PICKHURST ACADEMY - SCIENCE KNOWLEDGE ORGANISER

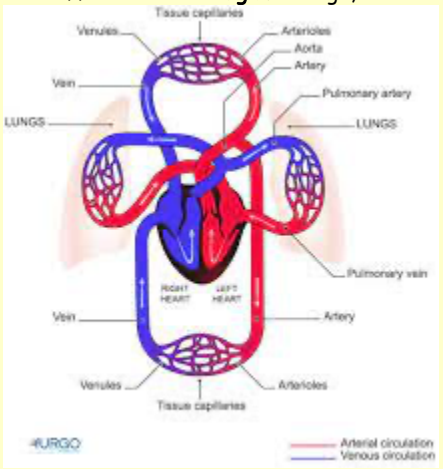
Year:	6	Topic:	Animals including Humans(Body Pump)	Strand: Biology

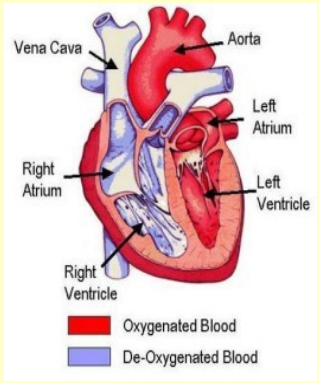
What will I know by the end of the unit:

- The **circulatory system** is made of the **heart**, **lungs** and **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.
- Alcohol can cause short-term effects such as addiction and loss of control and long-term effects such as **organ** damage, cancer and death.





- The right **atrium** collects the **deoxygenated** blood from the body, **via** the **vena cava**. It sends the blood to the right **ventricle**.
- The right **ventricle pumps** the **deoxygenated** blood to the **lungs**. Here the blood picks up **oxygen** and disposes of **carbon dioxide**.
- The **lungs** send **oxygenated** blood back to the left **atrium** which pumps it to the left **ventricle.**
- The left **ventricle** pumps the blood to the rest of the body, **via** the **aorta**.
  - 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**.

What might I know already:

- the function of the skeleton and the purpose of muscles;
- the basic parts of the digestive system and the functions of organs in this system;
- the different types of teeth in humans and their functions;
- the life cycle of a human and how we change as we grow and develop;
- the basic needs of animals for survival (water, food, air);
- the importance of exercise, hygiene and a balanced diet.

Key vocabulary

aorta	the main artery through which blood leaves your heart before it flows through the rest of your body
artery	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
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
nutrients	substances that help plants and animals to grow
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
ventilation	the exchange of air between the lungs and the atmosphere so that oxygen can be exchanged for carbon dioxide
ventricle	one of the chambers in the heart

PICKHURST ACADEMY - SCIENCE KNOWLEDGE ORGANISER

Year:	6	Topic:	Animals including humans (Body Health)	Strand: Biology

What will I know by the end of the unit:

Lifestyle choices that humans make, including diet, exercise and drug use can cause damage to the body.

The health of humans can be adversely affected by the following:

A poor diet: A healthy diet is one that helps to maintain or improve general health, providing the body with essential nutrition, including water, protein, essential fatty acids, vitamins, minerals and adequate energy (expressed in calories). A healthy diet can include plant- and animal-based foods. Where there are no pre-existing health problems, a properly balanced diet (in addition to exercise) is also thought to be important for lowering health risks such as obesity, heart disease, type 2 diabetes, hypertension and cancer.

This must be handled sensitively, as some children or family members may suffer from these conditions, which are not caused only by diet.

Exposure to disease-causing micro-organisms: Micro-organisms can be transmitted to and between humans in several ways, including eating and drinking contaminated food and water, through coughs and sneezes, by direct contact and by disease-carrying organisms such as mosquitoes and fleas.

Exposure to harmful substances: These include tobacco, which has been directly linked to breathing disorders, blocked arteries, heart disease, lung and other cancers and nerve damage, and alcohol drug and solvent abuse, which have been directly linked to impaired performance, personality change and major organ damage.

Lack of exercise, rest and sleep: Regular exercise makes humans stronger and more efficient, and a lack of regular exercise can lead to joint and muscle problems, clogged arteries, high blood pressure and heart disease. Humans need to rest and to sleep so that the body can repair and recharge itself. Insufficient sleep can lead to stress, anxiety and impaired performance.

Stress: Stress can be caused by a wide range of physical, emotional and environmental factors, and lead to a range of physical and physiological symptoms.

What might I know already:

- the function of the skeleton and the purpose of muscles;
- the basic parts of the digestive system and the functions of organs in this system;
- the different types of teeth in humans and their functions;
- the life cycle of a human and how we change as we grow and develop;
- the basic needs of animals for survival (water, food, air);

the importance of exercise, hygiene and a balanced diet.

Key vocabulary

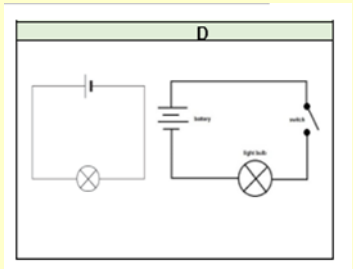
balanced diet	a diet consisting of a variety of different types of food and providing adequate amounts of the nutrients necessary for good health.
caffeine	an alkaloid compound which is found especially in tea and coffee plants and is a stimulant of the central nervous system.
clinical trial	Clinical trials are a type of research that studies new tests and treatments and evaluates their effects on human health outcomes
James Lind	James Lind (4 October 1716 - 13 July 1794) was a Scottish physician. He was a pioneer of naval hygiene in the Royal Navy.
long-term effect	A problem that is caused by a disease or treatment of a disease and may continue for months or years
nutrition	The process of providing or obtaining the food necessary for health and growth
recovery rate	It is a measure of how quickly an individual returns to their resting heart rate after exercise
Resting heart rate	Your RHR is the number of times your heart beats per minute while you're at rest.
rickets	Rickets is a condition that affects bone development in children. It causes bone pain, poor growth and soft, weak bones that can lead to bone deformities
roughage	fibrous indigestible material in vegetable foodstuffs which aids the passage of food and waste products through the gut.
saturated fat	a type of fat containing a high proportion of fatty acid molecules without double bonds, considered to be less healthy in the diet than unsaturated fat.
scurvy	a disease caused by a deficiency of vitamin C, characterized by swollen bleeding gums and the opening of previously healed wounds, which particularly affected poorly nourished sailors until the end of the 18th century
Short-term effect	A problem that is caused by treatment of a disease but usually goes away after treatment ends

PICKHURST ACADEMY - SCIENCE KNOWLEDGE ORGANISER

Year:	6	Topic:	Electricity (Danger Low Voltage)	Strand: Physics

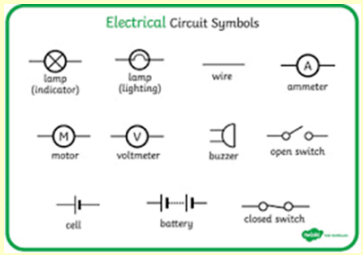
What will I know by the end of the unit:

- Electricity is a flow of electrons and this flow produces an electric current.
- A single battery is called a cell. Batteries are formed when a number of cells are grouped together. Once all the chemicals in a cell have reacted together, then no more extra electrons can be produced and the cell is 'dead'.
- A chemical reaction in a cell results in extra electrons at the negative terminal and a shortage at the positive terminal. As electrons are negatively charged they are attracted to the positive terminal. Electrons keep flowing through the circuit and they are not used up in the creating of light, movement or heat.



- The contents of a cell vary depending on the type of cell.
- Cells, switches, lamps, buzzers, motors, etc., are called components of circuits. They have two connection points called terminals. Both terminals must be connected to a power source's terminals in a loop for the electrons to flow and for the circuit to be complete. It is possible to construct a circuit and light a lamp using only one piece of wire, a cell and a lamp.

- Voltage is the driving force that causes current to flow around a circuit – 'the push'. It is the difference in potential energy between the positive and the negative terminals. As the voltage increases so does the work the current can do. Resistance is the measure of the difficulty electrons have in flowing through a material. It is much easier for the electrons to flow through a thick wire than through a thin wire. The resistance is much higher in a thin wire. Lamp filaments are very thin wire and have a high resistance. This converts the electrical energy into heat energy and results in the filament glowing white hot, therefore giving light as well as heat. Resistance is measured in ohms.



What might I know already:

- **Electricity** is a form of **energy** that can be carried by wires and is used for heating and lighting, and to provide **power** for **devices**.
- **Sources** of light and sound may need **electricity** to work.
- Where **electricity** comes from
- Which **appliances** need **electricity**
- What a **circuit** is, the **components** of a circuit and how it works.
- What **electrical conductors** and **insulators** are.
- What happens when a **switch** is added to a circuit.
- What **forces** and **resistance** are.

Key vocabulary

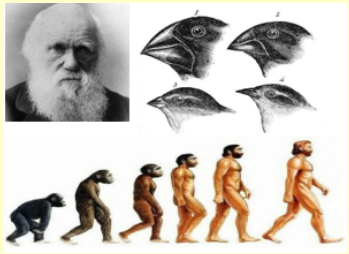
ammeter	measures the current in a circuit.
appliance	a device or machine in your home that you use to do a job.
battery	two or more cells that provide the power for a circuit.
bulb	A glass holder containing a wire which gives out light when electricity passes through it.
buzzer	an electrical device that is used to make a buzzing sound
cell	a single power source for a circuit, two or more cells makes a 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
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
source	where something comes from
switch	a small control for an electrical device which you use to turn the device on or off
voltage	Voltage is the pressure from an electrical circuit's power source that pushes charged electrons (current) through a conducting loop
wires	a long thin piece of metal that is used to fasten things or to carry electric current

PICKHURST ACADEMY - SCIENCE KNOWLEDGE ORGANISER

Year:	6	Topic:	Evolution and Inheritance (Everything Changes)	Strand: Biology

What will I know by the end of the unit:

- Charles Darwin, an evolutionary scientist, studied different animal and plant **species**, which allowed him to see how a**daptations** could come about. His work on 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**.

- **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 (adipose) 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.

What might I know already:

That things can be recognised as living and that common classification groups of animals include amphibians, reptiles, birds, fish, mammals, invertebrates. Animals that require a diet that includes animal protein are known as carnivores; animals that only require plant protein are known as herbivores and species which maintaina diet that includes both are known as omnivores. Animals have offspring which grow into adults. The basic needs of animals for survival are water, food and air. Some animals have skeletons for support, protection and movement. Sometimes environments can change and this has an effect on the plants and animals that exist there. Living things breed to produce offspring which grow into adults. This is called reproduction.

Key vocabulary

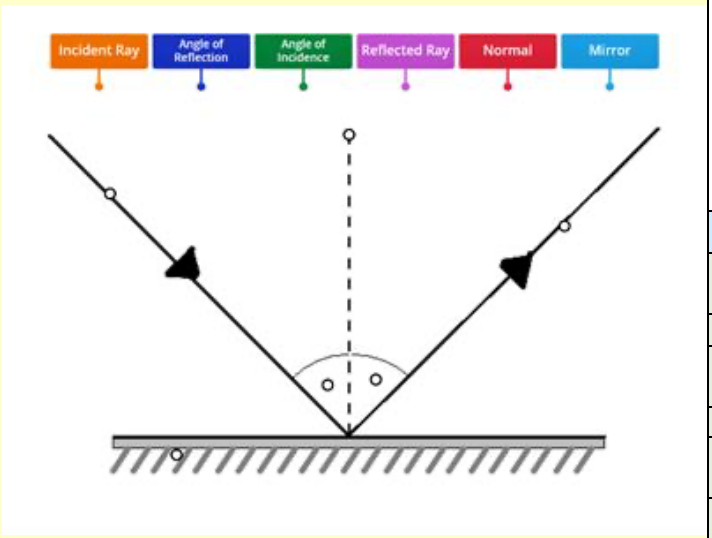
adaptation	a change in structure or function that improves the chance of survival for an animal or plant within a given environment.
ancestor	an early type of animal or plant from which a later type has evolved.
biodiversity	a wide variety of plant and animal species living in their natural environment.
characteristics	the qualities or features that belong to a species that make them recognisable.
environment	all the circumstances, people, things, and events around them that influence their life.
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 to enable them to survive better in their environment.
extinct	no longer has any living members, either in the world or in a particular place.
fossil	hard remains of a prehistoric animal or plant that are found inside a rock.
inherit	derive (a quality, characteristic, or predisposition) genetically from one's parents or ancestors.
natural selection	a process by which species of animals and plants 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 that is intended to explain something
variation	a change or slight difference

PICKHURST ACADEMY - SCIENCE KNOWLEDGE ORGANISER

Year:	6	Topic:	Light (Light up Your World)	Strand: Physics

What will I know by the end of the unit:

A ray diagram is a model of looking at the behaviour of light that can help predict phenomena such as the size and shape of shadows. The rays are straight lines that travel from the object to the image or the eye, with arrows showing the direction of the light.



When light travels from one medium to another its speed changes. Unless the light travels into the object at right angles to the surface there is also a change in direction. This is called refraction and is why an object half in water appears to be bent and why when we view things underwater they are not where they appear to be.

White light that comes from the sun and other sources, such as a torch, is made up of a number of colours (red, orange, yellow, green, blue, indigo, violet) but we cannot see these because they are mixed together. The light can be split into the separate colours with a prism (dispersion). White light can be split into its constituent colours in other ways, including using water, and this is how a rainbow is formed. The white light is split by the water drop (rain or mist) but bounces back in the direction it came from, so you can only see a rainbow if the sun is behind you and the rain/ mist is in front of you.

What might I know already:

Certain things produce light, usually by burning (e.g. the sun) or electricity (e.g. street lights). Shiny materials do not make light but do reflect it. Shadows are caused when certain materials block light. Light travels in straight lines. When light is blocked by an opaque object, a dark shadow is formed. The further away the light source is, the smaller the shadow is. The closer the source of the light, the bigger the shadow.

Key vocabulary

shadow	a dark area or shape produced by a body coming between rays of light and a surface.
dim	not shining brightly or clearly.
reflect	the throwing back by a body or surface of light, heat, or sound without absorbing it.
opaque	not able to be seen through
transparent	allowing light to pass through so that objects behind can be distinctly seen.
translucent	allowing light, but not detailed shapes, to pass through; semi-transparent.
ultra-violet	having a wavelength shorter than that of the violet end of the visible spectrum but longer than that of X-rays.
ray	each of the lines in which light (and heat) may seem to stream from the sun or any luminous body, or pass through a small opening.
beam	a ray or shaft of light
refraction	is the bending of light from one transparent surface to another.
periscope	an apparatus typically in a submerged submarine or behind a high obstacle) can see things that are otherwise out of sight.
spectrum	a band of colours, as seen in a rainbow, produced by separation of the components of light by their different degrees of refraction according to wavelength.
dispersion	the separation of white light into colours or of any radiation according to wavelength.
inverted	an image formed by the convergence of the actual rays of light from an object.
medium	the intervening substance through which sensory impressions are conveyed or physical forces are transmitted.

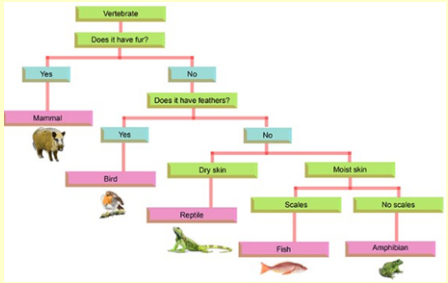
PICKHURST ACADEMY - SCIENCE KNOWLEDGE ORGANISER

Year:	6	Topic:	Living Things (The Nature Library)	Strand: Biology

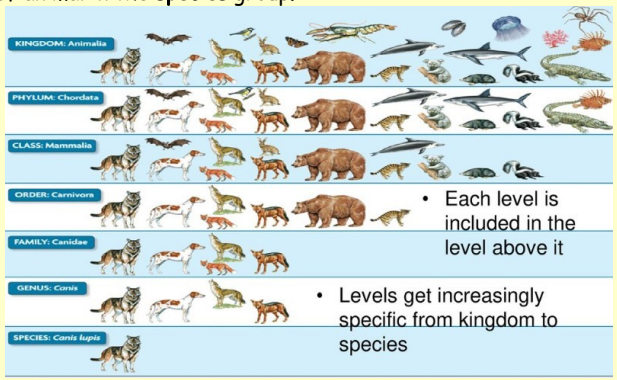
What will I know by the end of the unit:

Living things can be grouped according to different **criteria** (where they live, what type of **organism** they are, what features they have). For example, a camel can belong in a group of **vertebrates,** a group of animals that live in the desert, and a group of animals that have four legs.

A **classification key** is a tool that is used to group living things to help us identify them using recognizable **characteristics.**



The Linnaean system, named after Carl Linnaeus, has different levels where the number of living things in each group gets smaller and smaller, until there will just be one type of animal in the **species** group.



Microorganisms are very tiny **organisms** where a microscope has to be used to see them.

Examples of **microorganisms** include dust mites, bacteria and fungi, such as mould. Some **microorganisms** can be helpful in certain situations. Others can be harmful, and their spread needs to be controlled or contained.

What might I know already:

Animals can be grouped into **carnivores, herbivores** and **omnivores.** They can also be grouped into **vertebrates** and **invertebrates. Organisms** can be **classified** and we can use a **classification key** to identify them. Examples of **habitats** (including **microhabitats**) and the **organisms** that can be found there.

Living things depend on each other to survive. How **environments** are changing and how changes endanger living things. The relationships between **predators** and **prey**. How the **life cycles** of mammals, amphibians, insects and birds differ. How animals **reproduce** and the difference between sexual and asexual **reproduction** in plants. **Food chains** demonstrate the direction in which **energy** travels.

How **organisms** have **adapted** and **evolved** over time.

Key vocabulary

carnivore	an animal that eats meat
characteristics	the qualities or features that belong to them and make them recognizable
classification key	a system which divides things into groups or types.
criteria	a factor on which something is judged
energy	the ability and strength to do physical things
environment	all the circumstances, people, things and events around them, that influence their life
evolution	a process of change that takes place over many generations, where species of animals, plants, or insects slowly change some of their physical characteristics
food chain	a series of living things which are linked to each other because each thing feeds on the one next to it in the series
habitat	the natural environment in which an animal or plant normally lives or grows
herbivore	an animal that only eats plants
invertebrate	a creature that does not have a spine, for example an insect, a worm, or an octopus
microorganism	a very small living thing which you can only see if you use a microscope
omnivore	person or animal eats all kinds of food, including both meat and plants
organism	a living thing
predator	an animal that kills and eats other animals
prey	an animal hunted or captured by another for food
species	a class of plants or animals whose members have the same characteristics and are able to breed with each other
vertebrate	a creature which has a spine