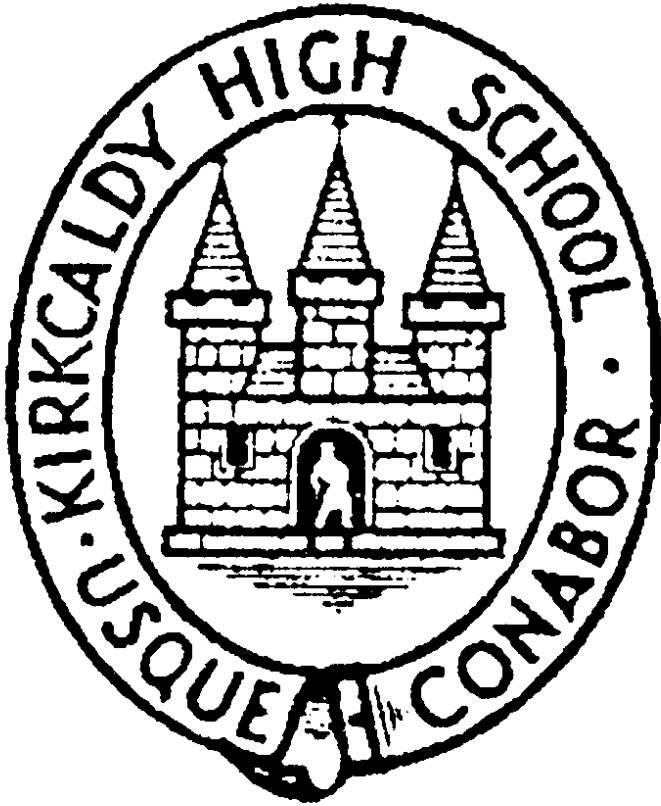


# 2nd Year Science

Homework Booklet



Kirkcaldy High School

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# Introduction

Date Due \_\_\_\_\_

## Nobel Prize

**1. Make a poster about the current Nobel Prize Winner for either Physics, Chemistry or Medicine. Make sure it answers these questions...**

- **Who has been awarded the prize?**
- **Where is this person from?**
- **What work did they do to get the prize?**
- **Why is this work important?**

**Make it bright, bold and colourful with some pictures!**

# Chemicals in Action

Date Due \_\_\_\_\_

## Acids and alkalis in the Home

### 1. Create a poster about acids and alkalis

- What are the differences between them?
- Name one household substance that is acid, one that is alkali and one that is a neutral
- Include two examples of neutralisation

**Make it bright, bold and colourful with some pictures!**

Date Due \_\_\_\_\_

## Acids and Alkalis

1. Complete the table below...

Substance	pH	Acid/alkali/ neutral	Colour in universal indicator
Iron Bru	3	A_____	R_____
Bleach	13	A_____	P_____
Soap	11	A_____	B_____
Salt	7	N_____	G_____
Lemon juice	2	A_____	R_____
Sugar	7	N_____	G_____
Car battery liquid	1	A_____	R_____
Baking soda	8	A_____	B_____
Indigestion tablets	8	A_____	B_____
sherbet	5	A_____	Y_____

**2. Why would you calm a bee sting with baking soda and a wasp sting with vinegar?**

Wasp venom is \_\_\_\_\_ and can be neutralised \_\_\_\_\_ vinegar. Bee venom is acidic \_\_\_\_\_ can be neutralised with baking soda.

**3. Write down three substances other than universal indicator that can be used as acid/alkali indicators.**

**4. Why do we say that “a salt” is produced during a neutralisation reaction and don’t write just “salt”?**

There are many \_\_\_\_\_ types of salts. They are a \_\_\_\_\_ of compounds

## Equations and naming Salts

1. Complete the chemical equations (the first one has been done for you). Use a separate sheet if you can't fit them on!

An acid and an alkali were added together to make a salt and water

Acid + alkali  $\rightarrow$  a salt + water

Hydrogen and oxygen react together to make water

H \_\_\_\_\_ + O \_\_\_\_\_  $\rightarrow$  W \_\_\_\_\_

Copper and acid react together to make water, a salt and hydrogen

C \_\_\_\_\_ + A \_\_\_\_\_  $\rightarrow$  W \_\_\_\_\_ + S \_\_\_\_\_ + H \_\_\_\_\_

Methane reacts with oxygen to make water and carbon dioxide

M \_\_\_\_\_ + O \_\_\_\_\_  $\rightarrow$  W \_\_\_\_\_ + C \_\_\_\_\_ D \_\_\_\_\_

Hydrogen reacts with nitrogen to make Ammonia.

H \_\_\_\_\_ + N \_\_\_\_\_  $\rightarrow$  A \_\_\_\_\_



## 2. Complete the table...

Acid	Alkali	Salt
Sodium hydroxide	Hydrochloric acid	Sodium chloride
Sodium hydroxide	Nitric acid	Sodium nitrate
Potassium hydroxide	Hydrochloric acid	P _____
Potassium hydroxide	Nitric acid	C _____
Calcium hydroxide	N _____ a _____	Calcium Nitrate
P _____ h _____	Hydrochloric acid	Platinum chloride
Tungsten hydroxide	N _____ a _____	Tungsten nitrate
C _____ h _____	H _____ a _____	Copper chloride

Date Due \_\_\_\_\_

## Metals

1. Write down a use of metals where they need to have each of these properties...

**Bendy** \_\_\_\_\_  
\_\_\_\_\_

**Strong** \_\_\_\_\_  
\_\_\_\_\_

**Shiny** \_\_\_\_\_  
\_\_\_\_\_

**Conductors of Electricity** \_\_\_\_\_  
\_\_\_\_\_

**Conductors of Heat** \_\_\_\_\_  
\_\_\_\_\_

**Dense/Heavy** \_\_\_\_\_  
\_\_\_\_\_

**Hard** \_\_\_\_\_  
\_\_\_\_\_

2. Write down three things that you might expect to see during a chemical reaction.

During a \_\_\_\_\_ reaction I might expect to \_\_\_\_\_  
fizzing (a gas produced), a \_\_\_\_\_ change or a solid  
formed.

3. Put these metals in order from most to least reactive:  
calcium, magnesium, sodium, potassium, copper, lithium  
zinc, rubidium, caesium, iron.

C \_\_\_\_\_, R \_\_\_\_\_, P \_\_\_\_\_,  
S \_\_\_\_\_, L \_\_\_\_\_, C \_\_\_\_\_,  
M \_\_\_\_\_, Z \_\_\_\_\_, I \_\_\_\_\_, C \_\_\_\_\_.

3. Describe an experiment you might do to find out the  
answer to question 3..

I would add \_\_\_\_\_ metal to water or to an acid \_\_\_\_\_  
write down my observations. .

# Summary

## Acids and Alkalis

- You can tell the difference between acids and alkalis using an **indicator** such as **universal indicator**
- **Acids** turn universal indicator **red, orange or yellow**, **alkalis** turn it **blue or purple** and **neutral** solutions turn it **green**.
- We can say how **acidic or alkaline** something is by giving it a number called the **pH** (small “p”, capital “H”).
- **Acids** have a pH of **6 or less** (even negative!), **alkalis** have a pH of **8 or more** and **neutral** solutions have a pH of **7**.
- When you “**cancel out**” an acid with an alkali (or the other way round) it is called “**neutralisation**”
- The products of a neutralisation reaction are a salt plus water.
- You can name a salt using the first part of the alkali name and the acid name.
  - *e.g.* sodium hydroxide + hydrochloric acid → sodium chloride
- Everyday examples of neutralisation are...
  - Farmers treating acid soil with lime (calcium carbonate)
  - Neutralising bee stings with baking soda
  - Talking indigestion tablets to increase the pH of stomach acid

## Chemical Reactions

- Chemical reactions often fizz (produce gas), go cloudy (produce a solid) or change colour.
- In a chemical reaction, a new substance is always formed.
- A chemical reaction can be **written** with the **reactants** (things you start with) on the **left** and the **products** (things you end up with) on the **right** with an **arrow** pointing between them.
  - *e.g.* hydrogen + oxygen → hydrogen oxide

## Metals

- A **property** of something is the way it **behaves**
- The properties of most metals is that they are strong, hard, shiny, malleable (bendy) and ductile (stretchable)
- When a **metal** reacts with **water or acid**, **hydrogen gas** is produced
- An order of reactivity of metals from most to least reactive is
  - Caesium, Rubidium, Potassium, Sodium, Lithium, Magnesium, Calcium, Zinc, Iron, Copper
- An ore is a rock that contains a metal.
- You can **extract** (remove) some **metals from ores** by **heating** them.
- You can extract (remove) some metals from ores by heating them with carbon.
- You can **extract** (remove) some **metals from ores** by **using electricity** (electrolysis).
- **Iron** is removed from iron ore in a **blast furnace**.

## Traffic Lights

How can we tell the difference between acid, alkali and neutral solutions?	<input type="radio"/>
What are the pH ranges (numbers) for acid, alkali and neutral solutions?	<input type="radio"/>
Which household chemicals are acids, which are alkalis and which are neutral?	<input type="radio"/>
What happens to the pH of an acid when you add an alkali?	<input type="radio"/>
How can you recover the salt from a neutralised solution?	<input type="radio"/>
Where do you encounter neutralisation in everyday life?	<input type="radio"/>
How can we recognise a chemical reaction?	<input type="radio"/>
What happens in a chemical reaction?	<input type="radio"/>
How can we write down a chemical reaction?	<input type="radio"/>
Of the metals Lithium, sodium, potassium, caesium, rubidium, copper, iron, zinc and magnesium, what is their order from most to least reactive?	<input type="radio"/>
What is produced when a metal reacts with water?	<input type="radio"/>
What is produced when a metal reacts with acid?	<input type="radio"/>
Why is iron used for bridges, copper used for wires and gold used for jewellery?	<input type="radio"/>
What is an ore?	<input type="radio"/>
How can we remove a metal from an ore?	<input type="radio"/>
How is iron removed from iron ore?	<input type="radio"/>

# Microbiology

Date Due \_\_\_\_\_

## Diseases

### 1. Create a poster about three diseases

- What is the name of each disease?
- What type of microbe is each disease (bacteria, virus or fungus)?
- What are the symptoms of each disease
- How can the disease be treated/cured?

**Make it bright, bold and colourful with some pictures!**

Date Due \_\_\_\_\_

## Microbes

1. Complete the table below...

Name of microbe	Example
	AIDS, Flu, chicken pox
Bacteria	
	Yeast, mushrooms, mould

2. How do bacteria reproduce?

Bacteria \_\_\_\_\_ by dividing in two. This is \_\_\_\_\_ multiplication.



### 3. How do viruses reproduce?

Viruses reproduce by \_\_\_\_\_ their DNA into living cells. This \_\_\_\_\_ the cell create copies \_\_\_\_ the virus.

### 4. How does yeast make bread rise?

Yeast feeds on the carbohydrates \_\_\_\_ the flour and produces bubbles of \_\_\_\_\_ dioxide gas. This makes the bread \_\_\_\_\_.

Date Due \_\_\_\_\_

## Uses of Microbes

1. Complete the table below...

Type of microbe	Use
	Bread making
	Yoghurt making
	Rubbish decomposition
	Sewage decomposition
	Cheese making
	Wine and Beer making

**2. Write down three diseases/conditions that are caused by microbes and three that are not.**

Three diseases/conditions that are caused by microbes are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.

Three diseases/conditions that are not caused by microbes are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.

**3. Write down three ways that microbes can be passed from one person to another.**

Three ways that microbes can be passed from one person to another are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.

# Summary

## Types of Micro-organisms

Micro-organisms (microbes) are **tiny creatures** that are individually **too small to be seen** without the help of a microscope. The **three main types** of micro-organisms are **bacteria, fungi** and **viruses**.

## Bacteria and Viruses

Bacteria reproduce by multiplication. They can double in their numbers every 20 minutes. A group of bacteria on a petri dish is called a community or colony. Viruses cannot be seen under any normal light microscope because they are the smallest of the micro-organisms.

## Fungi

Fungi prefer **damp** and **warm** conditions. A fungus called yeast can be used to produce alcohol and bread in a process called fermentation.

## Diseases

Our bodies have many ways of stopping microbes from entering, our **biggest barrier** against infection is our **skin**. If we do get ill our immune systems are able to kill off the bacteria or virus. We have **special cells** which help get rid of bacteria and viruses called **white blood cells**.

## Decomposition

**Fungi and bacteria** feed on many different substances. They do this to get energy. In this process the food is broken down, this is also known as **decomposition**. Through the process of decomposition organic waste can be recycled to produce **fertiliser**.

## Biological Weapons

Sadly, biological agents can be used in **warfare**. The three main groups of biological agents are **toxins, bacteria** and **viruses**. An example of a bacteria used in bioterrorism is **anthrax**.

## Traffic Lights

What is a micro organism?	<input type="radio"/>
What are the three types of micro organism??	<input type="radio"/>
How do bacteria reproduce?	<input type="radio"/>
Why can we not see viruses under a microscope?	<input type="radio"/>
What examples of fungi do you know?	<input type="radio"/>
What foods/drinks do we need yeast to make?	<input type="radio"/>
What conditions does mould prefer?	<input type="radio"/>
What is a colony?	<input type="radio"/>
What do we call a microbe that causes disease?	<input type="radio"/>
Which diseases are caused by microbes?	<input type="radio"/>
How are diseases caused by microbes spread?	<input type="radio"/>
How do our bodies protect us from microbes?	<input type="radio"/>
How do the cells in our bodies protect us from microbes?	<input type="radio"/>

# Forces

Date Due \_\_\_\_\_

## Space rocket

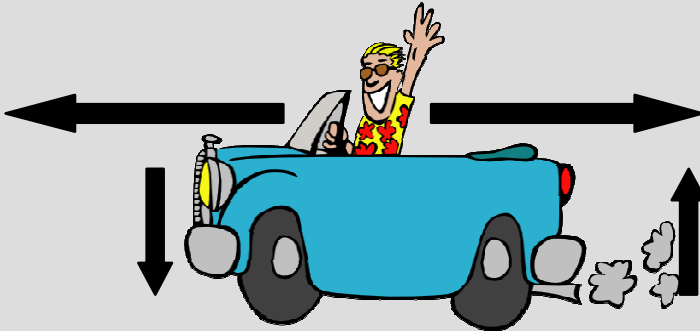
**1. Create a poster showing the rocket you would take into space**

- **What shape would you use and why?**
- **How you would fuel it and why?**
- **What would the forces be as it's taking off?**
- **Where you would fly it to and why?**

**Make it bright, bold and colourful with some pictures!**

## Forces and Movement

1. Label the arrows to show where each force on the car comes from.



2. Why would the overall force on the car be 20 N if the forward force from the engine is 30 N and the backwards friction force is 10 N?

Because...

Overall force =  $\underline{\quad}$  -  $\underline{\quad}$  =  $\underline{\quad}$  N

**2. Describe how the brakes on a bike use friction to slow the bike down.**

The brakes \_\_\_\_\_ the friction on the wheels and slow the bike down.

*(use “increase” or “decrease”)*

**3. In 1912 the “Titanic” sunk. What does this tell us about the sizes of the force due to gravity and the buoyancy force acting on the “Titanic”?**

The \_\_\_\_\_ force was bigger than the force due to \_\_\_\_\_ so the ship was \_\_\_\_\_ down.

*(use the words “pulled”, “gravity” and “buoyancy”)*

**4. When people come to Dr. Murray’s house for dinner, those who wear stiletto heels always make a mark on the wooden floor but the people with normal heels don’t. Why is this?**

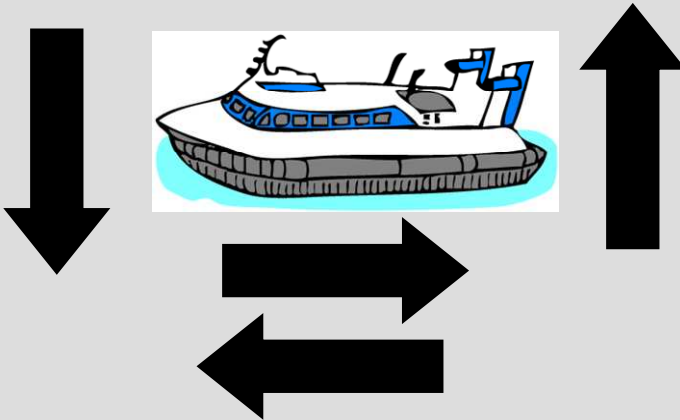
People in stiletto heels put more \_\_\_\_\_ on the wood. This leaves a \_\_\_\_\_ on it.

*(use the words “pressure” and “mark”)*



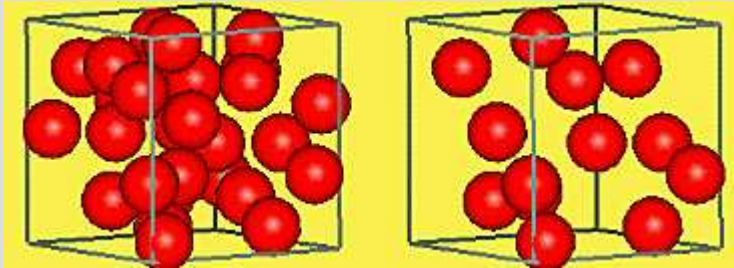
## Friction, density and levers

1. Describe using a force diagram how a hovercraft combats friction.



A hovercraft \_\_\_\_\_ air down. This \_\_\_\_\_ an upward force and reduces \_\_\_\_\_ friction between the hovercraft and the \_\_\_\_\_. It uses a fan to \_\_\_\_\_ itself forward. There is a \_\_\_\_\_ due to air friction pushing it backwards.

2. Look at the picture below. Box B is less dense than box a. Why?



A

B

Box B has fewer \_\_\_\_\_ than box A so it \_\_\_\_\_ a higher mass. Both boxes have \_\_\_\_\_ same volume so box B \_\_\_\_\_ less dense than box A.

3. If box B has the same density as water. Why would we expect box A to sink in water and box B to float?

If an object is denser \_\_\_\_\_ water then it will sink. Box A \_\_\_\_\_ be denser than water so \_\_\_\_\_ will not float.

# Summary

## Force diagrams

We can **represent forces** on a diagram using **force arrows**. The force arrows point in the **direction that the force is pushing or pulling**.

## Weight and Mass

The **mass** of something is the **quantity of matter** in it. The **weight** on something is the **force due to gravity** pulling on it. On earth, we can **calculate the weight** of something in Newtons by **multiplying** the mass in kilograms **by 10**.

Weight on the earth (N) = mass (kg) x 10

## Balanced Forces

If the **forces** on an object are **balanced** (pulling equally in opposite directions) then the object will either **not move** or continue in the **same direction at the same speed**. If the forces are **unbalanced** then the object will **accelerate** in the direction of the larger force

## Pressure

A **small force** on a **large area** will exert a **low pressure**. A **large force** on a **small area** will exert a **higher pressure**. The **pressure** in Pascals is equal to the **force** in newtons **divided by** the **area** in square meters.

Pressure = Force ÷ area

## Friction

A **friction** force can be due to a **surface, air, water or even syrup** (if an object is floating in syrup). The **friction** force always **opposes** the **direction the object is trying to move**. You can **change** the **size** of the force due to friction by changing the **surface**, changing the **liquid** an object is floating in or changing the **shape** of the object.

## **Buoyancy**

Objects floating on or in **water** have an **upward** force on them called **buoyancy**. If the force due to **gravity** is **larger** than the force due to **buoyancy** then the object will **rise** until it reaches the surface.

## **Levers**

To **reduce the force** needed to **lift** something you can use a **lever**. The **longer** the lever (*i.e.* the further from the pivot that you push), the **lower** the **force** needed to lift the object.

# Traffic Lights

How do we represent forces on a diagram?	<input type="radio"/>
How would you describe the force due to gravity?	<input type="radio"/>
What is the difference between weight and mass?	<input type="radio"/>
How can we convert between mass in kilograms and weight on the earth in Newtons?	<input type="radio"/>
What happens when the forces on an object are balanced?	<input type="radio"/>
What happens when the forces on an object are unbalanced?	<input type="radio"/>
What difference do force and area make to pressure?	<input type="radio"/>
What is the size of the pressure if there is a large force on a small area compared to a small force on a large area?	<input type="radio"/>
How can we calculate the pressure if we know the force and the area?	<input type="radio"/>
What is friction?	<input type="radio"/>
How can we change the size of a force due to friction?	<input type="radio"/>
What effect does the shape of an object have on the size are friction (or water friction, or syrup friction)?	<input type="radio"/>
Why does a boat float on water?	<input type="radio"/>
What difference does the length of a lever make to the force needed to lift an object?	<input type="radio"/>

# C.S.I

Date Due \_\_\_\_\_

## Forensic Science

**1. Create a poster about three science techniques that can be used to solve crimes.**

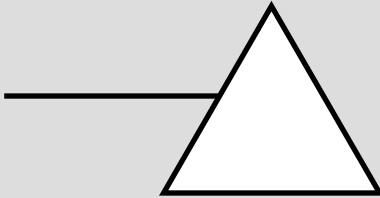
- **How do they work?**
- **How are they used?**
- **Find a famous case where each technique has been used**

**Make it bright, bold and colourful with some pictures!**

Date Due \_\_\_\_\_

## Light

1. Complete the diagram to show what happens to light when it passes through a prism.



2. The three “primary” colours of light are red, green and blue. Complete the sentences below to show which colours are created when the colours mix

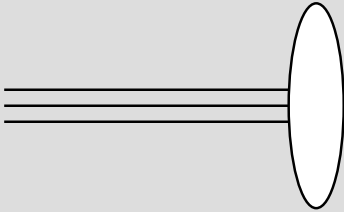
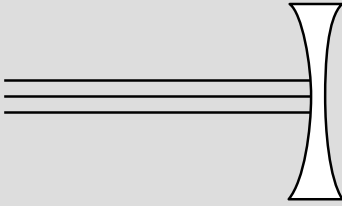
Red light and blue light mix to give \_\_\_\_\_ light.

\_\_\_\_\_ light and green light mix to give yellow light.

Blue light and green light mix to give \_\_\_\_\_ light.

Red, green and blue light mix to give \_\_\_\_\_ light.

3. Complete the diagrams below to show the path of the light when it leaves the lenses.



Label the diagrams with “*concave lens*” and “*convex lens*”.

4. RESEARCH ONLINE: what is the difference between “reflection” and “refraction”?

Reflection happens \_\_\_\_\_ light \_\_\_\_\_ off an object. Refraction happens when light \_\_\_\_\_ through an object. When the \_\_\_\_\_ passes through an object it \_\_\_\_\_ and slows down.



## Starch, Glucose and DNA

1. Foods that contain starch turn iodine from blue to black. Foods that contain glucose turn Benedict's Solution from clear blue to cloudy orange. Complete the table.

Food	Contains Starch or glucose?	Turns iodine solution black?	Turns Benedict's solution cloudy orange?
Potato	Starch only	Yes	no
Jelly	Glucose only		Yes
Rice	Starch only	Yes	
Lucozade	Glucose only		Yes
Bread	Starch only	No	
Oranges	Glucose only		
Beans	Starch and glucose		

**2. What is DNA and how could DNA evidence be used to solve a crime?**

DNA is a molecule that \_\_\_\_\_ all the information needed to \_\_\_\_\_ a living thing. It is unique to \_\_\_\_\_ living thing. DNA from a crime \_\_\_\_\_ can be compared to DNA \_\_\_\_\_ a suspect. That way, we could \_\_\_\_\_ out if a suspect had \_\_\_\_\_ to the crime scene.

**3. Do you think it is right to keep a “library” of the DNA of every human? Why/why not?**

**I think is is/is not right to keep a DNA library because**

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# Earth and Space

Date Due \_\_\_\_\_

## Planetary Holiday

**1. Choose a planet and design a poster to advertise holidays on your planet**

- **What is there to see/do?**
- **How long does it take to travel there?**
- **What would you see on the way?**
- **What's the atmosphere like?**

**Make it bright, bold and colourful with some pictures!**

Date Due \_\_\_\_\_

## Homework – Space and the Earth

1. Thinking about the earth, the moon and the sun, write down what gives us...

a) Days

The \_\_\_\_\_ it takes for the \_\_\_\_\_ to spin \_\_\_\_\_ once.

b) Months

The \_\_\_\_\_ it takes for the \_\_\_\_\_ to orbit once around the \_\_\_\_\_.

c) Years

The \_\_\_\_\_ it takes for the \_\_\_\_\_ to orbit once around the \_\_\_\_\_.

e) Seasons

The \_\_\_\_\_ angles that the \_\_\_\_\_ from the sun hit different parts of the \_\_\_\_\_.

**2. Dr. Murray's sister is exactly 28 years old. Using Dr. Murray's "light speed" spaceship, she travels to Proxima Centuri (4 light years from earth), spends 6 months shopping and sightseeing before returning to earth. How old is she when she returns?**

**(y= years, m = months)**

**Total time = \_\_\_ years + 0.5 years + \_\_\_ years**

**Total time = \_\_\_ years = \_\_\_ years and \_\_\_ months**

**3. What is...**

**a) A star?**

**A giant ball of \_\_\_\_\_ giving out energy through a nuclear \_\_\_\_\_.**

**b) A comet?**

**A body made of \_\_\_\_\_ which orbits a star.**

## Space and the Earth

1. Describe fully an experiment you would do to find out which metal is in an ore.

I would \_\_\_\_\_ the ore in a flame and find out \_\_\_\_\_ colour it turned the flame. The colour would \_\_\_\_\_ me which metal is in the ore.

2. What are the three things would you need to survive in space and how would you get these things?

I think I would need \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_  
\_\_\_\_\_. I would get these things by \_\_\_\_\_

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**3. Where do fuels come from?**

Most \_\_\_\_\_ come from crude oil. Crude \_\_\_\_\_ is the remains of prehistoric \_\_\_\_\_ and animals and is found \_\_\_\_\_ the sea or under ground.

**4. Why is our use of fuels causing Global Warming?**

When we \_\_\_\_\_ fuels we make carbon dioxide. This \_\_\_\_\_ heat and makes the earth \_\_\_\_\_.

**5. What do you think is the most important thing to have happened in the history of space exploration? Why?**

I think \_\_\_\_\_

\_\_\_\_\_ because  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Casualty

Date Due \_\_\_\_\_

## The Human Body

### 1. Create a user manual for the Human Body

- Choose three body parts
- What is each body part for?
- What can happen when each part malfunctions?
- How can a malfunction be sorted?
- How can we take care of each body part?

**Make it bright, bold and colourful with some pictures!**



Date Due \_\_\_\_\_

## Casualty

1. Complete the Table below with three bone names for each function.

Function	Bone names (x3)
Movement	
Support	
Protection	

## 2. Why do we breath?

Our \_\_\_\_\_ need oxygen to produce energy. When we \_\_\_\_\_, our bodies take in oxygen and \_\_\_\_\_ it with the food we \_\_\_\_\_. This produces energy.

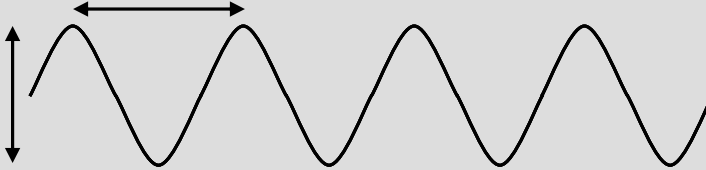
## 3. Complete the table for the parts of the heart

Function	What it is for
Right atrium	
Left ventricle	
Coronary artery	

Date Due \_\_\_\_\_

## Sound and Light

1. Mark on this wave “wavelength (m)” and “amplitude (Db)”.



Delete as appropriate

Changing the wavelength changes the pitch/volume of the wave.

Changing the amplitude changes the pitch/volume of the wave.

2. What is frequency?

Frequency is the \_\_\_\_\_ of waves \_\_\_\_\_ in one second.

3. How does a tuning fork produce sound?

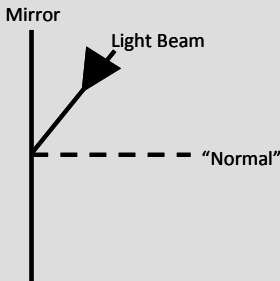
The tuning fork \_\_\_\_\_ when you hit it. This makes the air \_\_\_\_\_ around the fork vibrate and your \_\_\_\_\_ “hears” the vibration.

**4. RESEARCH ONLINE: what is the difference between “reflection” and “refraction”?**

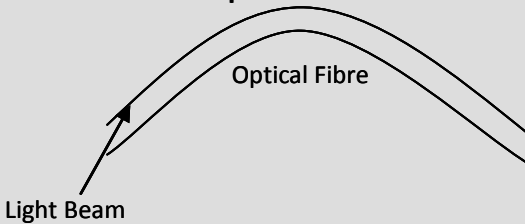
Reflection happens \_\_\_\_\_ light \_\_\_\_\_ off an object. Refraction happens when light \_\_\_\_\_ through an object. When the \_\_\_\_\_ passes through an object it \_\_\_\_\_ and slows down.

**3. Complete the diagrams below to show the path of the light when it...**

**Reflects from a mirror**



**Travels down an optical fibre**



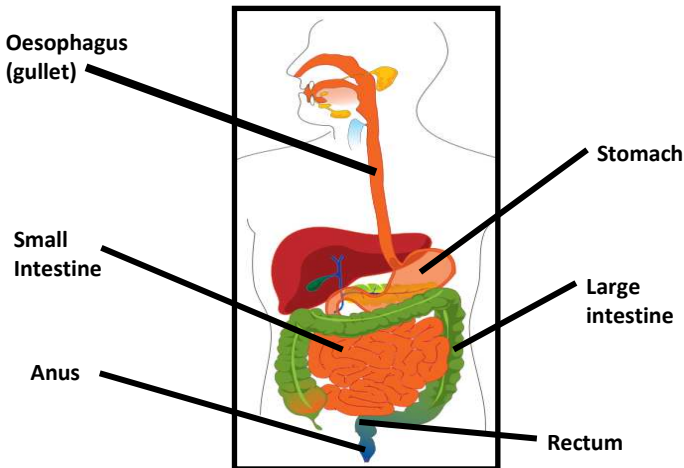
# Summary

## Systems and organs

The body has many **organs**. Organs work together as a **system** to perform a **function**.

System	Function
Digestive System	To break down food.
Respiratory system	To produce energy.
Circulatory system	To transport substances around the body.
Skeleton	Protection, movement and support.
Endocrine system	To control the functions of the body
Reproductive system	To produce offspring.
Urinary system	To expel liquid waste

## The digestive system



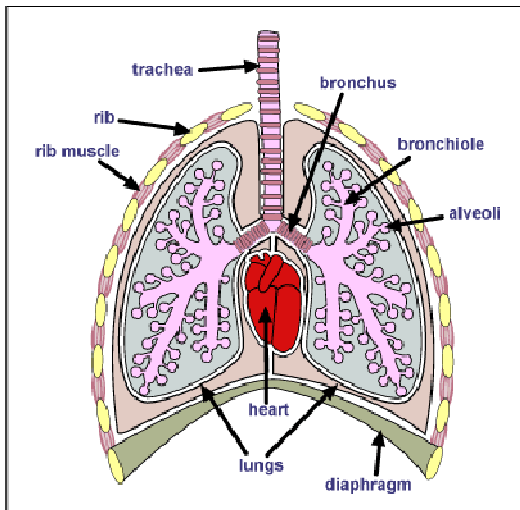
The **mouth breaks down** food. The **oesophagus transports** food to the stomach. The **stomach releases enzymes** to break down the food more. The **useful parts** of the food are **absorbed** by the **small and large intestine**. The **waste is stored** in the **rectum** and **excreted** through the **anus**.

For a **healthy diet**, our bodies need **carbohydrates** (bread, pasta etc.), **proteins** (meat, fish etc.), vitamins (fruit, vegetables) and a small amount of **fat** (fats, oils). The **most important carbohydrates** are **starch and glucose**. A starch molecule is many glucose molecules joined together. **Starch** turns **iodine solution** from **orange to blue/black**. **Glucose** turns **Benedict's solution** from **clear blue to a cloudy orange** when heated.

## The Respiratory System

**Respiration** is the process where the body reacts **food with oxygen** and **produces energy**. The **waste products** of this process are **carbon dioxide and water**.

Food + Oxygen → Carbon Dioxide + Water



The nose is **connected to the lungs** by the **trachea**. Air travels through the **bronchus** and **bronchioles**. The **oxygen** in the air is **reacted with food** in the **alveoli**.

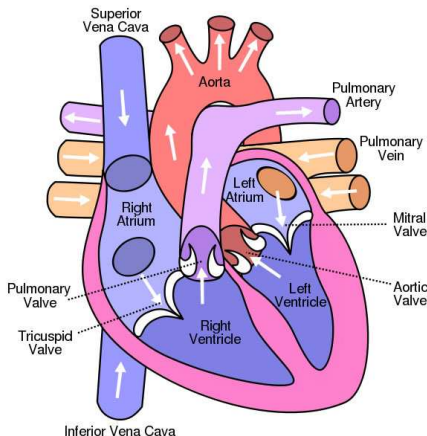
We **breath out** because the **diaphragm** moves up **squashes the lungs** and forces air out. We **breath in** when the **diaphragm moves down**. When we **exercise** we need more energy so our **breathing quickens**.

## The Circulatory System

**Blood carries oxygen** around the body. It is **pumped by the heart**. The heart is split into two halves. The **right side** (as the person is facing you)

pumps blood to the **lungs**. The **left side** pumps blood to the **rest of the body**. The left side is bigger than the right side as it has to work harder. There are three types of blood vessels:

Vessel	Function	Blood colour
Arteries	Carries blood away from the heart.	Bright red (has oxygen)
Veins	Carries blood towards the heart.	Purple (no oxygen)
Capillaries	Carries blood to muscles and organs.	Bright red (has oxygen)



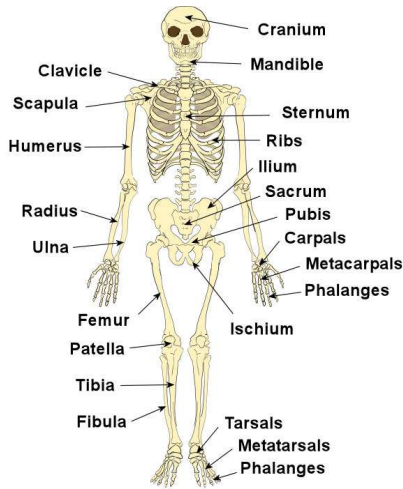
Blood has **red blood cells** to **carry oxygen**, **white blood cells** to **fight infection**, **platelets** to **heal wounds** and **plasma** that **allows the blood to flow**.

### The Endocrine System,

Chemicals called **hormones** tell our bodies **what to do**. Our hormones tell us what to do when it is **too cold**, **too hot** or even **when to grow!**

### The Skeleton

The skeleton is for **protection**, **support** and **movement**. Red blood cells are produced by the marrow in our bones.



## Parts of the Ear

- **Cochlea** –converts the **sound** vibrations into an electrical signal.
- **Eardrum** - a thin membrane that **vibrates when sound waves** reach it.
- **Eustachian tube** - it **equalizes the pressure** between the middle ear and the air outside.
- **Hammer, anvil and stirrup** – the bones that **bang together** when you hear..
- **Pinna** - **collects sound** and directs it into the outer ear canal
- **Semicircular canals** - help us maintain our sense of **balance**.

## Sound and Vibrations

Sound is a **form of energy**. Sound is created by a **vibration**; *e.g.* a violin string being plucked or your voice box vibrating when you are speaking. Sound can **travel** through air at a **fast** speed. (Around 330 metres per second or 3 football pitches a second). If there is a **vacuum** then **sound cannot travel**. Sound can travel very well through **solids, liquids and gases**. Sound travels **better through solids and liquids** than it does through gases.



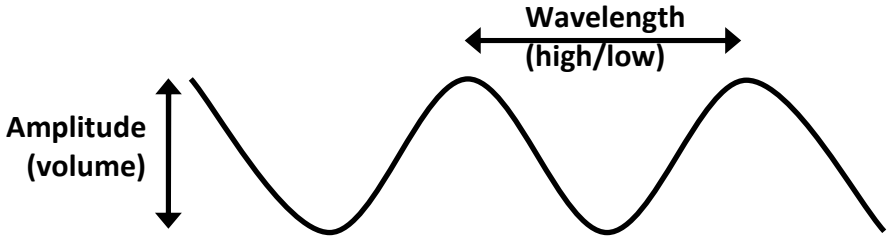
## Pitch and Volume

**Pitch** is a measure of how **high** or low a sound is. **Volume** is a measure of **how loud** a sound is.

You can change the **pitch** by changing the **frequency** of the wave.

Frequency is the **number of waves per second** and is measured in **Hertz** (Hz).

You can change the **volume** of the sound wave by changing the **amplitude** (height of the wave). Amplitude is measured in **decibels** (dB).

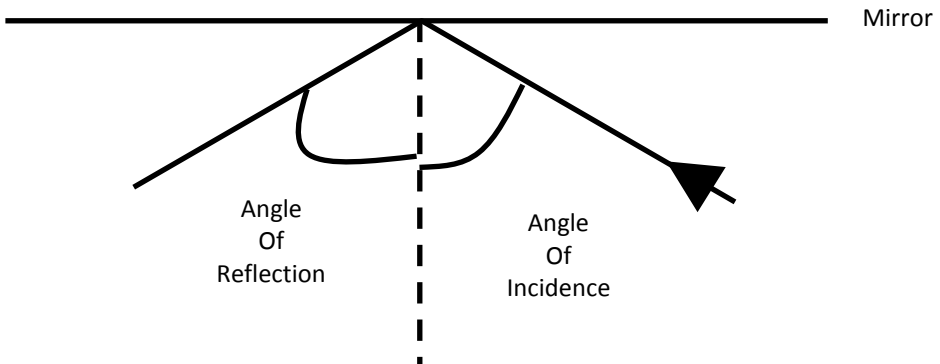


**Frequency = no. of waves produced in a second**

The **normal range of human hearing** for a young, healthy person is from **20 Hertz to 20000 Hertz**. Some animals *e.g.* dogs can hear higher sounds than we can.

## Light

Light travels in straight lines. When light **bounces off** an object, this is called **reflection**. The angle the light bounces off an object is the same angle that the light came in.



## Traffic Lights

What are the names of each of the body systems?	<input type="radio"/>
What is the function of the digestive system?	<input type="radio"/>
What are the organs that make up the digestive system?	<input type="radio"/>
What is the function of each organ in the digestive system?	<input type="radio"/>
What are the food types that we need?	<input type="radio"/>
What is respiration?	<input type="radio"/>
What is the function of the respiratory system?	<input type="radio"/>
What are the organs that make up the respiratory system?	<input type="radio"/>
What is the function of each organ in the respiratory system?	<input type="radio"/>
What is the effect of exercise on our bodies?	<input type="radio"/>
How do we breath?	<input type="radio"/>
How do our lungs work?	<input type="radio"/>
What is the function of the circulatory system?	<input type="radio"/>
What are the organs that make up the circulatory system?	<input type="radio"/>
What is the function of each organ in the circulatory system?	<input type="radio"/>
How do our hearts work?	<input type="radio"/>
What is the difference between veins, arteries and capillaries?	<input type="radio"/>
What is the function of the skeleton?	<input type="radio"/>
What are the parts of the skeleton?	<input type="radio"/>
What is the function of the endocrine system?	<input type="radio"/>

What are hormones?	<input type="radio"/>
What effect do hormones have on our bodies?	<input type="radio"/>
How is sound created?	<input type="radio"/>
How fast can sound travel?	<input type="radio"/>
What is pitch?	<input type="radio"/>
What is volume?	<input type="radio"/>
How can we change the pitch of a wave?	<input type="radio"/>
How can we change the volume of a wave?	<input type="radio"/>
What is frequency?	<input type="radio"/>
What is amplitude?	<input type="radio"/>
What units do we use to measure frequency?	<input type="radio"/>
What units do we use to measure amplitude?	<input type="radio"/>
What is the normal hearing range for a human?	<input type="radio"/>
What are the parts of the ear and what are they for?	<input type="radio"/>
What is reflection?	<input type="radio"/>
How does light reflect from a mirror?	<input type="radio"/>