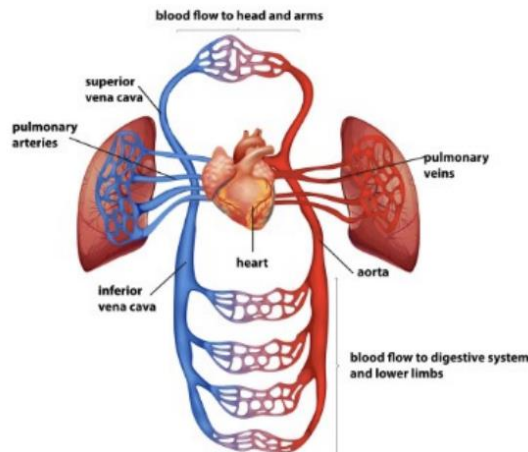


## Big Ideas



### Biology:

The cellular basis of life - Heredity and life cycles - Variation, adaptation and evolution - Organisms and their environments - Health and disease



1. The right atrium collects the deoxygenated blood from the body, via the vena cava. It sends the blood to the right ventricle.
  2. The right ventricle pumps the deoxygenated blood to the lungs. Here the blood picks up oxygen and disposes of carbon dioxide.
  3. The lungs send oxygenated blood back to the left atrium which pumps it to the left ventricle.
  4. The left ventricle pumps the blood to the rest of the body, via the aorta.
- The circulatory system is made of the heart, lungs and the blood vessels.  
Arteries carry oxygenated blood from the heart to the rest of the body.  
Veins carry deoxygenated blood from the body to the heart.  
Nutrients, oxygen and carbon dioxide are exchanged via the capillaries.  
Some choices, such as smoking and drinking alcohol can be harmful to our health.  
Tobacco can cause short-term effects such as shortness of breath, difficulty sleeping and loss of taste and long-term effects such as lung disease, cancer and death

## Vocabulary

**ammeter** measures the current in a circuit  
**appliances** a device or machine in your home that you use to do a job such as cleaning or cooking. Appliances are often electrical.  
**battery** small devices that provide the power for electrical items such as torches  
**bulb** the glass part of an electric lamp, which gives out light when electricity passes through it.  
**buzzer** an electrical device that is used to make a buzzing sound  
**cell** a synonym for battery  
**circuit** a complete route which an electric current can flow around  
**component** the parts that something is made of  
**conductor** a substance that heat or electricity can pass through or along  
**current** a flow of electricity through a wire or circuit  
**device** an object that has been invented for a particular purpose  
**electricity** a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for devices  
**energy** the power from sources such as electricity that makes machines work or provides heat  
**fuel** a substance such as coal, oil, or petrol that is burned to provide heat or power  
**generate** cause it to begin and develop  
**insulator** a non-conductor of electricity or heat  
**mains** where the supply of water, electricity, or gas enters a building  
**motor** a device that uses electricity or fuel to produce movement  
**power** Power is energy, especially electricity, that is obtained in large quantities from a fuel source and used to operate lights, heating, and machinery.  
**resistance** a force which slows down a moving object or vehicle  
**resistor** a part of an electric circuit that provides resistance to some of the current  
**source** where something comes from  
**switch** a small control for an electrical device which you use to turn the device on or off

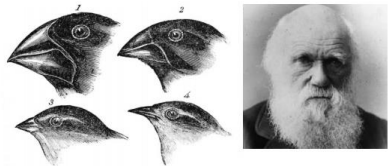
Alcohol can cause short-term effects such as addiction and loss of control and long-term effects such as organ damage, cancer and death.

Exercise can:

- tone our muscles and reduce fat
- increase fitness
- make you feel physically and mentally healthier
- strengthens the heart
- improves lung function
- improves skin

The heart is composed of four chambers; the right atrium, the right ventricle, the left atrium and the left ventricle.

How often your heart pumps is called your pulse.



Charles Darwin, an evolutionary scientist, studied different animal and plant species, which allowed him to see how adaptations could come about. His work on the finches was some of his most famous.

Evolution is a process of change that takes place over many generations, during which species of animals, plants, or insects slowly change some of their physical characteristics. This is because offspring are not identical to their parents.

It occurs when there is competition to survive. This is called natural selection.

Difference within a species (for example between parents and offspring) can be caused by inheritance and mutations.

Inheritance is when characteristics are passed on from generation to the next.

Mutations in characteristics are not inherited from the parents and appear as new characteristics.

Evidence of evolution comes from fossils - when these are compared to living creatures from today, palaeontologists can compare similarities and differences.

Other evidence comes from living things - comparisons of some species may reveal common ancestors.

Adaptation is when animals and plants have evolved so that they have adapted to survive in their environments. For example, polar bears have a thick layer of blubber under their fur to survive the cold, harsh environment of the Arctic while giraffes have long necks to reach the leaves on trees.

Some environments provide challenges yet some animals and plants have adapted to survive there

Sometimes adaptations can be disadvantageous. One example of this can be the dodo, which became extinct as it lost its ability to fly through evolution. Flying was unnecessary for the dodo as it had lived for so many years without predators, until its native island became inhabited.

When adaptations are more harmful than helpful, these are called maladaptations.

**voltage** the force of an electric current as measured in volts

**wires** a long thin piece of metal that is used to fasten things or to carry electric current

**angle** the direction from which you look at something

**dark** the absence of light

**dim** light that is not bright

**electricity** a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for machines

**emits** to emit a sound or light means to produce it

**light** a brightness that lets you see things.

**mirror** a flat piece of glass which reflects light, so that when you look at it you can see yourself reflected in it

**opaque** if an object or substance is opaque, you cannot see through it

**reflects** sent back from the surface and not pass through it

**shadows** a dark shape on a surface that is made when something stands between a light and the surface

**source** where something comes from

**surface** the flat top part of something or the outside of it

**torches** a small electric light which is powered by batteries and which you can carry

**translucent** if a material is translucent, some light can pass through it

**transparent** If an object or substance is transparent, you can see through it

**adaptation** a change in structure or function that improves the chance of survival for an animal or plant within a given environment

**ancestor** an early type of animal or plant from which a later, usually dissimilar, type has evolved

**biodiversity** a wide variety of plant and animal species living in their natural environment

**biome** a large naturally occurring community of animals and plants occupying a major habitat

**breeding** the process of producing plants or animals by reproduction

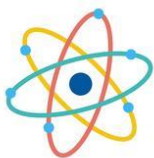
**characteristics** the qualities or features that belong to them and make them recognisable

**environment** all the circumstances, people, things, and events around them that influence their life



**Chemistry:**

Substances and Properties - Particles and Structure - Chemical reactions - Earth's atmosphere - Dynamic earth



**Physics:**

Matter - Forces and motion - **Sound, light and Waves** - **Electricity and Magnetism** - Earth in space

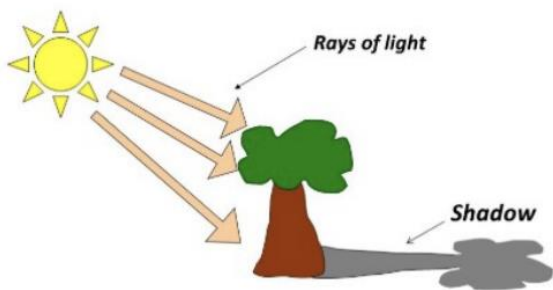
Light travels in a straight line.

When you place a torch on a table in a dark room, the beam travels in a straight line.

Reflection is when light bounces off a surface - this changes the direction in which the light travels.

Because light travels in straight lines, when there is an opaque object blocking the light, a shadow is formed.

These shadows have the same shape as the objects that cast them.



The size of a shadow changes as the light source moves.

**evolution** a process of change that takes place over many generations, during which species of animals, plants, or insects slowly change some of their physical characteristics

**extinct** no longer has any living members, either in the world or in a particular place

**fossil** the hard remains of a prehistoric animal or plant that are found inside a rock

**generation** the act or process of bringing into being; through reproduction, especially of offspring

**inherit** If you inherit a characteristic you are born with it, because your parents or ancestors also had it.

**maladaptation** the failure to adapt properly to a new situation or environment

**mutation** characteristics that are not inherited from the parents or ancestors and appear as new characteristics.

**natural selection** a process by which species of animals and plants that are best adapted to their environment survive and reproduce, while those that are less well adapted die out

**offspring** a person's children or an animal's young

**palaeontology** the study of fossils as a guide to the history of life on Earth

**reproduction** when an animal or plant produces one or more individuals similar to itself

**species** a class of plants or animals whose members have the same main characteristics and are able to breed with each other

**survive** continue to exist

**theory** a formal idea or set of ideas that is intended to explain something

**variation** a change or slight difference

**aorta** the main artery through which blood leaves your heart before it flows through the rest of your body

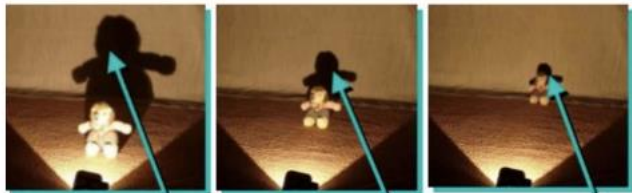
**arteries** a tube in your body that carries oxygenated blood from your heart to the rest of your body

**atrium** one of the chambers in the heart

**blood vessels** the narrow tubes through which your blood flows. Arteries, veins and

**capillaries** are blood vessels. capillaries tiny blood vessels in your body

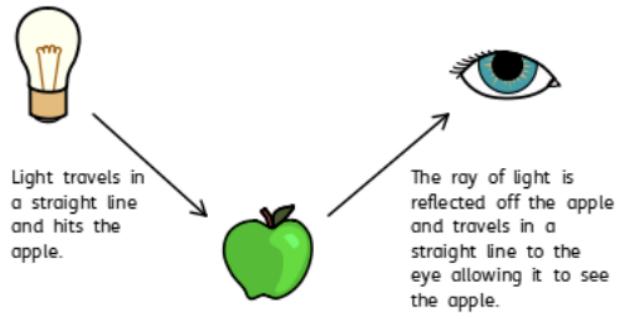
**carbon dioxide** a gas produced by animals and people breathing out



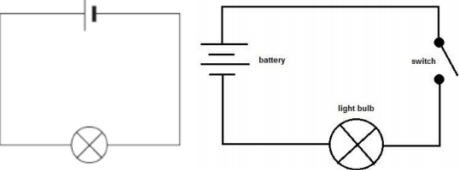
**LARGE SHADOW**  
when the toy is  
close to the light

**SMALLER SHADOW**  
when the toy is further from  
the light

**TINY SHADOW**  
when the toy is a  
long way from the light



Batteries are a store of energy. This energy pushes electricity around the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.' Symbols for: lamp, wire, buzzer, cell, battery, motor, switch (open), switch (closed). A series circuit will not work if a lamp is broken or a wire is disconnected.



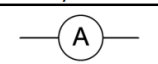
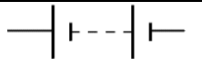


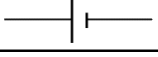

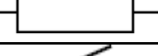
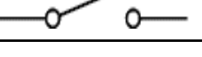
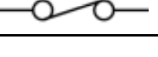
- circulatory system** the system responsible for circulating blood through the body, that supplies nutrients and oxygen to the body and removes waste products such as carbon dioxide.
- deoxygenated** blood that does not contain oxygen
- heart** the organ in your chest that pumps the blood around your body
- lungs** two organs inside your chest which fill with air when you breathe in. They oxygenate the blood and remove carbon dioxide from it.
- nutrients** substances that help plants and animals to grow
- organ** a part of your body that has a particular purpose oxygen a colourless gas that plants and animals need to survive
- oxygenated** blood that contains oxygen
- pulse** the regular beating of blood through your body. How fast or slow your pulse is depends on the activity you are doing.
- respiration** process of respiring; breathing; inhaling and exhaling air
- veins** a tube in your body that carries deoxygenated blood to your heart from the rest of your body
- vena cava** a large vein through which deoxygenated blood reaches your heart from the body
- ventricle** one of the chambers in the heart
- via** through

**Recall Quiz**



- How does the human circulatory system work?
- What is meant by a healthy diet? How might a bad diet effect you?
- How are nutrients and water transported around the body?

**Big Ideas in Science - What I need to know by the end of Y6 ( Y7 revision)**

Symbol	Component
	ammeter
	battery
	bulb
	buzzer
	cell
	motor
	resistor
	switch (open)
	switch (closed)

What changes take place from birth to old age of a human?

How does voltage affect the brightness of a lamp?

Could you draw a simple circuit, including a switch and a buzzer?

What is the function of a switch in a circuit? What happens when it is switched on and off?

How could you create a circuit where two lamps can be switched on and off separately?

Why are offspring not identical to their parents?

Describe how and animal/plant of your choice has changed over time.

Why do different environments suit different animals/plants? Give an example.

Can you describe the theory of evolution? (basic)

How does light travel? What can we see objects and colours?

Why do we have shadows? Why might their size and shape change?

What is refraction? Give an example.

How do we see? Draw a diagram.

What different classifications are there for plants/animals? Why are classifications important?

What is a micro-organism? Give an example of the environment they need to survive.

What does 'Mrs Gren' stand for? Why is this important?

Describe an animal/plant lifecycle.

### **Teaching resources:**

#### **Animals including humans:**

<https://pstt.org.uk/resources/curriculum-materials/assessment> (click 'Focussed Assessment Plans)

<https://explorify.wellcome.ac.uk/en/activities/the-big-question/how-can-you-help-someone-dance-for-24-hours>

<https://www.stem.org.uk/resources/community/collection/13109/year-6-animals-including-humans>

#### **Electricity:**

<https://pstt.org.uk/resources/curriculum-materials/assessment> (click 'Focussed Assessment Plans')

<https://explorify.wellcome.ac.uk/en/activities/whats-going-on/super-spinning-wire>  
<https://www.stem.org.uk/resources/community/collection/12390/year-6-electricity>

**Evolution and inheritance:**

<https://pstt.org.uk/resources/curriculum-materials/assessment> (click 'Focussed Assessment Plans)  
<https://explorify.wellcome.ac.uk/en/activities/odd-one-out/half-and-half>  
<https://www.stem.org.uk/resources/community/collection/12648/year-6-evolution-and-inheritance>

**Light:**

<https://pstt.org.uk/resources/curriculum-materials/assessment> (click 'Focussed Assessment Plans)  
<https://explorify.wellcome.ac.uk/en/activities/whats-going-on/find-your-focus>  
<https://www.stem.org.uk/resources/community/collection/12741/year-6-light>