

Food and Nutrition

Nutrients

Define health.

Health is a complete state of physical, mental and social wellbeing, not just the absence of disease.

Give details of why each of the seven types of nutrients are needed in the body. Give examples of each.

Nutrient	Why do we need it?	Examples
Carbohydrate	For energy	Bread, pasta
Protein	For growth and repair	Meat, fish, milk, cheese
Fat	To provide sources of energy, to help insulate the body in cold weather	Butter, oil, nuts
Minerals	Needed in small amounts to maintain health, e.g. calcium needed to make strong bones	Salt, milk (calcium), green vegetables (iron)
Vitamins	Needed in small amounts to maintain health, e.g. vitamin C helps cells in tissues to stick together properly	Dairy foods, fruit, vegetables
Fibre	Helps food move through the gut	Wholewheat cereals, wholemeal bread
Water	Fills up cells so that they hold their shape, cools you down when you sweat	Fruit juice, milk, water

Testing types of food:

- Food containing high levels of starch turns **black/blue** when iodine is added.
- Food containing high levels of protein turns **purple** when biuret solution is added.
- Food containing high levels of fat turns a test tube with ethanol **cloudy**.

Enzymes

What are enzymes?

Enzymes are biological catalysts that control reactions in the body

How do digestive enzymes aid the process of digestion?

Digestive enzymes break large insoluble food molecules into smaller soluble molecules.

Name the digestive enzymes that break down the following nutrients and what they are broken down into.

Nutrient	Digestive Enzyme	Broken down into:
Carbohydrate	Carbohydrase	Sugars
Protein	Protease	Amino acids
Fat	Lipase	Fatty acids and glycerol

Balanced Diets

What is a balanced diet?

Eating the right amounts of a wide variety of foods.

Define malnutrition.

Occurs when a person has an unbalanced diet (too much/too little of a nutrient).

What is 'traffic light' labelling found on pre-packaged food?

A colour coordinated label to show the nutrient contents of packaged food.

Give details of the deficiency diseases listed below.

- Obesity - People whose food contains more energy than they need, causing them to become overweight.
- Night blindness - Not able to see well in dim light, caused by a deficiency in vitamin A.
- Kwashiorkor - A form of severe protein malnutrition (a lack of protein).
- Scurvy - Causes painful joints and bleeding gums, caused by a lack of vitamin C.
- Rickets - Makes bones weaker than normal, caused by a lack of calcium and vitamin D.
- Anaemia - Tiredness and a shortness of breath, caused by a lack of iron.

Diet Types

What is energy measured in?

Joules, J

Give another unit of energy typically found on food packets.

Calories, Cal

Why does a teenager typically need to eat more than an adult?

A teenager will need to eat more to get more energy for growth spurts.

Proteins, fats and most carbohydrates are too **big** for your body to use and need to be **broken large down** into **small** pieces.

Digestion turns large **insoluble** molecules into smaller soluble ones.

Absorption

Where is digested food absorbed?

Small intestine

Define diffusion.

The movement of molecules from an area of high concentration to an area of low concentration.

Why does glucose (sugar molecules) diffuse from the small intestine to the blood stream?

As there is a lower concentration of glucose molecules in the blood stream.

Define osmosis.

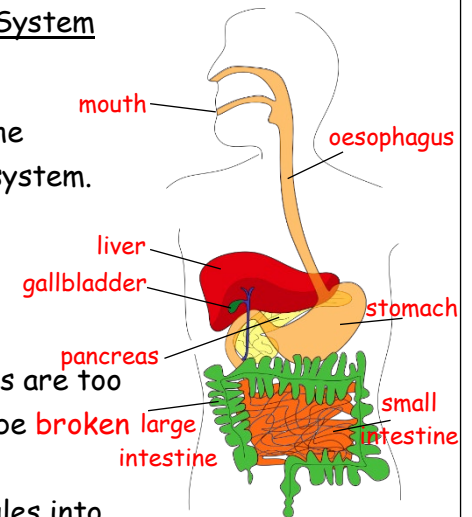
The movement of water molecules from an area of high concentration to an area of low concentration through a partially permeable membrane.

How is the small intestine adapted for its function?

The small intestine has a large surface area, allowing more efficient diffusion of molecules.

Digestive System

Label the parts of the digestive system.



Digestion turns large **insoluble** molecules into smaller soluble ones.

Combustion

Burning Fuels

What is a fuel?

A substance that contains stored energy that can be released during burning.

What is combustion?

A reaction in which burning in oxygen occurs.

Complete the following chemical reactions.

Zinc + oxygen → zinc oxide

Magnesium + oxygen → magnesium oxide

Methane + oxygen → carbon dioxide + water

What is a hydrocarbon?

A compound made of hydrogen and carbon only.

Crude oil is a mixture of hydrocarbons.

Fire Safety

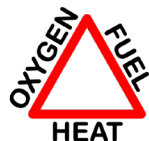
Define exothermic.

A reaction which releases heat into the surroundings.

Define endothermic.

A reaction which absorbs heat from the surroundings.

Draw the fire triangle below.



Label the following hazard symbols.



flammable



oxidising



explosive

Oxidation

Give the keywords for the following definitions.

Combustion	A reaction in which a substance combines with oxygen
Metal	Any element that is shiny when polished, conducts heat and electricity well, is malleable and flexible and often has a high melting point
Non-Metal	Any element that is not shiny and does not conduct heat and electricity well
Law of Conservation of Mass	The idea that mass is not lost or gained during a chemical reaction. The mass of all the reactants is equal to the mass of all the products
Metal Oxide	A metal that has combined with oxygen in a chemical reaction, e.g. magnesium oxide

Which metal rusts? Iron

Give the word equation for rusting.

iron + oxygen → iron oxide

What conditions must be present for rusting to occur?

Oxygen and water/moisture

Air Pollution

What is a pollutant?

A substance that can harm the environment of the organisms that live there.

Define complete combustion.

When a substance reacts fully with oxygen.

Define incomplete combustion.

When a substance reacts only partially with oxygen, such as when carbon burns in air producing carbon dioxide, carbon monoxide and soot (unburnt carbon).

What is acid rain?

Rainwater that is more acidic than usual due to air pollution.

What are cars fitted to reduce the pollution they cause?

Catalytic converters

Global Warming

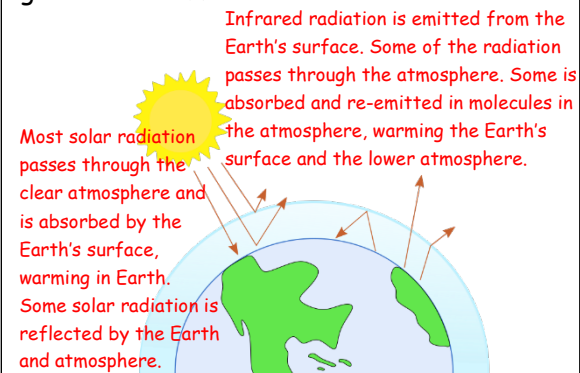
What is global warming?

Global warming is an increase in the greenhouse effect, causing an increase in the Earth's surface temperature.

What changes may be caused by global warming?

Polar ice-caps melting, changing rainfall patterns, severe flooding.

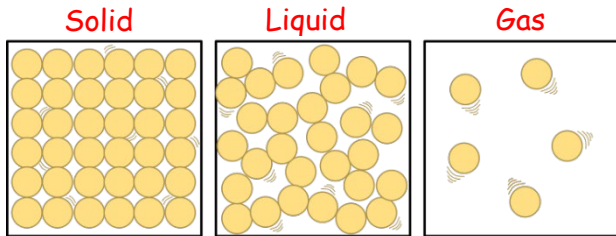
Label the diagram below to describe the greenhouse effect.



Fluids

The Particle Model

Label the particle model below.



add energy → ← remove energy

State properties of solids, liquids and gases. How strong are the forces between the particles in each state of matter? How close are the particles? Can the particles move?

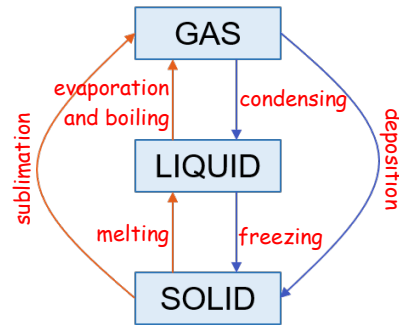
Solid	Liquid	Gas
Strong forces of attraction between particles	Some forces of attraction between particles	Next to no force of attraction between the particles
Particles are regularly arranged	Particles are randomly arranged	Particles are randomly arranged
Particles vibrate in fixed positions	Particles can move around each other	Particles can move quickly in all directions

What happens to materials when they are heated up or cooled down?

Materials expand when heated and contract when cooled. Particles in hotter materials move faster as they have more energy, taking up more space.

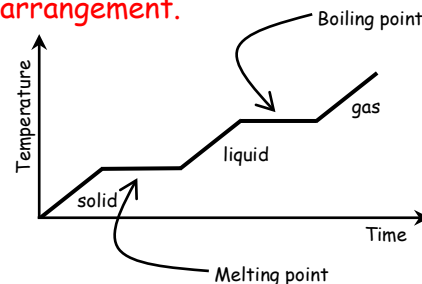
Changing State

Complete the diagram below by labelling the changes in state.



As you heat a solid the temperature rises until it reaches its melting point. Why does the temperature then stay the same until it becomes a liquid, even though the solid is still being heated?

As the solid is melting, the heat energy is making the particles break away from their fixed arrangement.



Pressure in Fluids

What is pressure?

The force of particles hitting a surface.

What is pressure measured in?

Pascal, Pa (N/m²)

How could altering the following affect pressure?

Mass of gas - An increase in the mass will cause an increase in pressure (more particles in the same volume).

Temperature of gas - An increase in the temperature will cause an increase in pressure (particles will have more energy and therefore more movement, causing more collisions between themselves and the surface of the container).

Volume of container - A decrease in the volume of the container will cause an increase in pressure (same number of particles in a smaller space).

Does pressure increase or decrease with depth in the ocean?

Decrease

Floating and Sinking

What is upthrust?

The force that pushes an object that is in or on a liquid upwards.

What is the density of water?

1 g/cm³

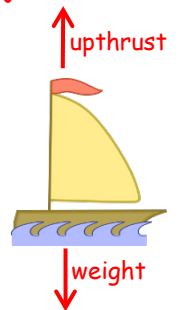
What is the equation for density?

Density = mass ÷ volume

Would an object with an overall density of 1.3 g/cm³ sink or float?

Sink - the object is denser than water

A boat is floating on water. Label the boat to show the forces acting on the boat and their relative sizes.



Drag

What is drag?

Air or water resistance.

How can air resistance be reduced?

By making the object streamlined.

What happens to the drag acting on a cyclist as the cyclist increases speed?

The drag will increase.

If the forces on an object are balanced, what will happen to the object?

- If the object is stopped: it will remain stopped.
- If the object is moving: it will continue to move at the same speed and in a straight line.

State the two things that can happen if the forces on an object are unbalanced.

- The speed will change.
- The direction of motion will change.

Breathing and Respiration

Aerobic and Anaerobic Respiration

Why do we need food and oxygen?

To convert into energy in the body.

What is respiration and where does it occur?

Respiration is a chemical reaction that releases energy. It occurs in the mitochondria in cells.

Give the word equation for aerobic respiration.

glucose + oxygen → carbon dioxide + water + energy

When does anaerobic respiration occur?

Anaerobic respiration occurs when cells do not have enough oxygen for aerobic respiration to occur.

Give the word equation for anaerobic respiration.

glucose → lactic acid + energy

Gas Exchange

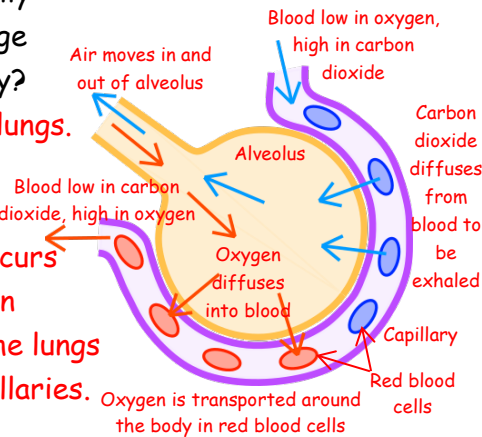
Where specifically does gas exchange occur in the body?

In alveoli in the lungs.

How does gas exchange occur?

Gas exchange occurs through diffusion between air in the lungs and blood in capillaries.

Label the diagram of where gas exchange occurs below.



Smoking and Emphysema

Emphysema will reduce the amount of oxygen carried into the bloodstream. Because there is reduced alveoli, which are the gas exchange surface between the lungs and blood capillaries. Give the effects of the four main chemicals found in cigarettes.

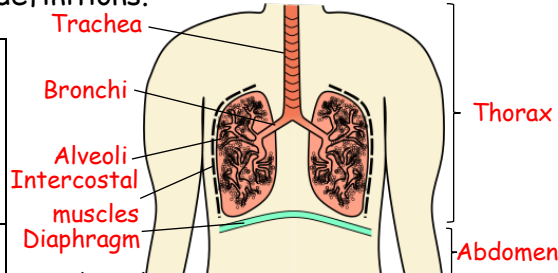
Tar	Irritates the alveoli in the lungs. Over time this causes the alveoli to break apart (emphysema).
Smoke	Can trigger asthma, in which the tiny tubes in the lungs become narrow and start filling with mucus. Less air can get into and out of the lungs, causing shortness of breath.
Nicotine	Is addictive. Also increases the heart rate and blood pressure, and makes blood vessels narrower than normal.
Carbon Monoxide	Takes the place of oxygen in red blood cells, reducing the amount of oxygen that the blood can carry.

The Respiratory System

Give the keywords for the following definitions.

Breathing	The movement of muscles that makes the lungs expand and contract
Ventilation	The movement of air in and out of your lungs
Gas Exchange	When one gas is swapped for another
Inhalation	Breathing in
Exhalation	Breathing out
Diffusion	When particles spread and mix with each other

Label the parts of the respiratory system.



How does the body draw air into the lungs?

Muscles in the diaphragm contract, pulling down. Muscles between the ribs contract, pulling the rib cage up and out. This causes the lungs to expand, drawing air into the lungs through the mouth and nose.

How does the body draw air out of the lungs?

The chest muscles relax causing the rib cage to fall and sink in. Muscles in the diaphragm relax, causing it to arch up. This squeezes the lungs, reducing the volume of the lungs and forces air out.

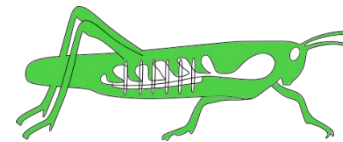
Comparing Gas Exchange

How are fish adapted to getting oxygen?

By having gills.

How are insects adapted to getting oxygen?

By having breathing tubes which connect to the air through tiny breathing holes along the insect's body.



Where specifically does gas exchange occur on a plant?

Through the stomata, on the underside of the leaf.

Getting Oxygen

What is the pulse rate a measure of?

The number of times your heart beats each minute (bpm).

What happens to your pulse rate when you exercise and why?

It increases as your cells need more oxygen and have more carbon dioxide to remove.

How does oxygen get from the lungs to your cells?

Oxygen diffuses into the blood which is then transported by your blood stream to every cell.