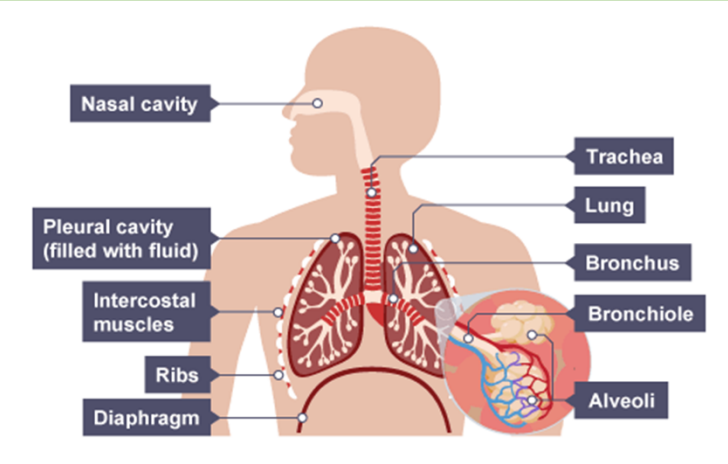
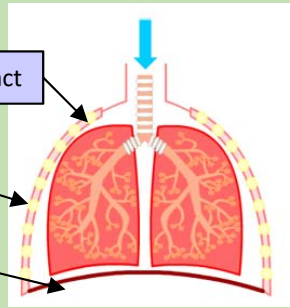
1. Biology – Breathing



The Mechanical Process of Breathing:

Inhaling:

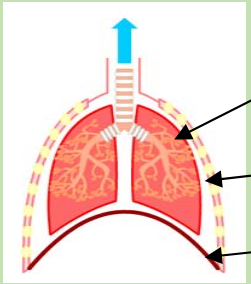


Intercostal muscles contract

Ribcage expands

Diaphragm contracts

Exhaling:



Intercostal muscles relax

Ribcage contracts

Diaphragm relaxes

Part	Function
Nasal Cavity	The preferred entry for air, lined with ciliated cells and mucus to trap dust and dirt.
Trachea	Air travels down the trachea to get to the lungs. This tube is from the larynx to the bronchi. It is also known as the windpipe.
Alveoli	Alveoli are tiny air-sacs located at the end of the bronchioles. This is where gas-exchange takes place.

Asthma affects the bronchioles. Asthma causes the airways to become narrower and excess mucus to be produced.

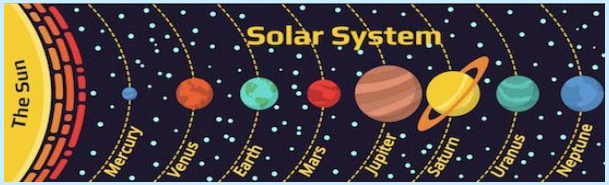
Smoking on the lungs:

Smoke damages the walls of the alveoli. The alveoli break down and merge with nearby air sacs. This decreases the surface area which reduces the efficiency of gas exchange.

The chemicals in cigarette smoke damage the cilia so they cannot remove dirt and dust. This leads to a build up of mucus and a smokers cough.

1. Physics – Space

The Earth is one of eight planets in our Solar System. All the planets orbit the sun which is a star.



Our Solar System is part of a galaxy called the **Milky Way**. The next closest closet galaxy is **Andromeda**.
All galaxies are in the Universe.
A **galaxy** is a gravitationally bound system of stars, stellar remnants, interstellar gas, dust, and dark matter.

Smallest to Largest
Planet, Star, Solar System, galaxy, Universe

A **light year** is used in space to measure distances:
It is the distance light travels in one year

2. Biology – Diet

Nutrient Groups:

Nutrient Group	*Food Examples*
Vitamins	Fruit, Vegetables
Minerals	Fruit, Vegetables
Protein	Meat, Nuts, Fish, lentils
Carbohydrates	Bread, pasta, potatoes
Fats (lipids)	Cheese, butter, oil
Fibre	Cereal, wholegrain foods
Water	Water, juice

Different nutrient groups are needed for different processes in the body.
- Carbohydrates are used for energy.
- Proteins are used for growth and repair.
- Lipids are used for insulation and energy.

A *balanced diet includes all the food groups*.
An unbalanced diet can lead to certain deficiencies such as scurvy (lack of vitamin C), rickets (lack of vitamin D) or brittle bones (lack of calcium). Overeating can lead to **obesity**. Issues associated with obesity include arthritis, heart disease, type 2 diabetes, some cancers and stroke.

Eating Disorders: are mental health conditions in which people do not eat enough food .

Disorder	*What is it?*	*Symptoms*
Anorexia	A person will starve themselves to keep their body weight low.	Weight loss, tiredness, stomach pains, moodiness.
Bulimia	A person will eat large amounts of food and then make themselves sick.	Sore throat, bad breath, rotting teeth, poor skin.

Both anorexia and bulimia can head to anaemia, fertility problems, osteoporosis and heart failure

Science | Chemistry & Physics | Year 7 | Step 2

Trinity MAT

1. Chemistry – Periodic Table

Elements in the periodic table are given a name and a symbol.
For example: Hydrogen is the name of an element and the symbol is H

Some of the most commonly used elements and their symbols are: hydrogen (H), oxygen (O), carbon (C), nitrogen (N), helium (He), copper (Cu), iron (Fe), magnesium (Mg), lithium (Li), sodium (Na), potassium (K), fluorine (F), chlorine (Cl), bromine (Br) and iodine (I).
There is a copy of the Periodic Table in your planner.

The elements are separated into two main sections – metals and non-metals. The elements coloured blue are metals and the elements coloured white are non-metals.

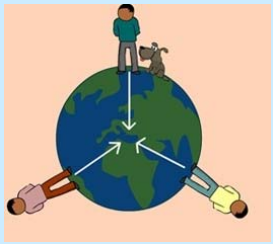
Metals are all solid at room temperature (approximately 20°C) except for mercury which is a liquid.

Properties of metals and non-metals:

Property	Metal	Non-Metal
Electrical Conductivity	Yes	No
Thermal Conductivity	Yes	No
Malleability/Brittleness	Malleable	Brittle
Density	High	Low
Sonorous	Yes	No

2. Physics – Gravity

Gravity acts between two objects. For example between a person and the Earth. Gravity is the reason we do not float above the ground.

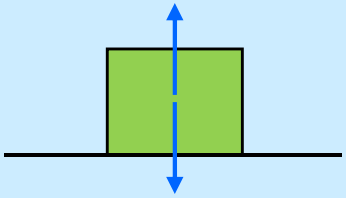


Gravity pulls the object to the centre of the Earth.

The gravity (gravitational pull) between the Sun and the planets is what keeps them in orbit. If this didn't exist the planets would not stay in our solar system.

Mass is the amount of matter an object contains. It is measured in kilograms (kg)
Weight is a force due to gravity. It is measured in Newtons (N).

Force diagrams show the forces acting on an object.



The arrow pointing **downwards is weight**. This force takes into account the gravity acting on the object.

The arrow pointing **upwards is normal contact**. This force acts at a 90° angle to the surface the object is touching.

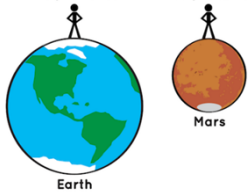
The force, weight, depends on two things:
1. The gravitational pull of the planet
2. The mass of the object

If an astronaut with a mass of 100 kg goes to different planets his mass always remains the same. However his weight will change depending on which planet he is on.

Jupiter is a very big planet. The gravitational pull is higher on this planet because it has a greater mass. The astronaut's weight will be higher on these planets.

Mercury and Mars are much smaller planets. The gravitational pull is lower on these planets because they are smaller. The astronaut's weight will be lower on these planets.

The man's mass (kg) stays the same on Earth and Mars. His weight (N) is higher on Earth than on Mars as the pull of gravity is stronger.



2. Chemistry – Acids and Alkalis

Examples of **acids**: vinegar, orange juice, battery acid, hydrochloric acid, sulfuric acid.

Examples of **alkalis**: oven cleaner, bleach, soap, toothpaste and sodium hydroxide.

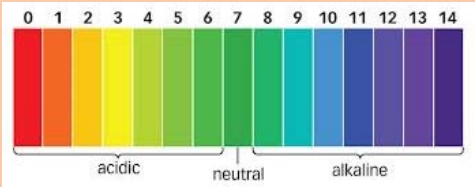
Neutralisation reaction-a reaction between an acid and an alkali.
The general word equation is- Acid + Alkali → Salt + Water

Indigestion:
Indigestion is caused by a build up of acid in the stomach. It can be treated using antacids which are an alkali medicine which ***neutralise*** the acid in the stomach.

Litmus paper is used to find out of a substance is an acid or an alkali.

	Colour of Red Litmus	Colour of Blue Litmus
Acid	Stays red	Turns red
Alkali	Turns blue	Stays blue
Neutral	Stays red	Stays Blue

The pH of a substance tells us how acidic or alkaline something is. When universal indicator is added to an acid, alkali or a neutral solution these colours are seen:



Acids that are pH 0, 1 and 2 are *strong acids*, whereas acids that are pH 4, 5 and 6 are *weak acids*. Alkalis that are pH 8, 9 and 10 are *weak alkalis* whereas alkalis that are pH 12, 13 and 14 are *strong alkalis*.