

# Types of Reaction

**What happens to the reactant atoms in a chemical reaction?**

The bonds between the atoms are broken  
The atoms then rearrange themselves and form new bonds

**Why is incomplete combustion dangerous to humans?**

Incomplete combustion occurs when there isn't enough oxygen for complete combustion. When this happens water is still formed but the second product is either soot (carbon) or carbon monoxide.  
The carbon monoxide is dangerous as it stops oxygen from being absorbed into the blood so a person can struggle to breathe.

## **Extend Targets**

E1: Explain how a reaction might appear to get lighter

E2: Predict the products of the thermal decomposition reaction of zinc carbonate

E3: I have 12.5g of calcium carbonate, it decomposes to make 8.4g of calcium oxide, how much carbon dioxide is made?

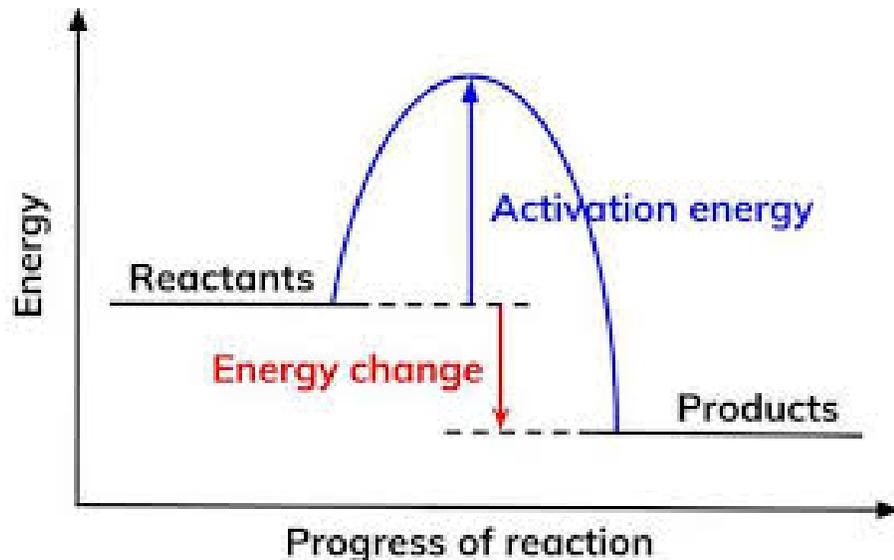
**The reaction appears to get heavier, explain why**

The reaction has oxygen as a reactant which is a gas. Gas mass is hard to measure but when it reacts with the magnesium it bonds to it and forms part of the product so its mass is part of the product. The reaction would appear to get heavier but in reality the oxygen came from the air.

## Explain what enthalpy of a reaction is:

It is the overall energy change of a reaction. Bonds are broken and new bonds are made, if the new bonds give out more energy than was taken to break the reactant bonds then the surroundings get hotter, this is exothermic. If the product bonds release less energy than was needed to break the reactant bonds then the vessel would feel colder, this is endothermic.

## Draw an energy level diagram for an exothermic reaction



## Chemical Energy

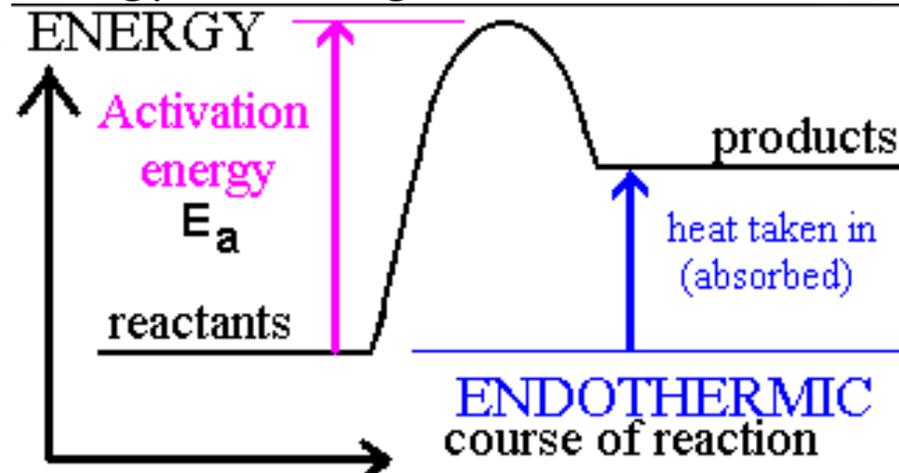
### Extend Targets

E1: Write a paragraph to compare endothermic and exothermic reactions

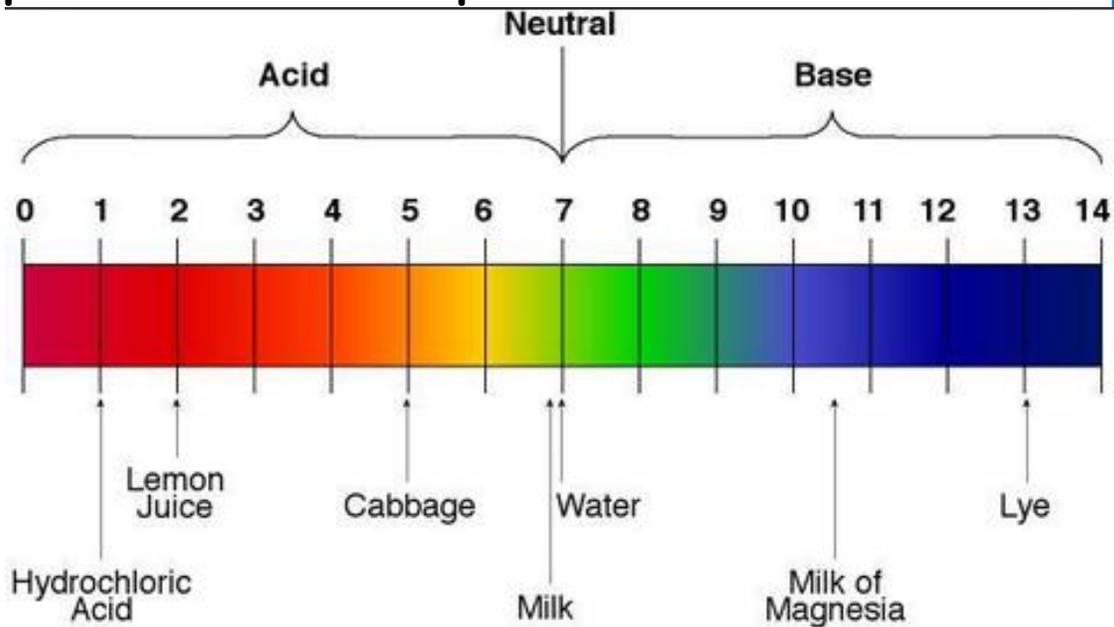
E2: Use the data from page 103 to calculate the energy change from question 3

E3:

## Draw an energy level diagram for an endothermic reaction



## pH scale with examples



The pH Scale

## Acids and Alkalis

### Extend Targets

E1: Describe and explain 2 situations where neutralisation is useful

E2: Describe and explain how copper chloride crystals can be made from copper oxide and hydrochloric acid

E3: A solution is bright yellow in UI, what's its pH and what type of substance is it?

Fill in the table to show colour changes with indicators

Substance	Red Litmus	Blue Litmus
Acid	Red	Red
Alkali	Blue	Blue
Neutral	Red	Blue

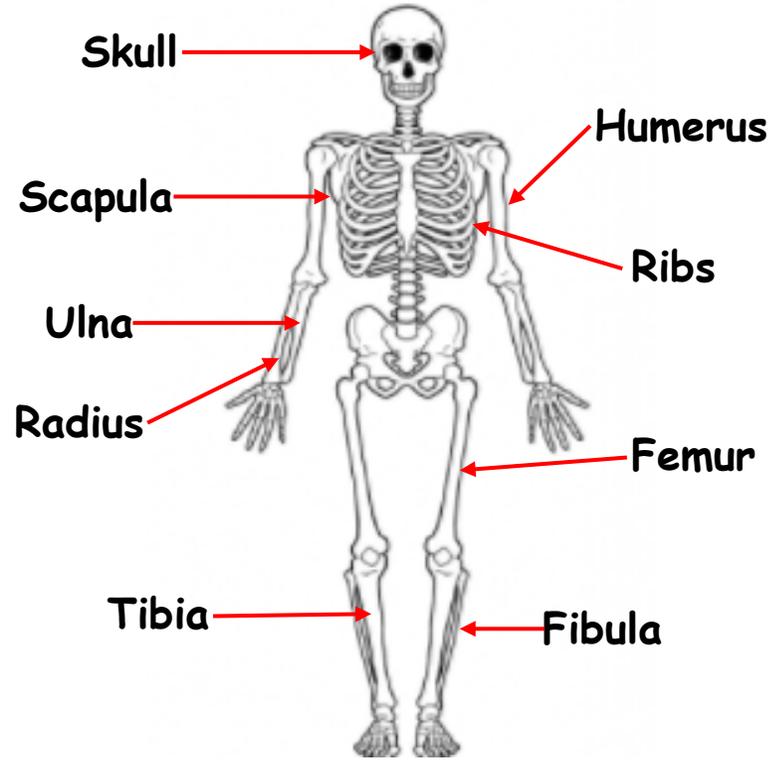
### What is neutralisation?

The acid and alkali cancel each other out to make a pH 7 substance

Name the following salts:

Sodium Chloride	Sodium sulphate	Sodium nitrate
Calcium chloride	Calcium sulphate	Calcium nitrate
Magnesium chloride	Magnesium sulphate	Magnesium nitrate

In the skeleton below label the following bones:



## Movement

**What is an antagonistic pair of muscles?**

Two muscles have to work together at a joint. This is called an antagonistic pair.

**Explain the 4 stages of movement using these pairs and give an example of an antagonistic pair of muscles in the body.**

- The tricep is **relaxed** while the bicep is **contracted** and the arm is bent towards the body.
- The bicep begins to **relax** and the tricep **contracts** lifting the ball.
- The bicep is fully **relaxed** and the tricep is fully **contracted**.
- The arm is fully straight.

**Levels of organisation:**

Organelles → Cells → Tissues → Organ → Organ System → Organism

**Example:**

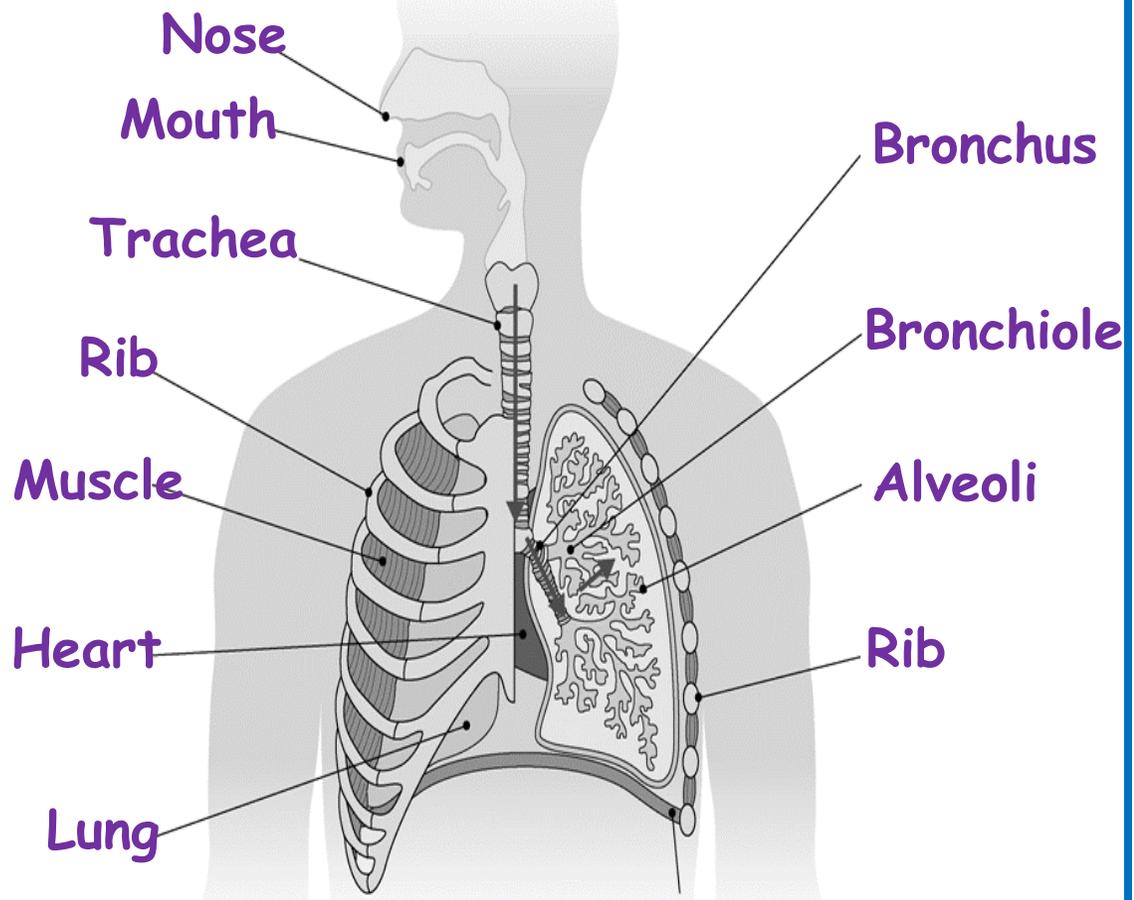
Mitochondria → Muscle Cell → Muscle Tissue → Stomach → Digestive System → Human

**Extend Targets**

E1: Suggest how plants and insects maintain their structure without a skeleton.

E2: Suggest why tendons are vital in the movement of the knee.

E3: Explain how the human skull has evolved from ancient ancestors.



# Breathing

Describe how you inhale air using the key terms: chest, pressure, volume, diaphragm, increases and decreases.

To breathe in:

- The diaphragm **contracts** - it moves **down**.
- **Volume** in chest **increases**.
- The **pressure** inside chest **decreases**.
- Air moves in.

## Extend Targets

E1: Draw a flow chart to show how the lungs exhale air.

E2: Explain why when someone has a punctured lung they cannot breathe in.

E3: Explain how the body is designed to stop food going down the trachea when you swallow.

## What are the effects of smoking on the lungs?

### Cigarettes contain:

#### Tar

- Sticky black material that collects in lungs.
- It irritates and narrows the airways.
- Contains chemicals that cause cancer.

#### Carbon monoxide

- A poisonous gas.
- Stop red blood cells from carrying as much oxygen as they should.
- It binds to red blood cells in the place of oxygen.

### Prolonged smoking can cause:

#### Emphysema

- A lung disease that affects the alveoli in the lungs.
- Their walls become weakened so they do not inflate properly when you inhale. Less oxygen gets into the body.

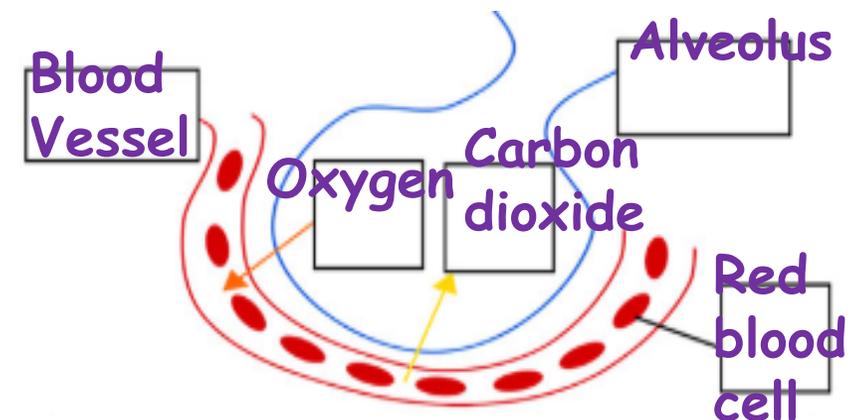
#### Respiratory infections

- Cilia are tiny hairs in your airway that help to keep your airways clean.
- Chemicals in tobacco smoke stop these from working.
- This means mucus, dirt and microorganisms can collect in your lungs leading to a infection.

## Breathing

### Explain how gas exchange happens in the alveoli

- Oxygen moves out of the alveoli by diffusion into the blood vessel.
- It binds with a red blood cell and is carried off to the heart to be pumped around the rest of the body.
- Carbon dioxide moves out of the blood and into the alveolus by diffusion.
- It is then breathed out of the lungs.



Aerobic Only	Both types	Anaerobic only
	Uses Glucose	
Needs oxygen		Doesn't need oxygen
	Chemical reaction	
Provides a lot of energy	Provides energy	Provides a little bit of energy
Products are carbon dioxide and water		Products are lactic acid in animals and ethanol and carbon dioxide in plants

## Respiration

**Describe in detail how the reactants for respiration get to cells around the body.**

**Carbohydrates** in food are **digested** and broken down into glucose.

Glucose is **absorbed from the small intestine** into the **blood** by **diffusion**.

Oxygen is **inhaled** into the lungs.

Oxygen is moved from the **alveoli** into the **blood** by **diffusion**.

Blood **transports** it around the body to cells.

### What is oxygen debt?

Oxygen debt is the **amount of oxygen** needed to **break down the lactic acid** built up during anaerobic respiration.

### What is fermentation?

A type of **anaerobic respiration** that happens in **bacteria and yeast** which produces **ethanol and carbon dioxide**.

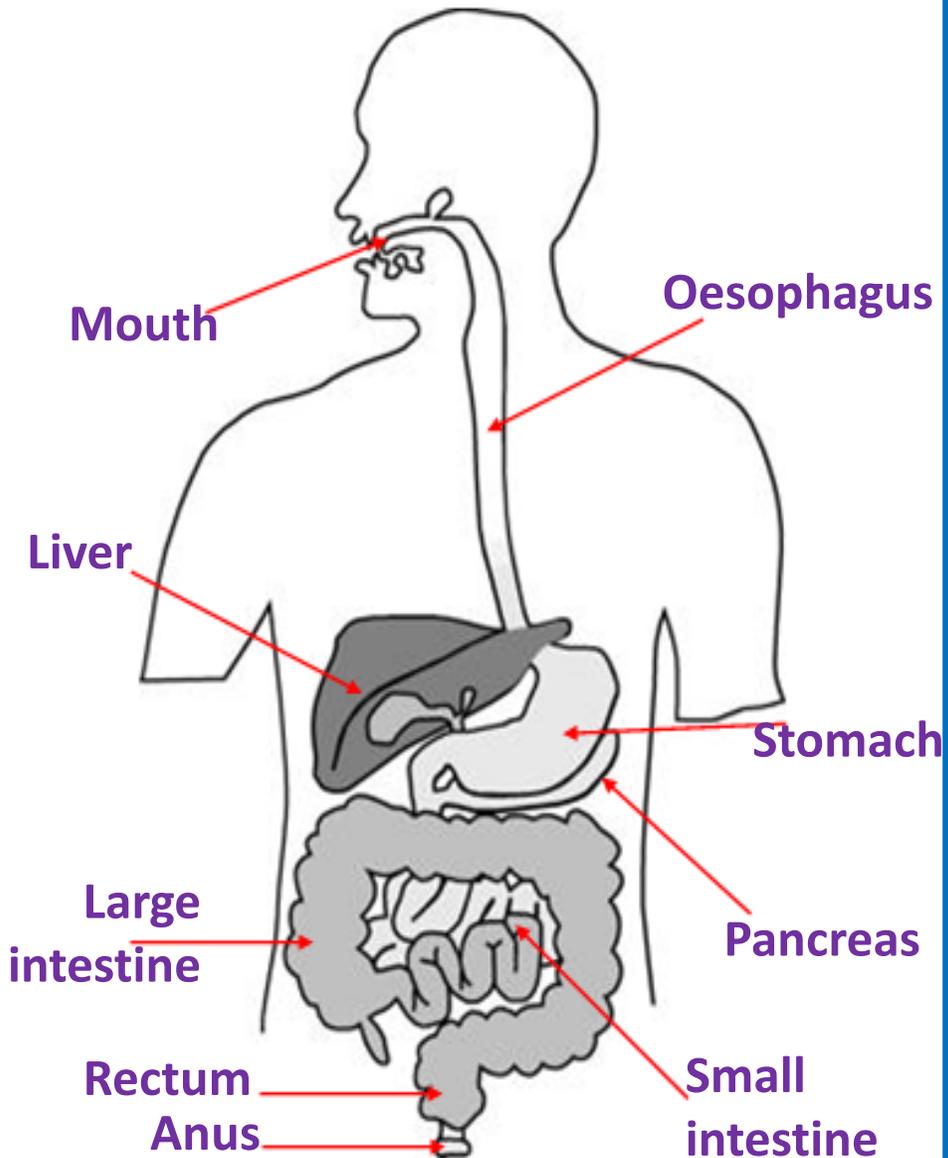
### Extend Targets

E1: Suggest why we use yeast when making products like bread and beer.

E2: Explain why you continue to breathe heavily after exercise even though you've stopped.

E3: Suggest why marathon runners are not able to sprint the distance.

# Digestion



## Food Tests:

**Test for fats** – Add a few drops of **ethanol** to a food solution. Shake and leave for 1 min. If it turns **cloudy**, **fats** are present.

**Test for protein** - Add a few drops of **biuret solution** to a food solution. Shake and leave for 1 min. If it turns **purple**, **proteins** are present.

**Test for starch** - Add a few drops of **iodine** to a food solution. Shake and leave for 1 min. If it turns **blue-black**, **starch** is present.

**Test for sugar** - Add a few drops of **Benedict's solution** to a food solution. Heat the test tube in a water bath. If it turns **orange-red**, **sugar** is present.

## What nutrients are absorbed in the small intestine?

The products of digestion are absorbed into the blood to be transported around the body. These are **glucose**, **amino acids**, **fatty acids** and **glycerol**.

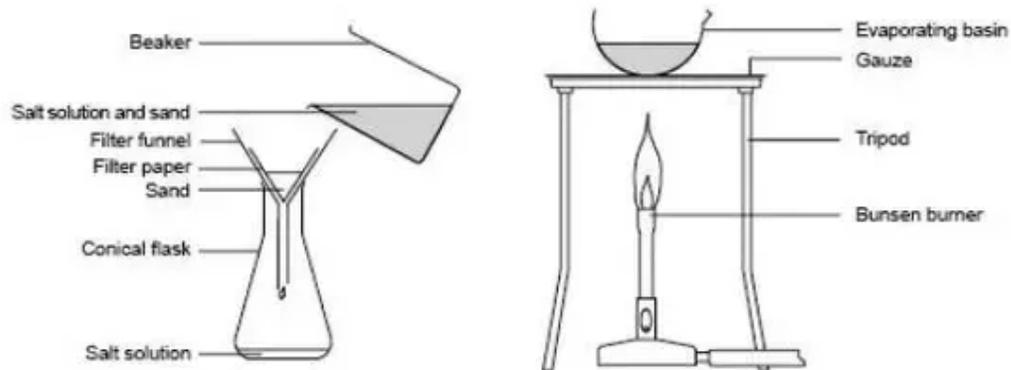
## Extend Targets

E1: Describe and explain 3 ways the small intestine is adapted to absorb the products of digestion.

E2: Compare and contrast testing a plant for starch and testing food for starch.

E3: Suggest 2 factors that can speed up the rate of digestion.

Draw and label diagrams to show the stages in the process of getting pure salt from rock salt



Add water, then pour the mixture through a filter

The sand will be trapped but the salt solution will pass through

Heat the solution until half of the water has evaporated

Pure salt crystals will form

**Explain separation of 2 liquids:**

Heat the mixture, the liquid with the lowest boiling point will evaporate first which can be condensed and collected

## Separating Techniques

**Extend Targets**

E1: Describe how you could separate ink and water

E2: Why do some substances travel further than others in chromatography?

E3: Write a paragraph comparing mixtures and pure substances

**Calculate the  $R_f$  value of the two spots:**

$$R_f \text{ value} = \frac{\text{Spot distance}}{\text{Solvent front}} = \frac{16}{20} = \underline{\underline{0.80}}$$

$$= \frac{5}{20} = \underline{\underline{0.25}}$$

**What is the difference between mass and weight?**

Mass is a measure of the amount of matter there is

It is measured in kilograms

Weight is a force, it is the effect of gravity on an objects mass

It is measured in Newtons

## Gravity

### Extend Targets

E1: Why is gravity different on Mars compared to Earth?

E2: Describe the factors that affect weight?

E3: Explain how the Moon stays in orbit around the Earth

### Draw 4 force arrows

All four should point to the Sun, A should be smallest, B and D should be the same size and C should be largest

**Where is the effect of gravity largest?**

C - the comet is closet to the Sun so the effect of gravity is most apparent.

**What is the weight of a person who has a mass of 76kg?**

$$W = m \times g = 75 \times 10 = \underline{750N}$$

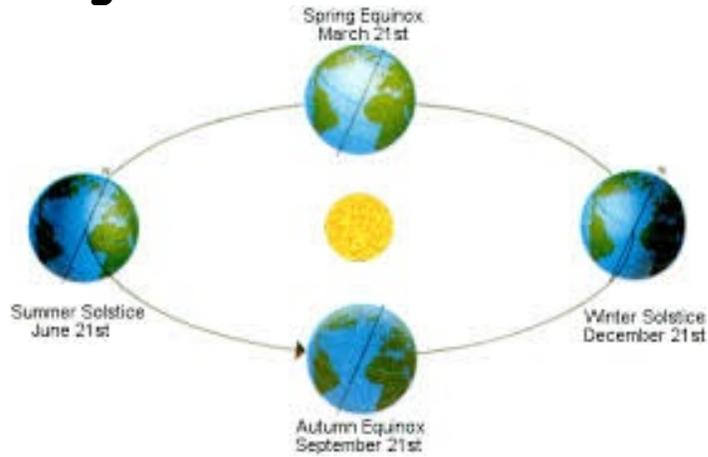
**What is the mass of a person who weights 964N?**

$$M = \frac{W}{g} = \frac{964}{10} = \underline{96.4kg}$$

**How many times less the Moon's gravity than Earth's?**

$$\frac{10}{1.6} = \underline{6.25 \text{ times bigger}}$$

## Draw a diagram of the seasons



## Define the following keywords

**Galaxy** - A collection of stars held together by gravity

**Planet** - A body that orbits a star

**Moon** - A natural object that orbits a planet

**Universe** - Billions of galaxies joined together to make up everything

**Solar system** - the Sun and planets orbiting it

## What are the factors stopping us leaving Earth?

**Distance** - other planets are very far away

**Technology** - there isn't the tech to get us to another planet quickly

# The Universe

## Extend Targets

E1: Explain why it is hotter in summer than in winter

E2: Why don't scientists use kilometres when looking at distances between stars?

E3: What is the link between distance from the Sun and temperature on planets?

## Solar And lunar eclipses

