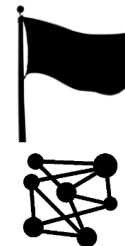


## Chemistry

Can I name everyday materials and talk about their properties?

Materials



Connect



Connect



Explain



Example



Attempt



Apply

Talk about differences in materials and what they notice, for example through cooking, melting and exploring material that create shadows.

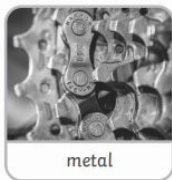
-All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons.

Together, name some common materials.  
 Identify what materials everyday objects are made from.  
 Consider the most/least common materials used around us.  
 Use words to describe properties of materials.  
 Test how waterproof different materials are.

Talk about the properties of some materials.  
 Sort materials according to their properties.

I know the names of some common materials and can describe the properties of these materials.  
**In Year 2,** I will say why some materials are more suitable to some jobs than others.  
 I have sorted and classified. I have made simple observations.

Materials:



-Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties.

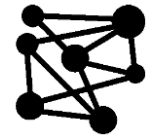
**Vocabulary**

Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, bendy, waterproof, rough, smooth, shiny, dull.

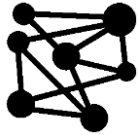
Why are different materials used for different purposes?

Concept

Materials



Connect



Connect



Explain



Example



Attempt



Apply

All objects are made of one or more materials.

Materials can be described by their properties. Some materials, e.g. plastic, can be in very different forms for different purposes.

-All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task.

-When choosing what to make an object from, the properties needed are compared with properties of the possible materials.

-A material can be suitable for different purposes and an object can be made of different materials.

-Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting.

-An architect is a person who plans and designs buildings.

Consider why particular properties of a materials might make it suitable or not suitable for a particular job, e.g. wood for a window or fabric for a ruler.

Investigate which materials can be squashed, bent, twisted or stretched. Observe what happens to materials after they have been manipulated.

Look at examples of architecture in famous buildings around the World.

Design and build a bridge that will support a given weight.

I know that materials have particular properties that make them suitable for particular jobs.

I know that materials can change shape.

**In Year 4**, I will find out how materials can change in other ways.

### Vocabulary

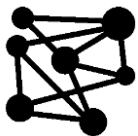
Properties of materials as for Year 1, plus opaque, transparent, translucent, reflective, absorbent, rigid, flexible, twist/twisting, squash/squashing, stretch/stretching.





## Biology

### Can foods be part of different food groups?



Connect



Explain



Example



Attempt



Apply



Connect

Animals need oxygen, food, water, energy and shelter to survive.

Humans need a healthy, balanced diet. Foods can be sorted into food groups.

Animals can be sorted into herbivores, carnivores and omnivores.

-Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need.

-Food contains a range of different nutrients, carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water and fibre that are needed by the body to stay healthy.

-A piece of food will often provide a range of nutrients.

-Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.

Explore the nutrients in a selection of foods, using food nutritional labels.

Label the bones of the human body and their purpose.

Explore the function of the skeleton and how it allows us to move.

Compare humans skeletons to the skeletons of other animals.

Sort animals into vertebrates and invertebrates.

Name and locate some of the main muscles in the body.

Plan a diet for several people who have different needs, e.g. an athlete, a dancer, a signer and a child.

Investigate if taller people are stronger using a fair test.

I know the role of the skeleton system and muscular system.

I know that food contains nutrients which humans need to grow and function well.

**In Year 5**, I will learn how nutrients are removed from our food in the small intestine and used across the body.

**In Year 6**, I will learn that diet and exercise, along with drugs and lifestyle, affect how our bodies function.

**Vocabulary**

**nutrition** - food or nourishment; **nutrients** - a substance that provides nourishment essential for the maintenance of life and for growth; **diet** - the food that a person eats; **carbohydrates** - the body's major source of energy; sugars, **protein** - provides the building blocks for muscles, bones, organs, and skin to grow and stay healthy; **vitamins** - a group of nutrients which the body needs to work properly, **minerals** - a non-living nutrient, **fibre** - a type of carbohydrate that the body cannot digest, **fat** - a nutrient that provides energy, **skeleton** - the framework of bones and cartilage that supports and protects the soft tissues and the internal organs of the body; **bones** - a rigid organ that constitutes part of the skeleton in most vertebrate animals; **muscles** - strong, stretchy parts of your body that help you move, stand, and even breathe, working like rubber bands that squeeze to pull on bones and make you move, **joints** - where two or more bones connect, allowing your body to move; support; protect; skull; ribs; spine

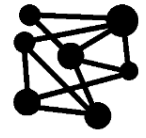


## Chemistry

### How do materials change state?

Concept

Materials



Connect



Explain



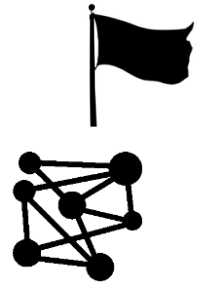
Example



Attempt



Apply



Connect

Objects can be made from different materials.

Words can be used to describe the properties of materials.

A material can be suitable for different purposes and an object can be made of different materials.

Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting.

-A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container.

-A liquid can be poured and keeps a level, horizontal surface.

-A gas fills all available space; it has no fixed shape or volume.

-Melting is a state change from solid to liquid.

-Freezing is a state change from liquid to solid. The freezing point of water is 0oC.

-Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC.

-Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy.

-Condensation is the change back from a gas to a liquid caused by cooling.

Sort materials into solids, liquids and gases using scientific definitions.

Observe materials changing states, including melting chocolate, boiling water, freezing water and condensing water.

Draw and create diagrams to represent the particle structure of a solid, a liquid and a gas.

Explore factors that increase the rate of evaporation.

Watch an animation and sing the water cycle song. Label a diagram of the water cycle. Observe a water cycle in a bag.

Carry out a fair test to find out which factors increase the rate of evaporation.

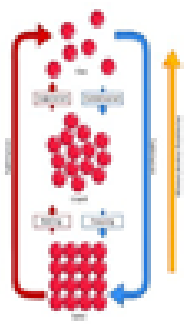
I know that materials can change shape and I know some factors that affect the rate at which this happens.

In **Year 5**, I will learn that some changes in materials are reversible (like melting and freezing) and some are irreversible (like boiling an egg).

In **KS3**, I will learn the difference between chemical and physical changes.

**Vocabulary**

Solid, liquid, gas, **state change** - where a substance transforms from one state of matter to another; **melting** - solid changing into liquid; **freezing** - liquid changing into solid; **melting point** - the special temperature where a solid material turns into a liquid; **boiling point** - the special temperature where a liquid turns into a gas; **evaporation** - liquid changing into gas; **temperature** - the measure of how hot or cold something is; **water cycle** - the continuous journey water takes from land to sky and back again; **condensation** - gas changing into liquid; **precipitation** - rain, snow, sleet, hail that falls to the ground.



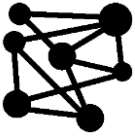
# Year 5 Autumn Term

## Physics

### How do forces affect my life?

Concept

Forces and magnets



Connect



Explain



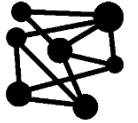
Example



Attempt



Apply



Connect

A force is a push or a pull.

Magnets attract or repel each other and some materials are magnetic.

When an object moves on a surface, the texture of the surface and the object affect how it moves.

-A force causes an object to start moving, stop moving, speed up, slow down or change direction.  
 -Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.  
 -Air resistance, water resistance and friction are contact forces that act between moving surfaces.

-A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover.  
 -Pulleys, levers and gears are all mechanisms, also known as simple machines.

Use arrows to draw the direction of forces in various scenarios.

Explore resistance using everyday objects.

Explore whether a carpet or concrete creates more resistance.

Using a ruler, glue stick and two rubbers (to create a seasaw with a rubber at both ends) explore what happens when the fulcrum is moved.

Draw diagrams to show how pulleys affect the direction of a force.

Research Isaac Newton, Galileo and Archimedes, exploring their theories about forces.

Carry out a fair test to find out what size/shape / material of a parachute will cause it to fall slower.

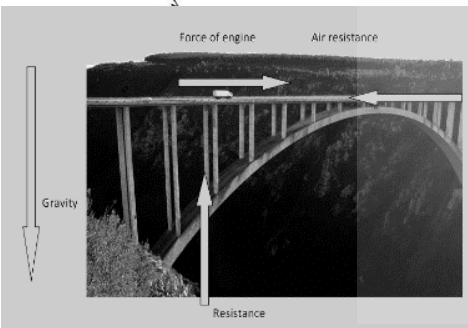
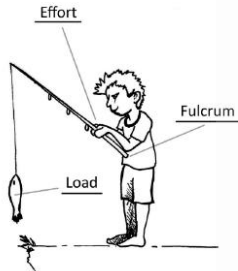
Carry out a fair test to find out if the length of a piece of rope will affect how easy it is to move an object.

Later in **Year 5**, I will learn how gravitational forces affect objects in the solar system.

**In KS3**, I will learn how objects can be deformed using forces. I will also learn about forces concerned with static electricity.

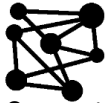
### Vocabulary

**Force** - the push or pull of an object; **gravity** - a force which tries to pull two objects towards each other, **air resistance** - a physical force which opposes the movement of an object through the air; **water resistance** - a physical force which opposes the movement of an object through the water; **surface area** - the total outer area of an object that is exposed; **friction** - force between two surfaces when one attempts to slide across the other; **mechanisms** - a system of parts that work together to produce a desired effect; **lever** - a bar or beam that pivots around a fulcrum; **pulley** - a wheel which carries a flexible rope / cable on its rim; **fulcrum** - the fixed pivot point around which the lever rotates; **effort** - the force applied to move an object; **load** - the object being lifted.





### How could I separate materials and what are reversible and irreversible changes?



Connect



Explain



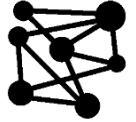
Example



Attempt



Apply



Connect

Different materials are suitable for different purposes. that materials can change state.

I know the names of the processes: melting, freezing, condensing and evaporating.

- Materials have different uses depending on their properties and state (liquid, solid, gas).
- Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.
- Mixtures can be separated by filtering, sieving and evaporation.
- Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.
- segregating certain substances from a mixture helps us to remove impurities or harmful substances.

Explore soluble materials and insoluble materials. Sort soluble and insoluble materials. Talk about the importance of being able to dissolve materials in liquids (e.g. in medicine and food).

Identify the difference between melting and dissolving. Make and draw models to present the two and show the differences.

Explore factors that speed up the rate at which materials dissolve.

Find out if salt that has been dissolved in water can be recovered (by evaporating the water).

Find out if water that has been heated up to form steam can be turned back into water.

Sort reversible and irreversible changes.

Explore the best ways to separate materials, e.g. paper clips and raisins, sand and marbles (e.g. through sieving and magnets).

Test the conductivity of various materials by testing which one keeps water warmer for longer.

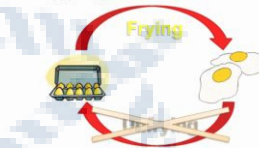
Using linking hexagons, write about what we have learnt throughout the block.

A reversible change is a change that is not permanent, such as freezing water.



We can get back to what we started with by melting the ice.

An irreversible change is permanent. An example of this is frying an egg.



Once we have a fried egg, we cannot 'un-fry' it.

I know that changes to materials can be reversed.

**In Year 6**, I will learn that nutrients are absorbed into the bloodstream in a dissolved form.

**In KS3**, I will learn about pure substances and diffusion.

I will also learn about other methods for separating mixtures, e.g. distillation and chromatography.

#### Vocabulary

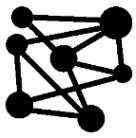
**thermal/electrical insulator** - a material that does not allow heat or electricity to move through it easily; **conductor** - a material that allows heat or electricity to move through it easily; **change of state** - the physical process in which a substance changes from one state of matter to another; **mixture** - a substance made by mixing other substances together; dissolve - become or cause to become incorporated into a liquid so as to form a solution; **solution** - a liquid mixture; **soluble** - able to be dissolved, especially in water; **insoluble** - incapable of being dissolved; **filter** - a porous device for removing impurities or solid particles from a liquid or gas passed through it; **sieve** - a utensil used for straining solids from liquids; **reversible change** - a change that can be undone; **non-reversible change** - a change that cannot be undone; **burning** - a chemical reaction usually accompanied by a flame.

# Year 6 Autumn Term

## Concept



**Biology**  
What is the function of the circulatory system and how do my lifestyle choices effect it?



Connect



Explain



Example



Attempt



Apply



Connect

Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.

Humans need to eat a healthy balanced diet to stay healthy.

Humans get the nutrients they need through the food that they eat.

-Blood is made up of red and white blood cells, plasma and platelets.

-The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.

-Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins.

Discuss whether red blood cells are more important than white blood cells.

Describe the function of the heart and notice patterns in heart rate before and after exercise.

Label a diagram of the heart.

Make a model of the human heart.

Dissect a pig's heart.

Explore the heart rate at different stages of life and in different animals.

Describe the journey that blood takes around the body using drama techniques.

Explore osmosis (and its role in the digestive system) using a gummy bear and water.

Sort healthy and unhealthy foods using nutritional labels.

Sort types of drugs and highlight their effects on the body.

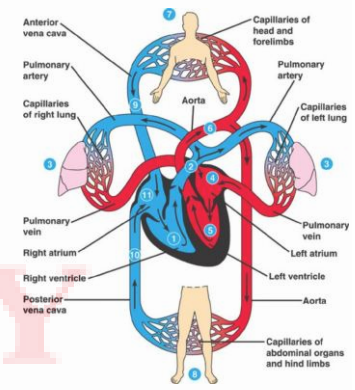
Carry out a fair test to find out what the effect of exercise is on heart rate.

Find out how long it takes for our pulse to get back to its resting rate.

### Vocabulary

**heart** - a hollow muscular organ that pumps the blood through the circulatory system; **pulse** - a rhythmical throbbing of the arteries as blood is passed through them; **rate** - speed of a process; **pumps** - to force a liquid or gas to move; **blood** - the red liquid that circulates in the arteries and veins of humans and other animals, carrying oxygen to and carbon dioxide from the tissues of the body; **blood vessels** - a tubular structure carrying blood through the tissues and organs; **transported** - to take or carry from one place to another; **lungs** - pair of organs inside the ribcage, involved with breathing, **oxygen** - a gas which animals breathe in; **carbon dioxide** - a gas which is absorbed by plants, **lifestyle** - the way in which a person lives; **platelet** - a small disc shaped cell fragment found in the blood; **plasma** - the colourless fluid part of the blood; **osmosis** - movement of water molecules from high to low concentrated area until both sides reach a balance; **aorta** - the main artery of the body; **deficiency** - a lack or shortage; **exercise** - activity requiring physical effort; **drugs** - a medicine or other substance which has a physiological effect when ingested or otherwise introduced into the body.

Produce an information leaflet to put into the local GP surgery describing the role of the heart and how to maintain a healthy heart and circulatory system.



Know the importance of a healthy, functioning heart.

Know that diet, lifestyle and exercise can affect our heart and circulatory system.

**In KS3**, I will learn more about the affects of recreational drugs on behaviour, health and life processes.

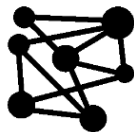
# Year 6 Autumn Term

Concept

Animals including humans



**Biology**  
 What is the function of the circulatory system and how do my lifestyle choices effect it?



Connect



Explain



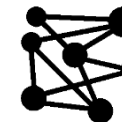
Example



Attempt



Apply



Connect

Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.

Humans need to eat a healthy balanced diet to stay healthy.

Humans get the nutrients they need through the food that they eat.

- Blood is made up of red and white blood cells, plasma and platelets.
- The heart pumps blood to the lungs. In the lungs, the blood picks up oxygen and gets rid of carbon dioxide (a waste gas).
- The blood then goes back to the heart, which pumps it around the rest of the body.
- The blood carries oxygen, water, and nutrients to the muscles and other parts of the body that need them.
- As the body uses these things, it makes carbon dioxide and other waste.
- The blood carries the carbon dioxide back to the heart, which then sends it to the lungs to be breathed out.
- Then the cycle starts all over again
- The things we eat, how much we move, and our daily habits can change how well our body works.

Discuss red and white blood cells, their purpose and functions.

Describe the function of the heart and notice patterns in heart rate before and after exercise.

Label a diagram of the heart.

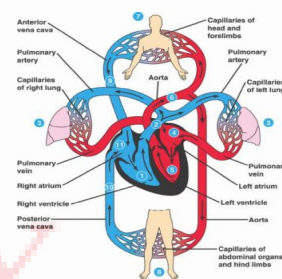
Explore the heart rate at different stages of life and in different animals.

Describe the journey that blood takes around the body using drama techniques.

Explain the impact of drugs and an unhealthy lifestyle on the heart.

Dissect a pig's heart.

Carry out a fair test to find out what the effect of exercise is on heart rate. Find out how long it takes for our pulse to get back to its resting rate.



Know the importance of a healthy, functioning heart.

Know that diet, lifestyle and exercise can affect our heart and circulatory system.

In KS3, I will learn more about the affects of recreational drugs on behaviour, health and life processes.

**Vocabulary**

**heart** - a hollow muscular organ that pumps the blood through the circulatory system;

**pulse** - a rhythmical throbbing of the arteries as blood is passed through them

**blood** - the red liquid that circulates in the arteries and veins of humans and other animals, carrying oxygen to and carbon dioxide from the tissues of the body

**blood vessels** - a tubular structure carrying blood through the tissues and organs

**lungs** - pair of organs inside the ribcage, involved with breathing,

**oxygen** - a gas which animals breathe in;

**carbon dioxide** - a gas which is absorbed by plants,

**platelet** - a small disc shaped cell fragment found in the blood

**plasma** - the colourless fluid part of the blood;

**deficiency** - a lack or shortage