experiment.
- ✦ **Dependent variable** → variable which is measured in an experiment.
- ✦ **Control variable** → variables which are kept the same throughout an experiment.
- ✦ **Reliability** → how trustworthy the result are. We increase this by repeating an experiment.
- ✦ **Accuracy** → how close a result is to its true value.
- ✦ **Validity** → How suited the method used in an experiment is for the purpose.
- ✦ **Average** → adding up the values and dividing the value by how many they are
- ✦ **Anomaly** → an odd result, which does not fit the pattern of results.
- ✦ **Data** → the results from an experiment



4Rs: Rehearse



4Rs: Revisit



4Rs: Reduce



4Rs: Retrieve

