

Subject Leader: Sarah Bonner

‘The Scientist is not a person who gives the right answers; but is one who asks the right questions.’

Claude Levi-Strauss

Science is the process of learning about the world around us and understanding it through observation, questioning, investigation and evaluation. Science at Normanton Common Primary Academy provides all children with high-quality scientific experiences that allow them to develop their independence, ideas and ways of working, thus equipping them with a deeper understanding of the world.

In Science, pupils will have the opportunity to:

Develop a secure understanding and skill-set in ‘working scientifically’.

Ask questions and recognise that they can be answered in different ways.

Learn how to ask the right types of questions.

Use a range of scientific equipment and resources.

Make plausible predictions based on prior knowledge.

Experience hands-on science activities that allow them to use their ‘working scientifically’ skills.

Answer questions and construct informed conclusions based on evidence they have gathered via their own investigations.

Improve their science capital by learning about a diverse range of scientific topics and how these can be transferred into real-life careers.

Challenge stereotypes by studying a rich and diverse range of individuals who have made a significant impact on scientific developments.

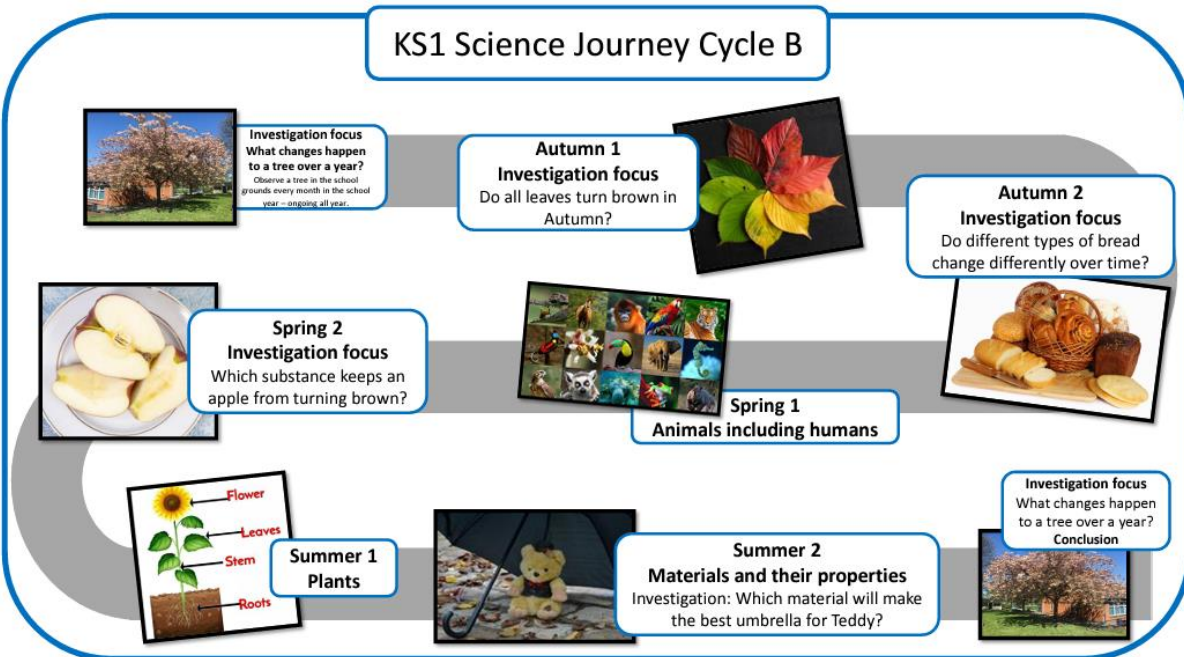
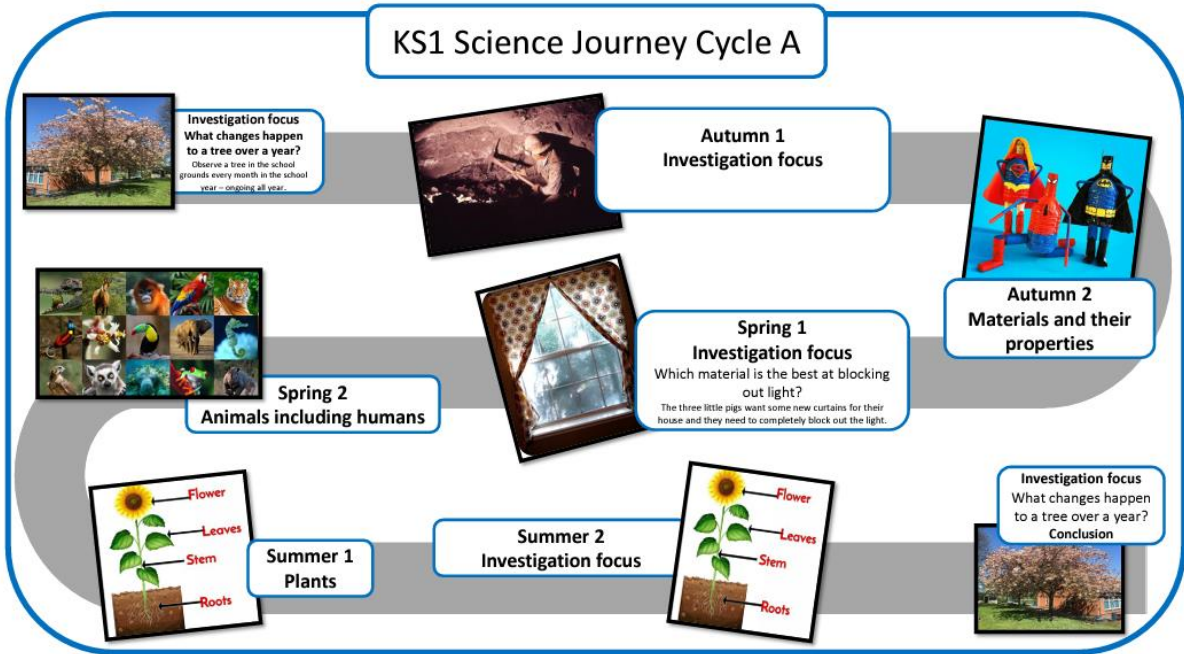
How is the content / theme chosen?

The content is chosen to make effective links with key themes and ensure coverage of the expectations as set out in the National Curriculum programmes of study, as well as the EYFS framework. At Normanton Common Primary Academy we ensure a clear, sequenced progression, which is taught systematically for all pupils to acquire the intended knowledge and skills. The content may be adapted or changed, based upon the needs or interests of specific cohorts.

How do we ensure progression of knowledge and skills?

At Normanton Common Primary Academy we have in place, for each subject area, a knowledge and skills progression document, which is used for planning, to ensure sequenced and appropriate content for specific year groups. Teachers are clear on the learning and expectations for each year group, as this has been carefully selected and mapped out so that children are building on prior knowledge and skills each term and each year. Within these documents there are opportunities for differentiation, in order to meet the needs of all learners.

Science Curriculum Road Map



LKS2 Science Journey Cycle A



NCPA Dunk-athon
Working scientifically
skills focus

States of matter
Is there a pattern in how long it takes
different ice lollies to melt?
Pattern seeking



Rocks, soils & fossils
Which type of rock would be best
for building a Stone Age house?
Identifying, grouping & classifying



Forces and magnets
Which magnet is the strongest?
Comparative/fair testing



Digestive/Muscular/Skeletal system
How does the human digestive
system work?
Research



Plants
What happens to celery when it is
left in a glass of coloured water?
Observation over time



LKS2 Science Journey Cycle B

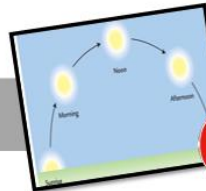


Floating and sinking
Working scientifically
skills focus

Electricity
Which metal make the bulb light the
brightest?
Comparative/Fair testing



Rocks, soils & fossils
What are the layers of soil and how
are they made?
Research



Light
How do shadows change throughout
the day?
Observation over time



Sound
Is there a pattern between the faintness
of a sound and the distance a person is
away from the sound source?
Pattern seeking



Living things & their habitats
How can we sort animals into groups?
Identifying, grouping & classifying



UKS2 Science Journey Cycle A



Forces

Which shape/size parachute takes the longest to fall?
Comparative/fair testing

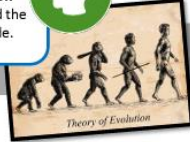
Vikings - Investigation

What are the Aurora Borealis and how are they created?
Research



Evolution and inheritance

How do animals evolve? Create a new animal and explain how it evolves and the changes that would need to be made.
Problem-solving



Animal classification/adaptation

Where do most animals live in the Amazon rainforest?
Identifying, grouping & classifying



Light and Electricity

Does the length of wire effect an electrical circuit? Is there a pattern?
Pattern seeking



Early Islamic Civilisation - Investigation

What changes can we see when we observe the moon for twenty days?
Observation over time



UKS2 Science Journey Cycle B

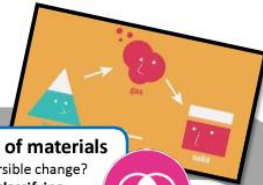
World War I - Investigation

Why do submarines sink if they are full of air?
Research



Properties and changes of materials

Which materials have a reversible change?
Identifying, grouping & classifying



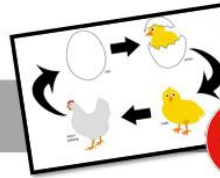
Animals including Humans

Which type of exercise has the greatest effect on our heart rate?
Comparative/Fair testing



Life Cycles

What comparisons can you make between the life cycle of two collections of animals?
Observation over time



Earth and Space

Is there a pattern between the size of a planet and the time it takes to travel around the Sun?
Pattern Seeking



Tudors

What foods did the Tudors take on long ship journeys? Create a provision list of foods that would last on a journey of 30 days.
Problem-solving



How is the subject taught?

Science lessons are carefully planned through our themes, so that valuable links can be made across other subjects. A two year, long term rolling programme maps out the coverage of the discrete teaching and learning opportunities for children to develop and embed specific skills. This ensures coverage of the National Curriculum, for science across Key Stage 1 and 2 and work within and beyond the Early Year's Framework across our Foundation Stage. Within each discrete block of science teaching, class teachers carefully plan the specific outcomes for their year group, based upon age appropriate knowledge and skills, as well as the needs of the cohort or individuals within it.

There is a strong focus on developing the scientific vocabulary of our children and retention of this through practical learning opportunities. New vocabulary is taught, with the emphasis on key scientific words and phrases. Although we actively introduce and are ambitious with the language we use, we understand the importance not to over complicate this language with very young children, but ensure underlying principles and meanings of the words are taught and understood.

Children are introduced to and reminded of key vocabulary. Questioning is used to check their understanding and prior knowledge, before new concepts, skills or knowledge are introduced.

Modelling is used by class teachers to clarify expectations, children are then given plentiful opportunities to consolidate, build upon and apply basic skills and knowledge, across a series of lessons, as well as across the year.

When children are learning about a subject through a discrete teaching sessions they are explicitly told that today they are going to be 'scientists.' They are then reminded of the key skills that they will learn, use and develop within this subject.

In Science these are:

We are learning to:

use our five senses

ask questions

make predictions

plan, investigate and set up tests

observe and measure

say why and how things happen

record ideas and findings, then use them to inform our conclusions

interpret and communicate results

evaluate

As well as the discrete teaching of knowledge in science lessons, science investigation days are planned to ensure that children have regular opportunities to embed their knowledge and practise their skills throughout the year. Children regularly engage in practical, 'hands on' learning, visits out, as well as visitors to school, to enhance their science experiences further.

Science is one of our key subject drivers in developing the 'Challenge & Educate' side of our school curriculum. Through studying a range of people from the past and present, who have had an impact on the world of Science, as well as a range of countries and cultures, children learn about and are taught to challenge stereotypes connected to gender, wealth, disability and cultural background. They are educated that differences should be celebrated and are not a barrier to achievement.

Pupils also have additional opportunities to extend their scientific knowledge and skills through cross-curricular work. Strong links with other subject areas, particularly Maths and English, ensure that children have numerous opportunities to apply skills across the curriculum. Opportunities to learn about significant people, including inventors and explorers are carefully chosen, so that children are continually developing the sense of the importance of science in the wider world. This learning also strengthens the links between science, history and geography.

Through studying a range of people and places linked to science, children are taught to challenge stereotypes connected to gender, wealth, disability and cultural background and are educated that differences, including where you are born or live in the world, should be celebrated and are not a barrier to achievement. Texts relating to science knowledge and concepts used to further underpin this understanding and encourage questions from children. This ensures that elements of the science curriculum are accessed by children throughout the year.

Teaching Science in EYFS

Planning and teaching in EYFS is similar to that in Key Stage 1. The children are expected to develop a specific set of skills and knowledge appropriate to their age. This is often beyond the expectations that are set out in the end of year Early Learning Goals, as we prepare our children with the knowledge and skills they will need in science, ready for year 1.

As well as topic work and the discrete teaching of skills and knowledge, children in EYFS are given the opportunity to explore, investigate, question and continually practise and embed their language and learning through the areas of provision set up in the indoor and outdoor learning environments.

How do we know that our children are making progress?

Ongoing assessments of the children's knowledge and skills is observed by the class teacher. Misconceptions are addressed and next steps carefully planned. Children's outcomes are compared to the subject specific skills and knowledge documents. At the end of a block of discrete teaching (or term) subject leaders gather an overview

of children's outcomes in each subject area. This is used to plan appropriate next steps for their future learning, as well as provide an overview of learning within a subject area across the whole school. End of year assessments are collated for children at the end of EYFS and Key Stage 1.

How do we promote our Curriculum Intent?

Active Citizens

Children have the opportunity to study the human impact on the world through carefully planned topics, including ocean pollution and deforestation.

Children have the opportunity to learn about about the human body and how to keep it healthy. They do this through practical experiences and links with other subjects, such as PE and PSHE.

We ensure that our children are exposed to a variety of scientists and STEM professionals from different backgrounds and parts of the world. We also ensure that the children have exposure to everyday scientists who are from the local area (Science Week 2021 video, dentist visit, archaeologist visit).

Active Learners

Children are exposed to various enquiry types and will engage in interesting, practical experiments throughout their learning.

Children work collaboratively to set up/carry out practical experiments.

Children feel confident to evaluate their experiments and offer suggestions of how to change them.

Children develop resilience when experiments don't go quite right or the outcome isn't expected and learn how to use this to advance future investigations.

We are passionate about building our children's science capital. They have the opportunity to learn about jobs in STEM, which broadens their understanding of what being a scientist is and develops their ambition.

Children develop knowledge and understanding of science questions, in order to ask questions that can be answered through scientific enquiry.

Active Communicators

Children are taught and encouraged to use subject specific vocabulary.

Children have opportunities to apply scientific vocabulary to written tasks that link to their English work.

Children discuss their ideas throughout the whole investigation process.

We are passionate about our children having opportunities to present their findings in a variety of ways – this could be through an informative poster or a presentation to the class.

Children are given the opportunity to work with professionals from the STEM community.

Mixed age extra-curricular clubs are offered throughout the year. These include Science Investigation, Environment (gardening and growing focus) and Eco clubs.

We provide our children with opportunities for Science through additional projects, such as MAT-wide science weeks, first-hand experiences and whole school science weeks.

What wider opportunities are provided for our children?

Children have the opportunity to experience whole school science weeks, which are usually centred around a theme. Most recently our focus was 'celebrating working scientifically' and saw us collaborate with other schools throughout Waterton Academy Trust. We offer an after-school science club, where children with a particular interest in the subject can socialise with like-minded children and engage in interesting experiments.

Children are able to take part in workshops run by expert visitors who aim to enhance the given topic. These experts also allow the children to understand the various job roles that come under the science umbrella. Children have many first-hand experiences in order to deepen their understanding and instil the awe and wonder around certain science topics. An example of this is our Nursery children helping to care for chicks as they hatch and grow, as part of their learning on life cycles. We also aim to utilise our fantastic outdoor area, which is brimming with natural science. Children have the chance to explore the wildlife area, our two bug-hotels and the outskirts of our field when studying living things and their habitats.

Knowledge Organisers:



Key Learning

- To identify, describe and compare a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1)
- To identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1)
- To know and describe the basic needs of animals including humans, for survival. (Y2)
- To know that animals, including humans, have offspring which grow into adults. (Y2)
- To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y3)
- To know and understand the importance for humans to exercise, eat the right amounts of different types of food, and hygiene. (Y2)

Vocabulary

- adult** A fully grown animal or plant.
- life cycle** The changes living things go through to become an adult.
- diet** The food and water that an animal needs.
- disease** Illness or sickness.
- exercising** A physical activity to keep your body fit.
- germs** Tiny living things that can cause disease.
- hygienic** How we keep ourselves and the world around us clean so we can stay healthy and stop germs spreading.
- nutrition** Food needed to live.
- pulse** The beating of the heart that can be felt in your neck.
- sight** Your eyes let you see all the things around you.
- hearing** Your ears let you listen to all the things around you. Your brain is able to tell what different sounds are.
- touch** Your skin gives you the sense of touch. You can tell if something is warm, cold, smooth or rough without even looking at it.
- taste** Your sense of taste comes from your tongue. You can tell if something tastes bitter or sweet. You might have some tastes you like and some you don't.
- smell** You smell using your nose. Your nose can tell if

Humans

Senses

sight

hearing

touch

taste

smell

Parts of the Body

Eatwell Guide

To grow into a healthy adult, we must eat the right types of food in the right amount and exercise.

Water, lower fat milk and sugar-free drinks.

Oil and spreads: Choose unsaturated oils and use in small amounts.

Eat less often and in small amounts.

To stay alive, all animals have three basic needs for survival:

Being active and exercising keeps our bodies and minds healthy.

To stop germs from spreading, it is important to be hygienic.

Human Life Cycle



Key Learning

- To identify, describe and compare a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1)
- To identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1)
- To know and describe the basic needs of animals including humans, for survival. (Y2)
- To know that animals, including humans, have offspring which grow into adults. (Y2)
- To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1)
- To know and understand the importance for humans to exercise, eat the right amounts of different types of food, and hygiene. (Y2)

Vocabulary

- offspring** The child of an animal.
- young** Offspring that has not reached adulthood.
- live young** Offspring that has not hatched from an egg.
- amphibians** Amphibians live in the water as babies and on land as they grow older. They have smooth, slimy skin.
- birds** All birds have a beak, two legs, feathers and wings.
- fish** Fish live and breathe under water. They have skin, fins to help them swim and they breathe through gills.
- mammals** Mammals are animals that breathe air, grow fur and feed on their mother's milk as a baby.
- reptiles** All reptiles breathe air. They have scales on their skin.
- carnivore** Animals that mostly eat other animals (meat) are carnivores.
- herbivore** Animals that only eat plants are herbivores.
- omnivore** Animals that eat both plants and other animals are omnivores.
- life cycle** The changes living things go through to become an adult.
- adult** A fully grown animal or plant.

Common animals

Mammals

human mouse dog cow

Birds

penguin chicken flamingo robin

Fish

goldfish tuna shark eel

Reptiles

snake tortoise lizard alligator

Amphibians

frog toad newt salamander

Some animals give birth to **live young**.




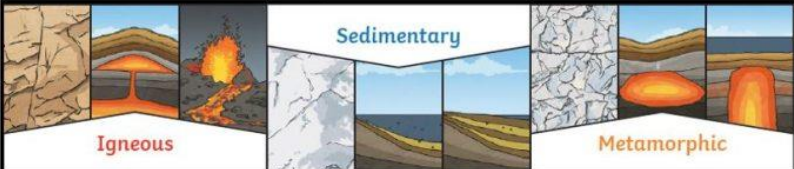

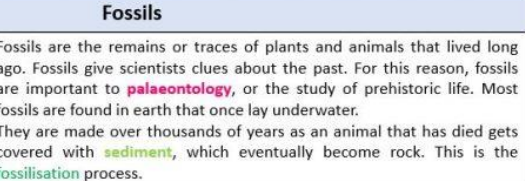

Some animals lay eggs which the young hatch from.





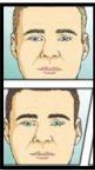


















Both of these types of young then **develop** into adults.

Some **offspring** look like their **adult** when they are born.

Some **offspring** do not look like their **adult** when they are born.

All young animals change as they go through the different stages of their **life cycle** and grow into **adults**.

Rocks and Soils		Spring 2, LKS2	#NCPAScience
<p>Key Learning</p> <ul style="list-style-type: none"> To know how different types of rocks and their simple properties. To describe how fossils are formed. To compare and group different types of rocks. 		<p>Naturally occurring rock types</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Igneous rocks These are volcanic. They are formed when magma (molten rock) or lava cools and hardens. This can happen underground or on the Earth's surface when a volcano erupts.</p> </div> <div style="text-align: center;">  <p>Sedimentary rocks Sedimentary rocks are formed when other rocks are eroded by wind and water. Over millions of years, this sediment is buried and squashed. Over time, this pressure causes the sediment to turn back into rock. Some sedimentary rocks are formed from the remains of dead animals or plants.</p> </div> <div style="text-align: center;">  <p>Metamorphic rocks Metamorphic rocks are formed from igneous and sedimentary rocks. Intense heat and pressure inside the Earth's crust squeeze and fold buried rocks, causing them to change.</p> </div> </div>	
<p>Vocabulary</p> <p>Igneous rock Rock that has been formed from magma or lava.</p> <p>Sedimentary rock Rock that has been formed by layers of sediment being pressed down hard and sticking together. You can see the layers of sediment in the rock.</p> <p>Metamorphic rock Rock that started out as igneous or sedimentary rock but changed due to being exposed to extreme heat or pressure.</p> <p>magma Molten rock that remains underground.</p> <p>lava Molten rock that comes out of the ground is called lava.</p> <p>sediment Natural solid material that is moved and dropped off in a new place by water or wind, e.g. sand.</p> <p>permeable Allows liquids to pass through it.</p> <p>impermeable Does not allow liquids to pass through it.</p> <p>fossilisation The process by which fossils are made.</p> <p>palaeontology The study of fossils.</p>		<p>Sedimentary</p>  <p>Igneous</p>  <p>Metamorphic</p> 	
		<p>Fossils</p>  <p>Fossils are the remains or traces of plants and animals that lived long ago. Fossils give scientists clues about the past. For this reason, fossils are important to palaeontology, or the study of prehistoric life. Most fossils are found in earth that once lay underwater. They are made over thousands of years as an animal that has died gets covered with sediment, which eventually become rock. This is the fossilisation process.</p>	

Evolution and Inheritance		Spring 2, UKS2	#NCPAScience															
<p>Key Learning</p> <ul style="list-style-type: none"> To know that living things have changed over time. To know that fossils provide information about living things. To know about Charles Darwin and his theories evolution. To know that living things produce offspring of the same kind. To know how animals and plants are adapted suit their environment in different ways. To know that adaptation may lead to evolution. 		<p>Change over time</p> <p>Changes to animals can happen in a short amount of time. For example, a dog goes through stages of its life cycle, usually developing from puppy to adult. Imagine what can happen in hundreds, thousands, even millions of years!</p> 																
<p>Vocabulary</p> <p>fossils the remains or traces of plants and animals that lived long ago.</p> <p>naturalist an expert in or student of natural history.</p> <p>Charles Darwin a renowned British naturalist.</p> <p>offspring a person or animals child/children.</p> <p>inheritance the way that parents pass traits onto their offspring.</p> <p>variation the differences between the individuals in a species.</p> <p>species a group of similar organisms that are able to reproduce.</p> <p>inherited trait genetically transferred from the parents to the next generation.</p> <p>adaptive trait characteristics that are influenced by the environment the living thing lives in.</p> <p>natural selection a process by which a species changes over time in response to changes in the environment, or competition between organisms, in order for the species to survive. The members of the species with the most desirable characteristics are able to produce the best-adapted offspring.</p>		<p>Fossils</p>  <p>Fossils help people, specifically palaeontologists or archaeologists, to find out and make conclusions about living things of the distant past.</p>																
		<p>Charles Darwin</p>  <p>Born February 12, 1809, Shrewsbury, Shropshire, England. Died April 19, 1882, Downe, Kent, England.</p> <p>English naturalist whose scientific theory of evolution by natural selection became the foundation of modern evolutionary studies. His observations while aboard the HMS Beagle, changed the understanding of evolution on Earth.</p> 																
		<p>Inheritance</p> <p>Animals and plants produce offspring that are similar but not identical to them. Offspring often look like their parents because features are passed on. There can be variation between parents and their offspring, but also you can see variation within any species, even plants.</p> <p>Inherited Traits Eye colour is an example of an inherited trait, but so are things like hair colour the shape of your earlobes and whether or not you can smell certain flowers.</p> 																
		<p>Adaptation and Evolution</p> <p>Adaptations are any physical or behavioural characteristics of an animal that help it to survive in its environment. These characteristics fall into three main categories: body parts, body coverings and behaviours. Any or all of these types of adaptations play a critical role in the survival of an animal.</p> <p>Adaptive Traits Characteristics that are influenced by the environment the living things live in. These adaptations can develop as a result of many things, such as food and climate.</p> <table border="1"> <tr> <td>camel</td> <td></td> <td>desert</td> <td></td> <td>It has wide feet to make it easier to walk in the sand.</td> </tr> <tr> <td>cactus</td> <td></td> <td>desert</td> <td></td> <td>It stores water in its stem.</td> </tr> <tr> <td>toucan</td> <td></td> <td>rainforest</td> <td></td> <td>Its narrow tongue allows it to eat small fruit and insects.</td> </tr> </table> <p>Evolution is the process of adaptation over a long period of time.</p>		camel		desert		It has wide feet to make it easier to walk in the sand.	cactus		desert		It stores water in its stem.	toucan		rainforest		Its narrow tongue allows it to eat small fruit and insects.
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