The three types of 'learning journey'

HIAS Moodle+ resource

The building block topic: Ideas build upon each other sequentially making and increasingly sophisticated model
The big model topic: An important model is shared at the beginning but detail and complexity is added through the topic.
The multiple context topic: An important over arching concept or idea is taught at the beginning and then applied in a number of different contexts through the topic.

Key Stage 1

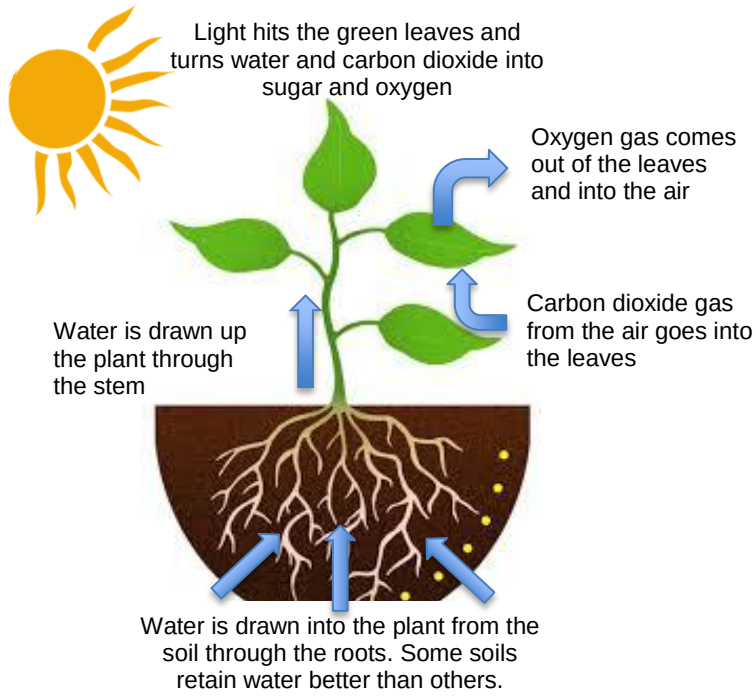
Topic	Key ideas	Learning journey	Parts of the story			
Animals: How animals survive	• There are many different animals with different characteristics • Animals need food to survive • Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy. • Animals move in order to survive. • Exercise keeps animal's bodies in good condition and increases survival chances. • Animals have senses to help individuals survive. When animals sense things they are able to respond	Building block	**Chapter 1** Animals need food to survive; it gives them energy to move and material to grow. Animals are all different and so eat different foods, some eat other animals (carnivores) and others only eat vegetables (herbivores).	**Chapter 2** Animals have to get their food so they have to move to where it is, which means they have to move in different ways depending upon where their food is. Animals that eat other animals have to hunt them (predators) animals that are hunted are prey.	**Chapter 3** Animals use their senses to detect where their food is and if there are any predators around, animals have different ways of avoiding being eaten e.g. camouflage, protection and moving away fast.	
Animals: Simple animal life time lines	• All animals eventually die. • Animals reproduce new animals when they reach maturity. • Animals grow until they reach maturity and then don't grow any larger	Big model	**The model of animal life** All animals are born which is when they can eat and breath When animals are no longer able to reproduce they usually die They grow and develop until they are string enough to reproduce		**How it varies between different animals** • Different animals live for different ages • Different animals reach different sizes before they are able to reproduce • Different animals reproduce at different ages	
Pushes, pulls and their effects	• Materials can be changed by physical force (twisting, bending, squashing and stretching) • Things can move in different ways. • Pushing and pulling can make things move or stop. • Pushing and pulling can change the shape of things. • Pushing and pulling can make things move faster or slower. • Bigger pushes and pulls have bigger effects.	Building block	**Chapter 1** Objects move in different ways; they roll, slide, bounce etc	**Chapter 2** We can change the way an object moves by pushing or pulling them. Sometimes pushing and pulling slows things down, sometimes it speeds them up and	**Chapter 3** Bigger pushes and pulls have bigger effects.	**Chapter 4** Sometimes when an object is pushed, pulled or twisted it changes shape.

	• Pushing and pulling can make things move faster or slower.			sometimes it makes it change direction.		
Habitats and how the seasons affect them	• Some things are living, some were once living but now dead and some things have never lived • There is variation between all living things. • Different animals and plants live in different places. • Living things are adapted to survive in different habitats. • Environmental change can affect the plants and animals that live there	Building block	**Chapter 1** All animals get their nutrients by eating. Some animals hunt and eat other animals (***predators***) and some animals are hunted and eaten by other animals (***prey***). Animals that eat only other animals are called ***carnivores.*** Animals that only eat plants are called ***herbivores***, and animals that eat both animals and plants are called ***omnivores***	**Chapter 2** All animals are adapted to eat and survive (they are adapted to survive as predators ***and*** prey). Animals have adapted many different ways to survive as predators or prey. Plants are also adapted to survive; they have adapted to get the water and light they need and avoid being eaten or dying when chewed.	**Chapter 3** The changing seasons have a dramatic effect on plants, which has an impact on the animals that feed on them. Animals have adapted ways of surviving when the seasons change and food become scarce including hibernating, storing food (fattening up), migrating.	**Longitudinal studies** Children should raise and explore questions that ***demand*** the identification of creatures and plants in their local environment and how their populations change through the seasons. Linking the properties of the seasons to the changing populations and beginning to question how populations of different organisms are related.
Materials and their properties	• There are different materials • Materials have describable properties • Different materials have different properties. • Materials can be changed by physical force (twisting, bending, squashing and stretching)	Multiple context	**The big idea about materials.** • There are many different materials that have different describable and measureable properties. • Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass). • The properties of a material determine whether they are suitable for a purpose.		• These ideas are explored through testing materials to see if they are appropriate for particular jobs. • Topics need to be arranged so that all the main groups of materials are explored and important properties are investigated (strength, flexibility, waterproofness, absorbency, softness, slippiness, stretchiness, brittleness)	
Growing plants	• Plants usually grow from seeds and bulbs. • Plants need warmth, light and water to grow and survive	Building block	**Chapter 1** Most plants start growing from a seed or bulb.	**Chapter 2** All plants need water, light and warmth to grow and survive.	**Chapter 3** A seed produces roots to allow water to get into the plant and shoots to produce leaves to collects the sunlight.	
Plant reproduction	• Flowering plants make seeds to reproduce and make more plants. Some plants die after producing seeds and others live for many generations.	Building block	**Chapter 1** All flowering plants make seeds that can grow into new plants	**Chapter 2** Sometimes the plant dies after it has produced its seed	**Chapter 3** Sometimes the plant lives for many generations producing seeds each year	

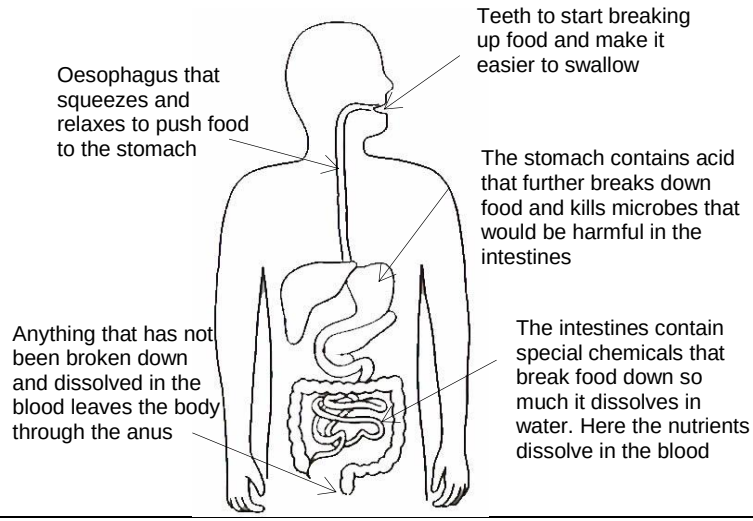
Years 3 and 4

Topic	Key ideas	Learning journey	Parts of the story			
Animals; Skeletons and movement	• Many animals have skeletons to support their bodies and protect vital organs. • Muscles are connected to bones and move them when they contract. • Movable joints connect bones	Building block	**Chapter 1** • All vertebrates have internal skeletons that protect vital organs. • Invertebrates have exoskeletons that protect vital organs	**Chapter 2** Skeletons support the weigh of land animals. Stronger bones can support more weight	**Chapter 3** Bones are connected (but can move relative to each other) at joints. Muscles connect to bones and move them when they contract. Stronger bones can anchor stronger muscles	
Light	• There must be light for us to see. Without light it is dark. • Light comes from a source. • We need light to see things even shiny things. • Transparent materials let light through them and opaque materials don't let light through. • Beams of light bounce off some materials (reflection). • Shiny materials reflect light beams better than non-shiny materials	Multiple context	**Chapter 1** We can only see things when there is light and the light had to come from somewhere. All light originally comes from a light source	**Chapter 2** When light hits an object it can do a number of things • If the object is transparent it will go through it and we will be able to see through it. • If the object is opaque it will block the light and no light will get through. • If the object is perfectly reflective light will bounce back off it and we will see reflections of objects. • If the material is translucent it will allow light through but we wont be able to see through it.		
Solids, liquids and gases	• Materials can be divided into solids, liquids and gases. • Solids, liquids and gases are described by observable properties • Heating causes solids to melt into liquids and liquids to evaporate to gases • Cooling causes gases to condense to liquids and liquids to freeze to solids • The temperatures at which given substances change	Building block	**Chapter 1** Materials can be divided into solids liquids and gases. **Solids** hold their shape unless forced to change. **Liquids** flow easily but stay in their container because of gravity.	**Chapter 2** • Heating causes solids to melt into liquids and liquids to evaporate to gases • Cooling causes gases to condense to liquids and liquids to freeze to solids	**Chapter 3** Different substance change state at different temperatures but the temperatures at which given substances change state are always the same.	**Chapter 4** The temperature at which a substance melts from a solid to a liquid is the same at which it freezes from a liquid to a solid. The temperature at which a substance boils from a liquid to a gas is the same at which it condenses from a gas to a liquid.

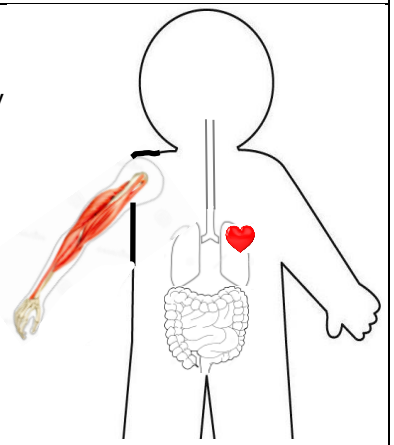
<table>
<tr><td></td><td>state are always the same.</td><td></td><td>Gases move everywhere and are not held in containers by gravity.</td><td></td><td colspan="2"></td></tr>
<tr><td>Mixtures and separating them</td><td>• Materials change state by heating and cooling.
• Some changes can be reversed and some can’t.
• When two or more substances are mixed and remain present the mixture can be separated.</td><td>Building block</td><td>Chapter 1
When more than one substance are present in the same container it is called a mixture</td><td>Chapter 2
When a substance is added to a liquid it has dissolved if no bits of the substance can be seen and the liquid is transparent. This mixture is called a solution. Not all substances dissolve in water.</td><td colspan="2">Chapter 3
All mixtures can be separated if they have a difference in property. This is because both (or all) of the materials are still present.<table><tr><td>Separating technique</td><td>Difference in property required</td></tr><tr><td>Filtration and sieving</td><td>A solid that does not dissolve in a liquid. Different sized solid bits</td></tr><tr><td>Magnets</td><td>Some materials magnetic others not</td></tr><tr><td>Evaporation</td><td>A solid dissolved in water and the solid has a high boiling temperature</td></tr><tr><td>Floating</td><td>Some materials float and other sink</td></tr></table></td></tr>
<tr><td>Feeding relationships and the environment</td><td>• Living things can be divided into groups based upon their characteristics.
• Different food chains occur in different habitats.
• Environmental change affects different habitats differently.
• Human activity significantly affects the environment.
• Different organisms are affected differently by environmental change</td><td>Building block</td><td colspan="2">Chapter 1
In any habitat there are food chains and webs where nutrients are passed from one organism to another when it is eaten. If the population of one organism in the chain or web is affected it has a knock on effect to all the others.</td><td>Chapter 2
Environmental change (the seasons, human activity, climate change) affects different organisms differently and therefore different habitats differently because all organisms in a habitat are interdependent.</td><td>Longitudinal studies
Children should raise and explore questions that demand the identification and classification of creatures and plants in their local environment (insects, spiders, birds, mammals, reptiles and amphibians). Questions should require children to consider how environmental change (the seasons, human activity, climate change) affects different organisms within their environment differently and therefore different habitats differently because all organisms in a habitat are interdependent.</td></tr>
<tr><td>How plants reproduce</td><td>• Flowering plants have evolved specific parts to carry out pollination, fertilisation and seed growth.
• Seed dispersal improves chances of enough seeds germinating and growing to mature plants and</td><td>Building block</td><td>Chapter 1
Flowering plants have evolved specific parts to carry out pollination, fertilisation and seed growth.
Coloured and scented petals and attract insects</td><td>Chapter 2
All flowering plants reproduce by pollen from the male reaching the stigma of the female. However all plants look slightly different because they pollinate in different</td><td>Chapter 3
Plants have evolved many different ways to disperse their seeds. Seed dispersal increase the chances of the seeds germinating and growing into mature plants</td><td>Chapter 4
Seeds and bulbs need the right conditions to germinate. They contain a food store for the first stages of growth (i.e. until the plant is able to produce its own food</td></tr>
</table>

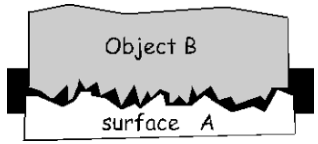
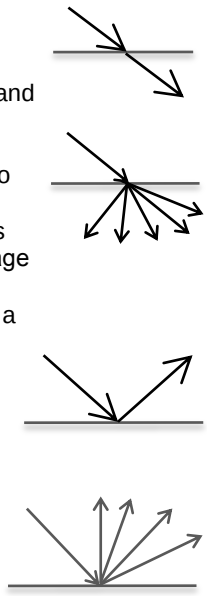
	reproducing. • Seeds and bulbs need the right conditions to germinate. They contain a food store for the first stages of growth (i.e. until the plant is able to produce its own food)		Stamen hold pollen Stigma collect pollen Ovaries contain eggs that grow into seeds when pollen from the male moves down the stigma.	ways.		through its leaves)
How plants make their food	• Plants make their own food in their leaves to provide them with energy, grow, repair, and reproduce. • Leaves absorb sunlight and carbon dioxide through leaves. • Plants have roots to provide support and to draw moisture from the soil, through stems to take water to the rest of the plant. • The plant makes its food from water and carbon dioxide, using sunlight as energy, in the green parts of plants (mainly leaves)	Big model	**Chapter 1** Plants don't eat and so have to make their own food to provide them with energy and material to grow.	**The model of how plants grow** Plants turn water from the ground and carbon dioxide from the air into sugar, which is used for energy and making new material to grow.  		
Magnets and their effects	• Magnets exert attractive forces on some materials. • Magnets exert attractive and repulsive forces on each other. • Magnets exert non-contact forces, which work through some materials.	Building block	**Chapter 1** Magnets exert attractive forces on some metals	**Chapter 2** Each end of a magnet is called a pole, opposite poles are called north and south. Magnets exert attractive forces on each other	**Chapter 3** Magnetic forces work through other materials including air, so magnets don't need to be touching to exert their force. It is called a non-contact	**Chapter 4** The strength of magnetic forces are affected by: • The strength of the magnet. • The distance between the magnet and the

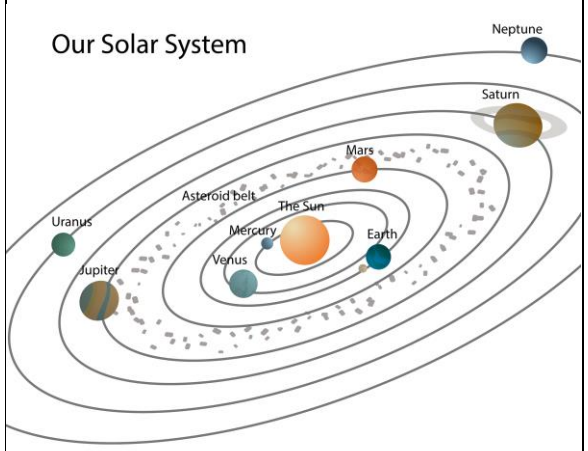
	• Magnetic forces are affected by the magnets strength. • Magnetic forces are affected by the mass of the object being attracted. • Magnetic forces are affected by the distance between magnet and object			when the poles facing each other are north and south (opposites). Magnets exert repulsive forces on each other when the poles facing each other are the same.	force	object. • The material the object is made from.	
Electrical circuits	• A source of electricity (mains or battery) is needed for electrical devices to work. • A complete circuit is needed for electricity to flow and devices to work. • Electricity sources push electricity round a circuit. • More batteries will push the electricity round the circuit faster. • Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators. • Devices work harder when more electricity goes through them	Building block	**Chapter 1** Lots of devices are powered by electricity; these need a source of electricity, which could be mains or battery.	**Chapter 2** The battery's job is to push electricity to the device, but it needs something to carry the electricity all the way from the supply to the device, this is what we call a circuit.	**Chapter 3** If there are more batteries they push harder and so the device will work harder e.g. brighter or faster.	**Chapter 4** However not everything can carry the electricity from the source to the device, some materials allow the electricity through (conductors) and others don't (insulators)	
Animals: Digestion	• Different animals are adapted to eat different foods. • Animals have teeth to help them eat. Different types of teeth do different jobs. • Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. The blood takes nutrients around the body. • Nutrients produced by plants move to primary consumers then to secondary consumers	Building block	**Chapter 1** Animals need a variety of foods to help them survive. The main food groups are: • Meat, dairy and pulses to provide protein for muscles. • Grains and root vegetables to provide carbohydrates for energy.	**Chapter 2** Different animals require different foods to survive. Humans require a balanced diet to remain healthy but healthy diets vary depending upon the type of activity that humans do.	**Chapter 3** The nutrients in food have to get to every part of the body. The blood transports them. The role of digestion is to get the nutrients in food to dissolve in the blood, if it doesn't dissolve it can enter the blood and be transported. Humans achieve this as below:		

	through food chains.		• Fat for insulation and energy. • Fruit and vegetables for minerals, vitamins and fibre.		

Years 5 and 6

Topic	Key ideas	Learning journey	Parts of the story	
Respiration in animals	• Oxygen is breathed into the lungs where it is absorbed by the blood. • The heart pumps blood around the body. • Muscles need oxygen to release the energy from food to do work: Oxygen is taken into the blood in the lungs, the heart pumps blood through blood vessels to the muscles, the muscles take the oxygen and nutrients from the blood	Big Model	**Chapter 1** All animals need oxygen to survive. Every part of animals bodies need oxygen, especially muscles Muscles need a supply of oxygen and sugar to make them work, they are supplied this by the blood.	**The big model** The blood circulates around the body in a way that ensures all muscles in the body get a supply of oxygen and sugar The heart pumps blood to every muscle in the body. The circulatory route must allow the blood to collect oxygen from the lungs, sugar from the intestines and visit muscles. The blood then returns to the heart where it is pumped again. 
Making new substances	• Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible. • Sometimes mixed substances react to make a	Multiple context	**The big idea** It is possible to change materials into completely different ones. This is very important because new substances might have different properties to materials we currently have. For example plastics can be moulded into intricate shapes, are waterproof, strong and electrical insulators. When materials are heated or mixed with other materials they sometimes can be made to turn into new materials. The question is how would we know if it was a new material or the same material mixed differently?	

	new substance. These changes are usually irreversible.		Indicators that something new has been made are: 1. The properties of the material are different (colour, state, texture, hardness, smell, temperature) 2. If it is not possible to get the material back easily it is likely that it is not there any more and something new has been made (irreversible change)		
Forces that oppose motion	• Air resistance and water resistance are forces against motion caused by objects having to move air and water out of the way. • All matter (including gases) has mass. • Friction is a force against motion caused by two surfaces rubbing against each other • Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move.	Building block	**Chapter 1** • When objects move through air and water they have to push it out of the way. The water and air push back with forces called water resistance and air resistance. The harder it is to push the material out of the way the greater the resistance. • Gases weigh less than liquids and so water resistance is greater than air resistance	**Chapter 2** • Friction is a force against motion caused by two surfaces rubbing against each other. It occurs because no surfaces are perfectly smooth; they have bumps and undulations that can interlock when placed on top of each other. • To move one interlocking surface over another one of three things must happen: 1. The surfaces must rise slightly 2. The bumps on the surface must bend 3. The bumps on the surface must break All of these actions requires a force, this is what causes friction 	**Chapter 3** Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move.
Light and how we see.	• Light travels in straight lines. • Light reflects of all objects (unless they are black). Non-shiny surfaces scatter the light so we don't see a single beam. • Animals see light sources when light travels from the source into their eyes. • Animals see objects when light is reflected off that object and enters their eyes	Building block	**Chapter 1** When light is emitted from a light source it travels in straight lines until it hits an object. This can be represented by an arrow.	**Chapter 2** • When light hits an object it may go through it in a straight line (transparent, light goes through and the arrows don't scatter so you can see an image through it) or the material may allow the light to go through but scatter it in many directions (translucent, light goes through but you can't see an image through the material). • It may bounce off the material in a straight line (reflect, so we can see a reflection image in the object), or it may scatter off in many directions (so we can't see an reflection image in the object). Shiny surfaces are better reflectors and rough surfaces scatter light more. Opaque objects don't allow any light to pass through them. 	**Chapter 3** Animals see when light enters their eyes; they see an object when light from the object enters their eyes.
Space and gravity	• Stars, planets and moons have so much mass they	Building block	**Chapter 1** The universe is vast and contains billions of stars.	**Chapter 2** Stars produce vast	**Chapter 3** • Gravity is a force of attraction between

	attract other things, including each other due to a force called gravity. Gravity works over a distance. • Stars produce vast amounts of heat and light. All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars. • Objects with larger masses exert bigger gravitational forces • Objects like planets, moons and stars spin • Smaller mass objects like planets orbit large mass objects like stars		The solar system is a collection of planets and moons orbiting our nearest star, the sun. It can be represented using a model.  All objects in the solar system are spinning as well as orbiting.	amounts of heat and light. All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars	any two things that have mass and bigger masses exert bigger forces. • Gravity works over a distance but gets weaker as the distance increases. Stars, planets and moons have so much mass they exert a large gravitational attraction on other things, including each other. • Differences in gravity result in smaller mass objects like planets (or moons) orbiting larger mass objects like stars (or planets)
How sound is made, travels and can be changed Sound travel	• Sound travel can be blocked. • Sound spreads out as it travels. • Changing the shape, size and material of an object will change the sound it produces. • Sound is produced when an object vibrates. • Changing the way an object vibrates changes it's sound. • Sound moves through all materials by making them vibrate. • Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds. • Faster vibrations (higher frequencies) produce higher pitched sounds.	Building block	**Chapter 1** • Sounds can be made in many different ways and individual sounds have the properties of pitch and volume. • When a sound is made it immediately spreads out in all directions. As it travels its volume decreases but its pitch remains the same.	**Chapter 2** • Sound is made when an object is made to vibrate (move backwards and forwards or up and down). • As the material vibrates it makes whatever it is in contact with vibrate, including air. As the air vibrates it makes whatever it is in contact with vibrate also, which might be a wall or even your eardrum. Sound moves through materials vibrating making other materials they are in contact with vibrate.	**Chapter 3** • Pitch and volume are determined by how the material vibrates: ➢ **Pitch** is determined by how fast an object vibrates, i.e. the frequency of vibration. The higher the frequency the higher the pitch. ➢ **Volume** is determined by how big the movement of each vibration is (the amplitude of vibration). The bigger the amplitude the higher the volume. • Smaller objects and tighter strings and surfaces tend to vibrate with a higher frequency.

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<td>Controlling electrical circuits</td>
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Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push'.
Current is how much electricity is flowing round a circuit.
The greater the current flowing through a device the harder it works.
When current flows through wires heat is released. The greater the current the more heat is released

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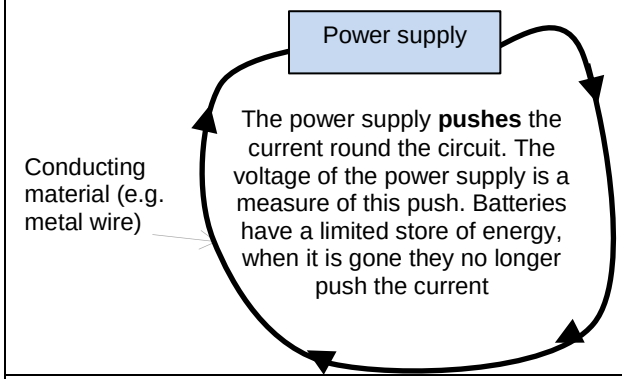
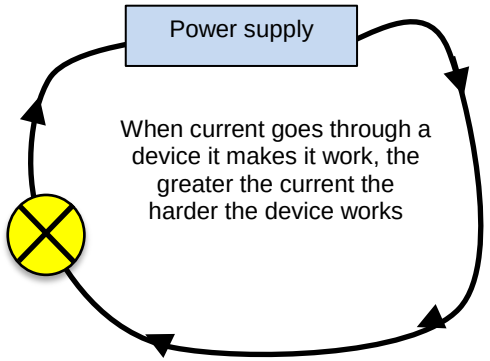
<td>Building block</td>
<td colspan="3">
Chapter 1


Chapter 2


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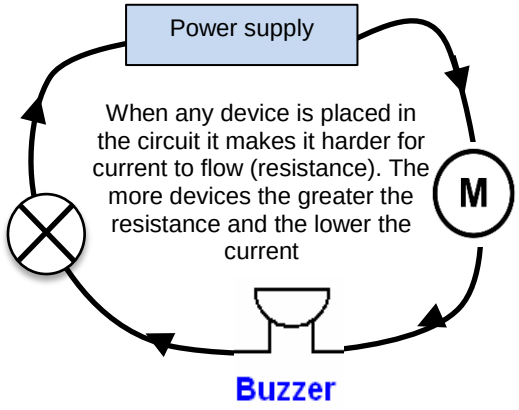
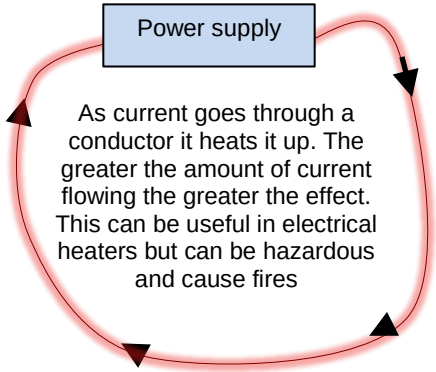


Chapter 4


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<td>Evolution and natural selection</td>
<td>

Some organisms reproduce sexually where offspring inherit information from both parents. Some organisms reproduce asexually by making a copy of a single parent
Fossils provide evidence that Living things have changed over time.

</td>
<td>Building block</td>
<td>Chapter 1
Over the last many millions of years there are many examples of organisms becoming extinct and others evolving into new organisms</td>
<td>Chapter 2
The way fossils form and are found mean the fossil record is an incomplete record of all evolution. Scientists have had to piece together evidence to work out how</td>
<td>Chapter 3
Darwin's theory of Natural Selection explains how evolution occurs. It can be simplified in the flow chart.</td>
<td>Chapter 3
All living things have similar stages of life.</td>
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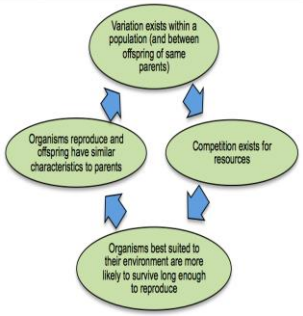
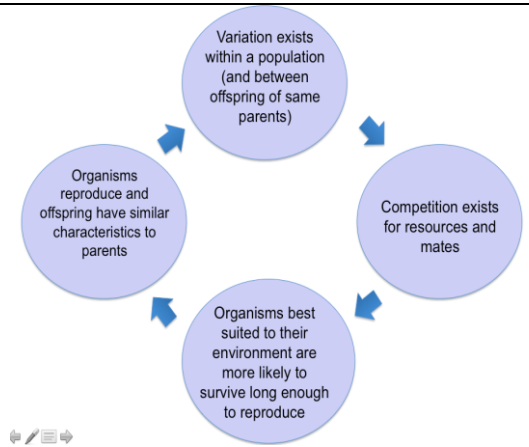
	• Environmental change can affect how well an organism is suited to its environment.  • Over time the characteristics that are most suited to the environment become increasingly common • Different types of organism have different life cycles. • Life cycles have evolved to help organisms survive to adulthood. •		over many generations. The fossil record provides evidence for this.	organisms evolve.	 • Some organisms reproduce sexually where offspring inherit information from both parents, others reproduce asexually by making a copy of a single parent. A sexual reproduction results in little variation in a population that makes evolution less likely.	Fertilisation Developing what is essential for surviving outside mother or seed Birt Developing body and learning if an animal Able to move (if animal) and find (or make if plant) own food independently Growing in order to survive independently and learning if an animal Adolescent Developing reproductive organs Mature adult Different animals have adapted these stages differently, which has enabled them to survive.