Kettlethorpe HIGH SCHOOL

Year 8

Knowledge Organiser Booklet

Name:

_____

_____

Tutor:

_____

Art
Computing
Dance & Drama
DT
English
Food H&C
Geography
History
MFL
Music
PE
RE
Science
Textiles

THINK PINK!

If you see PINK in your books, make the corrections.

Capital letters

- sentence starts
- proper nouns
- the word 'I'

Commas

- to separate three or more items in a list
- use a pair of commas when you are inserting extra information in the middle of the sentence
- use after an adverbial

Before sunrise, Zac ate his breakfast.

Apostrophes

- to show that a letter or letters are missing: *I'm - haven't - don't*
- to show something belongs to something else: *The parents' meeting lasted an hour.*

1. Have you carefully reread your work?
2. Have you checked to see if you accidentally made any mistakes?
3. Are you proud of your work?

Common mistakes

There refers to a place or idea.

Their shows belonging.

They're is short for 'they are'.

use should have - not 'should of'

use could have - not 'could of'

use would have - not 'would of'

Spelling

- use the dictionary
- make sure to use subject specific vocabulary

APPLY THE RULES. BE CONSISTENT. CHECK FOR ACCURACY.

WWW - Descriptive comment on **what went well**

EBI - Descriptive comment saying your work would be **even better if**

Punctuation

Literacy LASTS...

colon

to introduce extra info

semi colon

to link connected sentences

exclamation mark

You only need one!

ellipsis

to leave a trailing thought...

full stop

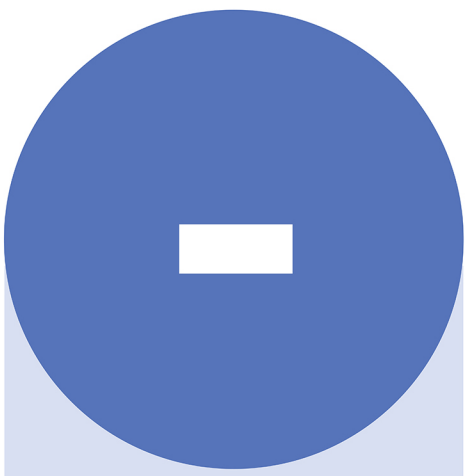
to end a sentence

comma

to add/separate information

brackets

to add extra information



dash

to add/separate information

apostrophe

for omission or possession

direct speech

"Are you listening?"

single quotation marks

to include quotes

question mark

at the end of a question

Do you know your roots?

Literacy LASTS...

-scop-

root meaning '***to see***'

sub-

prefix meaning '***under***'

hypo-

prefix meaning '***below***'

ex-

prefix meaning '***out of***'

con-

prefix meaning '***with***'

-logy

suffix meaning '***study of***'

-graph-

root meaning '***writing***'

-bio-

root meaning '***life***'

-techn-

root meaning '***art /skill***'

micro-

prefix meaning '***small***'

-chron-

root meaning '***time***'

-phon-

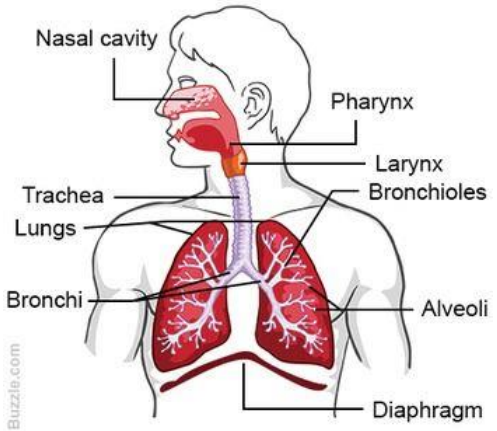
root meaning '***sound***'

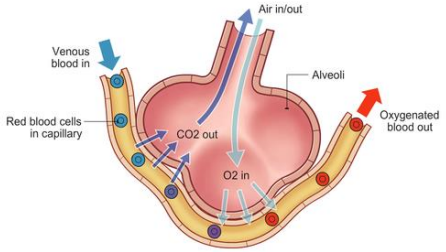
Aerobic respiration

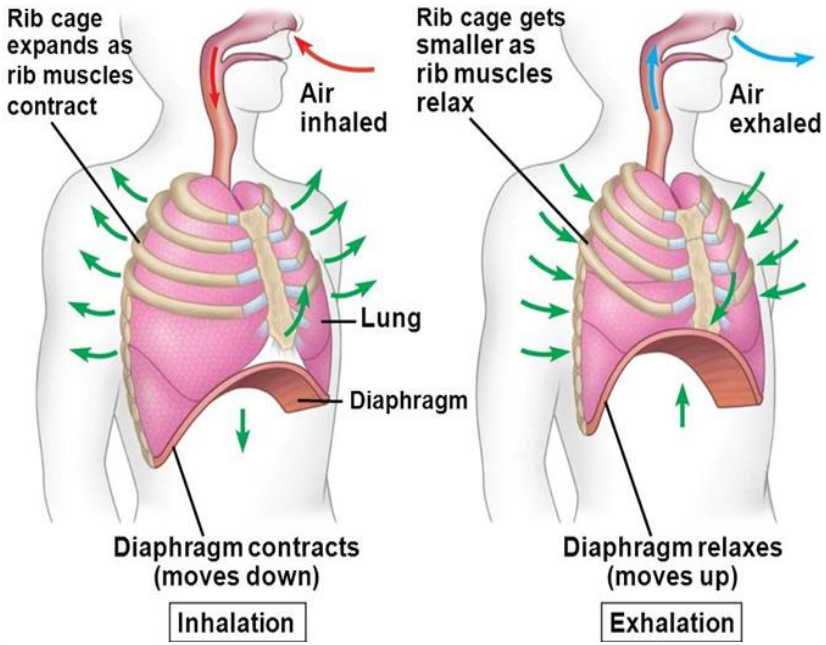
Glucose and oxygen react together in cells to produce carbon dioxide and water and releases energy. The reaction is called **aerobic respiration** because oxygen from the air is needed for it to work. The **mitochondria**, found in the cell cytoplasm, are where most respiration reactions take place.

aerobic respiration

glucose + oxygen ⟶ carbon dioxide + water







Anaerobic respiration

During hard exercise, not enough oxygen can reach your muscle cells. So, aerobic respiration is replaced with **anaerobic respiration**, this type of respiration does not need oxygen.
Anaerobic respiration produces much less energy than aerobic respiration. The waste product, **lactic acid**, builds up in the muscles causing pain and tiredness .

anaerobic respiration in animals

glucose ⟶ lactic acid

Anaerobic respiration happens in plants and microorganisms. Yeast can break down glucose into ethanol and carbon dioxide in a process called **fermentation**. Ethanol is the alcohol found in alcoholic drinks like beer and wine.

anaerobic respiration in plants and microorganisms

glucose ⟶ ethanol + carbon dioxide

The ribs, intercostal muscles (rib muscles) and diaphragm all play important roles in breathing. The table below shows the change that occur during inhalation (and exhalation.

During Inhalation	During Exhalation
-diaphragm contracts	-diaphragm relaxes
-chest expands	-chest contracts
-air flows in	-air flows out
-volume increases	-volume decreases
-pressure decreases	-pressure increases

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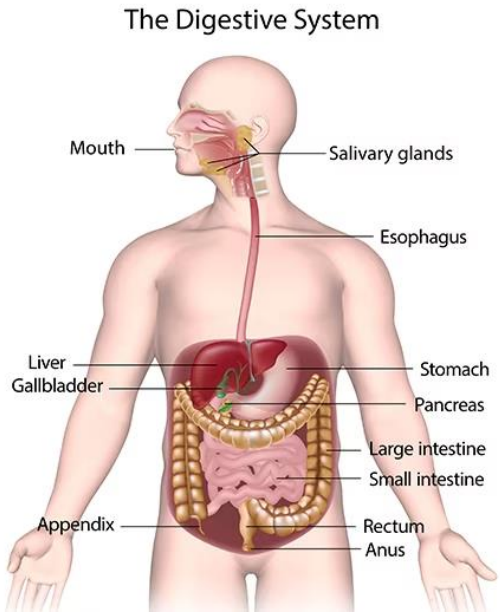
Key Stage 3 SCIENCE

Year 8 (Term 1) | *Breathing & Respiration*

Digestive System

1) The mouth has teeth that mechanically digest food. The saliva contains amylase which breaks down carbohydrates into glucose.
2) The food is pushed down the oesophagus by rings of muscles.
3) Hydrochloric acid in the stomach gives a good environment for enzymes to break food down. The stomach muscles churn the food.
4) Bile is a green liquid that is made by the liver and is released by the gall bladder. It helps digest fats.
5) The pancreas releases enzymes into the small intestine that help digest our food.
4) The small intestine is the longest part of the digestive system. It is made from microscopic villi that help increase the surface area so more nutrients can be absorbed quickly.
5) The large intestine absorbs any remaining water.
6) Any undigested food is stored in the rectum as faeces and leaves the body via the anus.



Food Tests – REQUIRED PRACTICAL

There are some simple chemical tests that can be carried out, to see what food groups are present.

a) **Starch**: if iodine is added to starch, it will turn **blue/black**.

b) **Protein**: if Biuret solution is added to protein, it will turn **purple**.

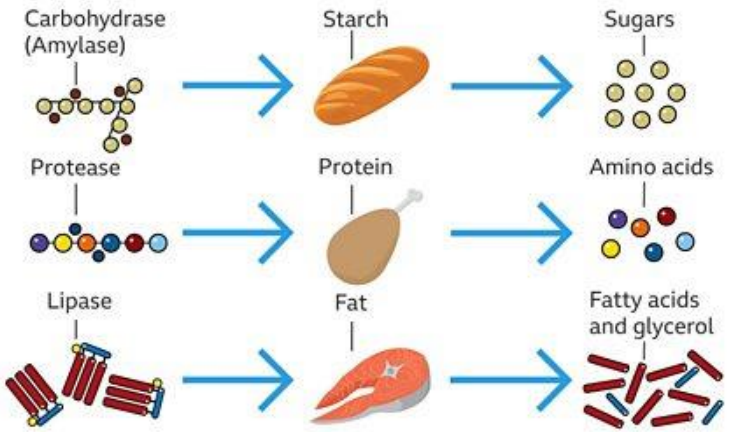
c) **Fat**: to test for fat, mix the food with a small amount of ethanol and distilled water, if a **milky-white** emulsion appears, then fat is present.

d) **Sugar**: If Benedict's solution is added to sugar and heated, it will form an **orange** precipitate.

Drug type	Example	Effect
Stimulants	Caffeine, nicotine	Increased alertness
Sedatives	Alcohol, tranquilisers	CNS slowed
Painkillers	Aspirin, morphine	Suppress pain receptors & neurones in CNS
Hallucinogens	LSD, cannabis	Feeling of enormous energy, hallucinations
Alcohol	Alcoholic drinks	Lowers inhibitions, slowed CNS and reaction times
Solvents	Glue, paint, fuel	Distorted perception, hallucinations

Enzymes

Enzymes are found in digestive juices. They are biological catalysts, which means they speed up digestion without being used up. Carbohydrates, fats, and Proteins each have their own enzyme that breaks them down.



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Key Stage 3 SCIENCE
Year 8 (Term 1) | *Digestion*

Elements, Compounds and Mixtures

Elements are substances made up of only one type of atom. The periodic table contains all the elements that are found in the Universe. (e.g. Gold, Carbon, Iron)

Compounds are two or more elements chemically joined together. e.g. Water- H_2O (where 2 hydrogen atoms are joined to one oxygen atom.

Mixtures are two or more elements not chemically combined and can easily be separated by physical methods. (e.g. Air)

Group 1 (Alkali metals)

Very low densities (most can float)

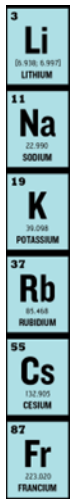
Soft enough to be cut with a knife.

They react violently with water and air.

The outer shell contains only 1 electron.

Their reactivity increases as you go down the family.

They are called 'Alkali' metals because they all react with water to form an alkali solution.



Group 7 (Halogens)

They are diatomic molecules (2 atoms).

They have low melting and boiling points.

Their reactivity decreases going down the group.

All have 7 electrons in their outer shell.

The more reactive halogen displaces the less reactive one.

Word and Symbol Equations

- To represent chemical reactions, we use word and symbol equations.
- These equations always have the **reactants** on the left and **products** on the right.
- Reactants are what we start with and products are what we make.
- E.g

hydrogen + oxygen → water

H_2 + O_2 → H_2O

(reactants) (products)

Group 0 (Noble gases)

Group 0/8 are called the Noble gases

The Noble Gases are very unreactive.

They have a full outer shell (they don't need to lose or gain an electron).

They are all colourless, odourless gases.

They are monoatomic (found as single atoms).

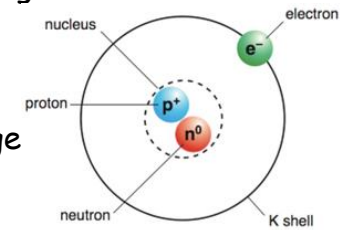
Structure of the Atom

An atom is made up of three subatomic particles: protons, neutrons and electrons.

Protons and neutrons are found in the nucleus of an atom (in the centre)

Electrons are found orbiting the nucleus in shells.

Protons - **positive** charge, electrons - **negative** charge and neutrons - **no charge**.



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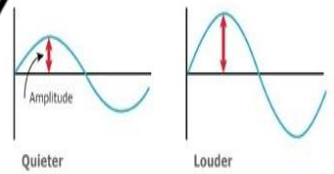
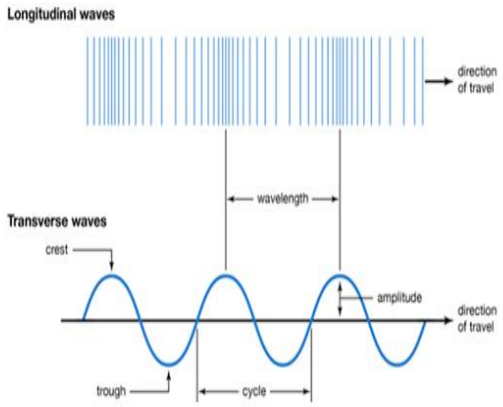
Key Stage 3 SCIENCE

Year 8 (Term 2) | *Elements and the Periodic Table*





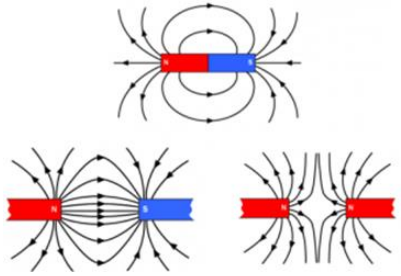
Longitudinal waves – oscillations in parallel to the wave direction, through solids; liquids, and gases. One wavelength is between two consecutive compressions or rarefactions.

Transverse waves – oscilations are at right angles to the wave direction, can travel through matter or as electromagnetism, the amplitude is the height of a peak or the depth of a trough, from rest.

Sound vs electromagnetic waves (eg: sound vs light waves)	
Sound	Light and other EM waves
Needs a medium to travel through.	Does not need a medium to travel through (can cross a vacuum).
Longitudinal wave.	Transverse wave.
Fastest in more dense media.	Slower in more dense media.

Magnetic fields

A bar magnet is an example of a permanent magnet, this means it produces its own magnetic field. Every magnet has two poles, **North and South**. The magnetic field is the strongest at the poles. Iron, Steel, Nickel and Cobalt are all examples of magnetic materials.

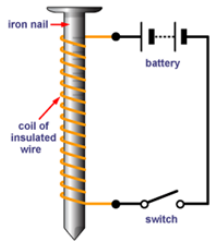


Electromagnets

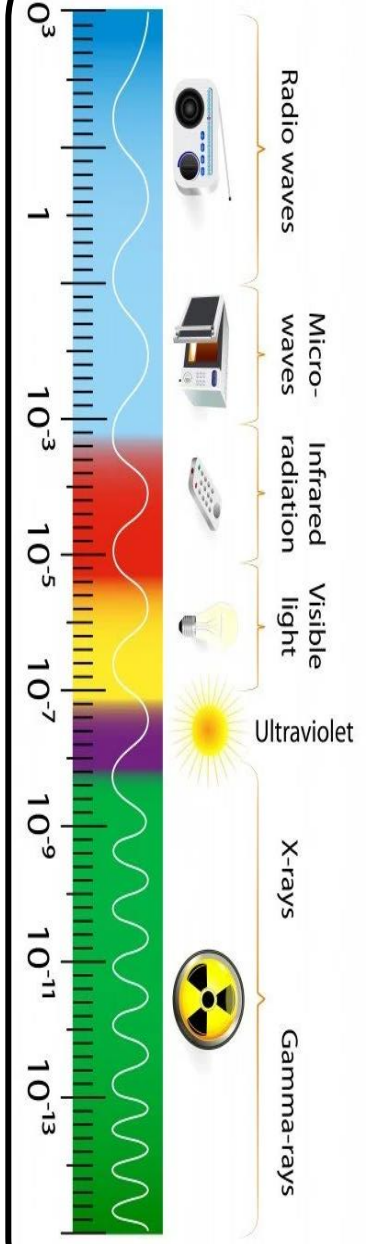
An electromagnet can be made by wrapping a coil of wire around an iron core such as a nail. When a current flows through the wire, the core is magnetised. When the current flow stops, the core is demagnetised. This allows the electromagnet to be switched on and off.

The strength of the electromagnet can be increased by:

- Increasing the voltage.
- Increasing the current.
- Increasing the number of turns of wire.



THE ELECTROMAGNETIC SPECTRUM



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Key Stage 3 SCIENCE

Year 8 (Term 2)| *Magnetism & Waves*

Work done and energy transfer

Work is always done as a result of a force acting on an object.
The amount of work done is easily calculated using the formula:

Work done = **Force** x **distance** (in direction of force)

$$W = F \times s$$

Units
Work done - Joules (J)
Force - Newtons (N)
Distance - metres (m)

Eg. If a force of 1000N makes this car move 200m to the left the work done is:

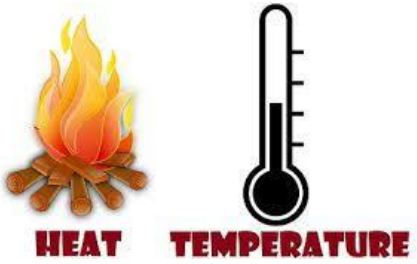
W = 1000 x 200
= 200 000J

4. Heat and Temperature

Temperature measures how hot or cold something is. It is measured in °C.

Heat is a measure of the thermal energy stored in the particles of the object. Energy is measured in joules (J).

You need to be able to explain the difference.

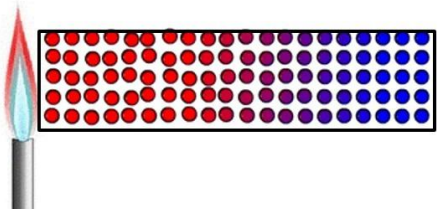


Conduction

This is how heat is transferred through a solid.

The particles in a solid are always vibrating. When an object is heated the particles vibrate more.

Vibrations are passed from particle to particle.



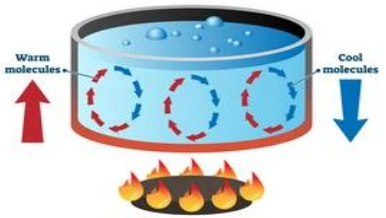
Convection

This is how heat is transferred through liquids and gases.

Warmer liquids and gases are less dense than colder liquids and gases.

Warmer liquids/gases rise. Cooler liquids/gases sink.

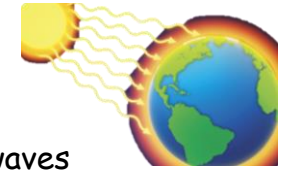
This causes a convection current.



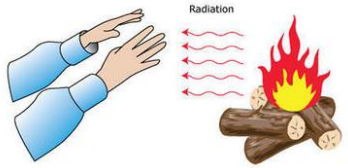
Radiation

This is when heat is transferred as infrared radiation or waves.

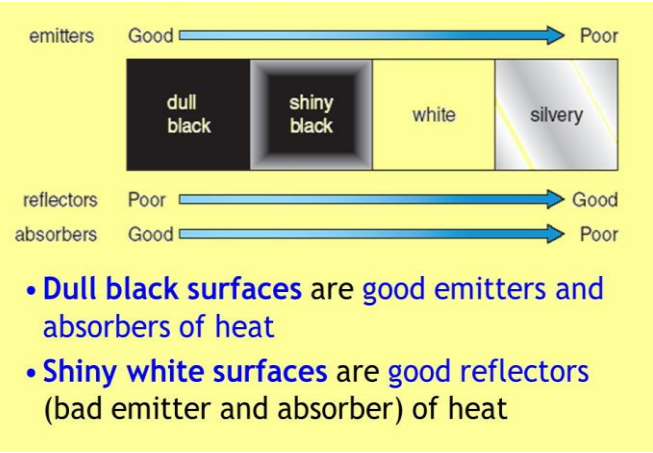
No particles are involved and infrared can pass through a vacuum.



Heat transfers through waves



Absorbers and emitters



- **Dull black surfaces** are good emitters and absorbers of heat
- **Shiny white surfaces** are good reflectors (bad emitter and absorber) of heat

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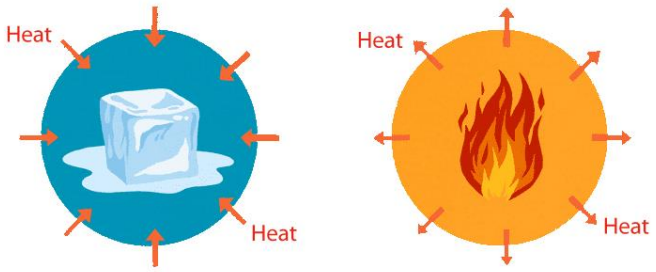
Key Stage 3 SCIENCE

Year 8 (Term 3)| *Energy – Work, Heating and Cooling*

Endothermic vs. Exothermic Reactions

Energy is conserved in chemical reactions. The total energy of the biological system is the same before and after a reaction.



Endothermic

The Endothermic reaction is cooler than surroundings.

Exothermic

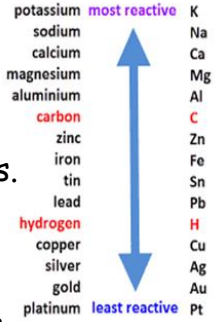
The Exothermic reaction is hotter than surroundings.

The Reactivity Series

The reactivity series is the list of metals placed in order of their reactivity.

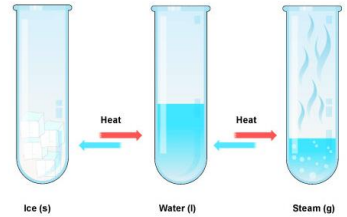
The reactivity series can be used to make predictions about the reactions of metals.

The metals at the top are most reactive (e.g. Potassium) and the metals at the bottom are least reactive (e.g. Gold).

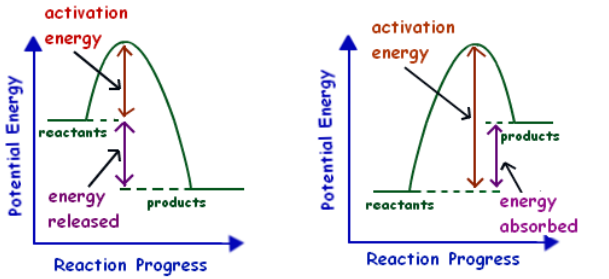


Physical or Chemical change?

A **physical change** means that the physical state changes e.g. When ice melts to produce water or water boils to produce steam.



A **chemical change** always involves a new substance being produced. Chemical changes often involve a change in colour, bubbling or heat being produced.



Exothermic reaction

Endothermic reaction

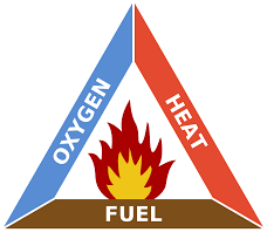
In an **Exothermic** reaction energy is transferred to the surrounding.

In an **Endothermic** reaction energy is taken from the surrounding.

Combustion

Combustion is another name for burning.

The fire triangle shows the 3 things needed for a fire to start and keep going.



If one of the sides of the triangle is removed a fire will not start or will go out.

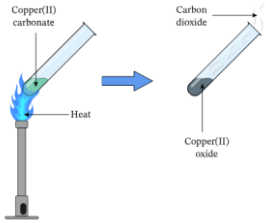
Combustion reactions produce carbon dioxide and water.

e.g. methane + oxygen → carbon dioxide + water

Types of chemical reaction

Thermal decomposition uses heat to break down a substance.

e.g. When copper carbonate is heated, it breaks down to produce copper oxide and carbon dioxide.



Oxidation occurs when an element or compound reacts with oxygen. E.g. Many metals react with oxygen to make metal oxides. For example, magnesium burns rapidly in air:
Magnesium + oxygen → magnesium oxide

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Key Stage 3 SCIENCE

Year 8 (Term 3) | *Chemical Reactions*

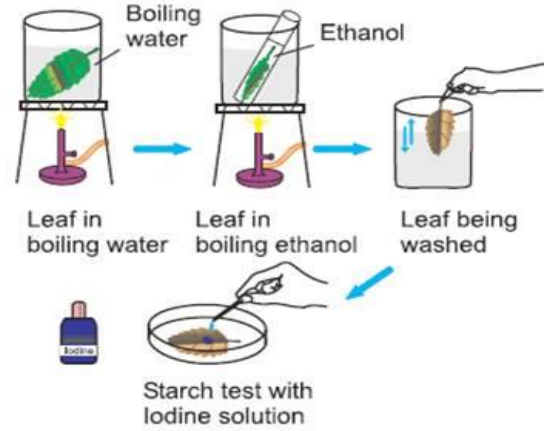
Word equation

Carbon dioxide + Water —(Light, Chlorophyll)→ Glucose + Oxygen

Photosynthesis

- Plants use photosynthesis to make food (glucose) using energy form the **sun**.
- The plant takes in water through the roots and carbon dioxide through the leaves via the stomata.
- Photosynthesis takes place in the **chloroplasts**.
- The glucose made in photosynthesis is stored as **starch**.
- Limiting factors for photosynthesis are light , temperature and CO_2 concentration.

Testing leaves for starch



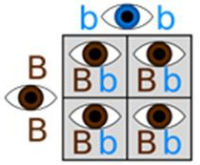
Sexual and Asexual Reproduction

Sexual reproduction	Asexual reproduction
2 parents	1 parent
variation	No variation
Off spring have features of both parents	Offspring are clones of the first parent
Used in the production of offspring	Used in the production of offspring, for growth and replacement cells

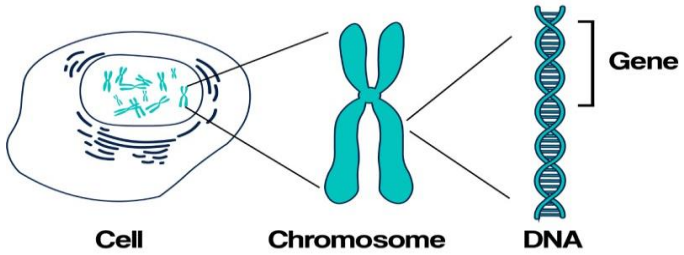
Punnet Square

Dominant alleles are always shown by a capital letter
Recessive alleles are always shown by a lower case letter

Eg – brown eyes dominant (B)
blue eyes recessive (b)

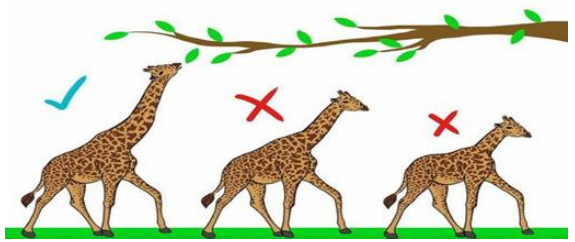


Genotype of offspring 100% Bb
Phenotype of offspring 100% brown eyes



Natural Selection

- Each species shows variation
- There is competition within each other.
- The 'better adapted' of the species are more likely to survive.
- These survivors will pass on their better genes to their offspring.



Endangered and Extinction

- Endangered: A species that is in danger of extinction, but can still be saved.

- Extinct: An animal is extinct if no more of that species is alive in the wild or in captivity.

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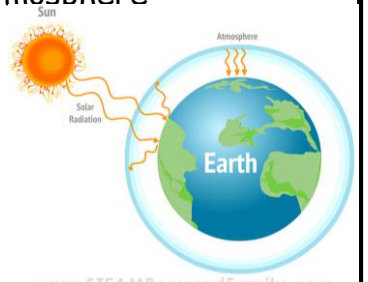
Key Stage 3 SCIENCE

Year 8 (Term 4)| *Photosynthesis and Inheritance*

Global Warming

Global warming is the gradual increase in the average temperature of the atmosphere **caused** due to the increase in concentration of greenhouse gases in the atmosphere

(GREENHOUSE EFFECT).



Effects of global warming: sea levels rising, extreme weathers, drought/famine, destruction of species, floods.

Climate change

Climate change describes a change in the average conditions — such as temperature and rainfall — in a region over a long period of time.

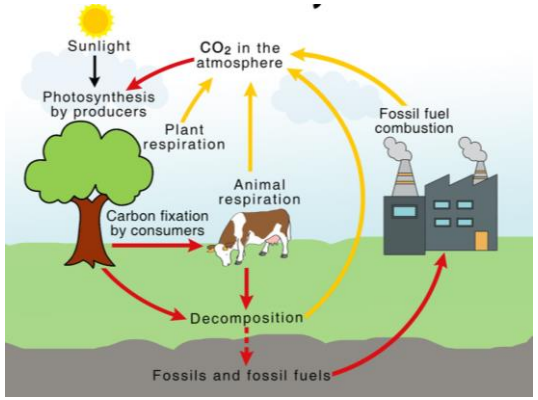
Burning fossil fuels, cutting down forests and farming livestock are the main causes of climate change.

Reduce, Reuse and Recycle

- **Reduce**: Use less.. .buy less... avoid waste ... turn off lights... take shorter showers.
- **Reuse**: Use things more often... use cloth shopping bags... repair...try travel mugs... compost more.
- **Recycle**: Separate waste material so that the recyclable products can be transformed into something new!

Carbon Cycle

The carbon cycle describes how carbon moves between the atmosphere, soils, living creatures, the ocean, and human sources.



Earth's Atmosphere

- Earth is approx. 4.5 billion years old.
- The Earth's molten surface started to cool and form the crust.
- Volcanoes were erupting, and releasing gases (carbon dioxide, methane, ammonia, water vapour).
- The Earth cooled and formed the oceans.
- Green plants and algae evolved, they absorbed carbon dioxide and released oxygen.
- Basic animal life evolved with increasing oxygen levels.

Extracting metals

Most metals are found in the Earth's crust as ores.

Some unreactive metals such as gold are found as the metal itself.

Metals need to be extracted from their ores using two types of reactions.

Burning ores with carbon (reduction)

Electrolysis

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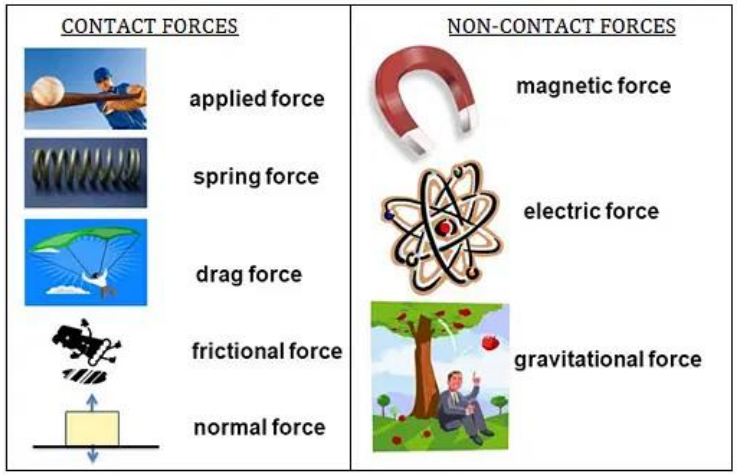
Key Stage 3 SCIENCE

Year 8 (Term 5)| *Climate and Earth resources*

Contact and non-contact forces



Calculating Pressure

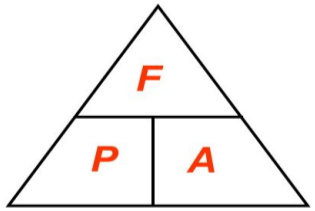
Pressure (Pa)= Force(N) divided by area (m2)

also:

force = pressure x area

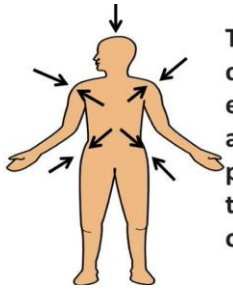
and:

area = force / pressure



Note:
1 Pa is the same as 1 newton per square metre (N/m^2)

Atmospheric Pressure



The pressure inside our bodies is also equal to the atmospheric pressure and cancels the pressure from outside.

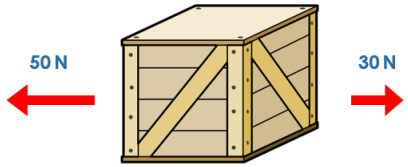
Atmospheric pressure near the ground is higher than pressure higher up.

Therefore, mountaineers often take oxygen tanks with them

Resultant force

There are usually several different forces acting on an object. The overall motion of the object will depend on the size and direction of all the forces.

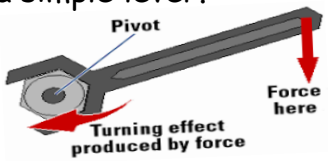
The motion of the object will depend on the **resultant force**. This is calculated by adding all the forces together, taking their direction into accoun+



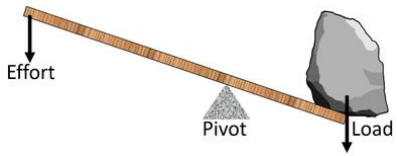
Resultant force on the crate = 50 N – 30 N = **20 N to the left**

Turning Forces (Moments)

A turning force acts a certain distance from a pivot. The turning effect of a force is called a moment. A spanner is a simple lever.

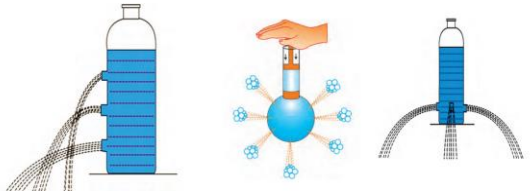


moment (Nm) = force (N) x perpendicular distance from the pivot (m)



Pressure in Liquids (Hydraulics)

Liquids are incompressible; particles are very close and there is very little space between them.
The pressure increases as you go deeper because the weight of the water above also increases.



The pressure in liquids acts in all directions.

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