

Biology - Animals including humans

EYFS	Year 1 and 2		Year 3 and 4		Year 5 and 6	
Core substantive knowledge (Key) and Vocabulary						
	Cycle A	Cycle B	Cycle A	Cycle B	Cycle A	Cycle B
To know that my heart beats faster after I exercise.	Know that a balanced diet includes carbohydrates, protein, vitamins and fat.	To know animals including humans, reproduce and have offspring.	Know that food is chewed, passed through the oesophagus, digested by the liver and pancreas in the stomach and travels through the small and large intestine to the bowel.	Know that muscles help us move our skeletons.	To know the life cycle of plants including fertilisation from pollen in the stigma to create a seed in the ovary.	To know how to label the heart, veins and arteries. Describe the function of the heart and lungs to pump oxygenated blood around the body through blood vessels.
To know that germs can spread if my hands are not clean.	Know why it is important to exercise and eat healthily.	To know what a carnivore, herbivore and omnivore eats.	To know what molars, canines and incisors are and explain their uses.	Know the main food groups and the amount needed of each for a healthy diet.	To know the changes as humans, develop from birth to old age.	To know how exercise, diet and drugs can affect the body in different ways.
To know that I can see, hear and smell.	To know that animals, including humans need water, nutrition, shelter and oxygen for survival.	To know that parts of the body link to their senses.	To know how to construct and interpret a variety of food chains identifying the producers, predators and prey.	To know what a skeleton does and the different types of skeletons.	To know the life cycle of humans and other animals from gestation to embryo to young, adult through to old age.	
		To know and name animals into fish, amphibians, reptiles, birds and mammals and know why they are different.			Know that plants move water and nutrients using capillary action.	

Core Substantive Knowledge Science Curriculum Morton Academy

						To know that nutrients and water are transported through the blood stream in humans and animals.
exercise germs hygiene clean spread see sear smell	balanced diet carbohydrates protein vitamins fat fruit and vegetables exercise healthy water shelter nutrients survival oxygen	reproduce offspring carnivore herbivore omnivore senses amphibians reptiles birds mammals	oesophagus, digested liver pancreas stomach small intestine large intestine bowel canines incisors molars food chains produces prey predators	muscles skeleton carbohydrates protein vitamins fat movement support endoskeleton exoskeleton hydro-static	life cycle ovary filament fertilisation pollen stigma	birth gestation embryo adolescence adult exercise diet drugs nutrients capillary action heart veins arteries lungs oxygenated vessels blood chambers

Core Substantive Knowledge Science Curriculum Morton Academy

Biology – Plants						
EYFS	Year 1 and 2		Year 3 and 4			
Core substantive knowledge (Key) and Vocabulary						
	Cycle A	Cycle B	Cycle A	Cycle B		
To know vocabulary linked to plants such as leaf, flower, stem.	To know and name ferns, roses, daffodils, dandelions, nettles, conifers, oak trees and horse chestnut trees.			To know that roots anchor, stem/ trunks support and transport water, leaves photosynthesise and produce food, flowers produce seeds to make new plants.		
	To know the root, stem, flower, petal of a flowering plant and the trunk and branch of a tree.			To know that water is transported from root to leaf through the stem/ trunk using capillary action.		
	To know that conifers produce pinecones and horse chestnuts produce chestnuts and oaks produce acorns			To know that pollination is when the seed is produced in a flower. It can be done by the wind or an insect.		
To know that plants grow from a seed to plant.	To know that different plants can grow in the same environment.			To know that seeds must disperse to have a good chance of survival.		
	To know the difference deciduous and evergreen trees.					
	To know how plants change over time.					
	To know what a plant lifecycle is and show seed/ bulb/ cone, root and shoot, leaf, flower, blossom.					
	To know that plants need light, heat, water and nutrients to grow.					
plant leaf flower stem seed water sunlight soil	root stem flower petal trunk branch conifers environment			transport photosynthesis capillary action pollination seed dispersal stamen carpel reproduce		



Core Substantive Knowledge Science Curriculum Morton Academy

	deciduous tree evergreen tree life cycle seed bulb shoot blossom light heat water nutrients			germination		
--	--	--	--	------------------------	--	--

Biology - Living things

EYFS	Year 1 and 2		Year 3 and 4		Year 5 and 6	
Core substantive knowledge (Key) and Vocabulary						
	Cycle A	Cycle B	Cycle A	Cycle B	Cycle B	Cycle B
To know the main similarities and differences between themselves and others.	To know that some things are living, dead and things that have never been alive	To know that some things are living, dead and things that have never been alive		To know how to classify invertebrates into arthropod's (jointed limbs) and non - arthropods.	To know that mammals give birth to live young.	To know how to create classify living things into broad groups including micro - organisms, plants and animals.
To know where animas live in their environment, in woodland, ponds or soil.	To know how to construct a simple food chain	To identify and name a variety of plants and animals in their habitats, including microhabitats.		To know how to create classification keys of living things in their local environment.	To know that amphibians lay eggs in water, an insect goes from egg, larva pupa adult.	To know how to give reasons for classifying plants and animals based on specific characteristics
	To know how a polar bear, African elephant, frog, shark, ant, beetle have adapted to their environment.	To describe how animals obtain their food from plants and other animals using a simple food chain.		To know the impact of plastic pollution on ocean life, deforestation on forest dwellers and industrial waste in rivers.	Know that the pupa stage in certain insects is when they go through metamorphosis.	To know that microorganisms can also be divided into a number of specific groups.
	To know how a cactus, water lily, and mangrove tree have adapted to suit their environment.			Group living things in a variety of ways based on what they eat, where they live.	To know that plants can be pollinated by wind, water, insects such as beetles or bees.	
	To know that indigenous means to occur naturally in an area.			Identify and group a variety of living things in their local environment.	To know the reproductive cycle of a flowering plant, and a fern.	
	Producer Prey Consumer Habitat Indigenous Desert Rainforest	Habitat Micro habitat		classification arthropod amphibian deforestation industrial waste pollution	Reproduction Stigma Ovary Anther Pollination Metamorphosis	Classification Micro-organisms



Core Substantive Knowledge Science Curriculum Morton Academy

	Adaptation					
--	------------	--	--	--	--	--

Biology – Seasonal Change. Rocks and Soils. Evolution and Inheritance

Core knowledge

EYFS	Year 1 and 2		Year 3 and 4				Year 5 and 6	
Seasonal change			Previous knowledge	Rocks and soils		Previous knowledge	Evolution and inheritance	
	Cycle A	Cycle B		Cycle A	Cycle B		Cycle A	Cycle B
To show concern and care for the environment.		To know the changes across the four seasons in the temperature, animal activity and plant lifecycle.	Know that rocks are materials that are hard.	To investigate different kinds of rocks on the basis of their appearance and simple physical properties.		Know about human and animal lifecycles		To explain that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
To notice changes and differences in the environment.		To describe weather associated with the seasons.	Know that soil is used to grow plants.	To sort different types of rocks compared to how they are formed including sedimentary, igneous and metamorphic.		Know how animals adapt to their habitats		To identify how animals and plants are adapted to suit their environment and that adaptation may lead to evolution.
To develop an understanding of decay and changing over time.		To observe how day length changes.		To explain how fossils are formed.				To know that living things have changed over time and fossils provide a record.
				To explain that soils are made from rocks and organic matter.				
Rot Decay environment		Spring Summer Autumn Winter Seasons		Igneous Sedimentary Metamorphic Properties Physical				Offspring adaptation evolution inheritance palaeontologist



Core Substantive Knowledge Science Curriculum Morton Academy

		Weather Day		Fossil Crystal Permeable Impermeable				genotype
--	--	----------------	--	---	--	--	--	----------

chemistry – materials and their properties – states of matter

Core substantive knowledge and **retrieval knowledge**

EYFS	Year 1 and 2		Year 3 and 4			Year 5 and 6	
			Previous knowledge	States of matter		Properties and changes of materials	
	Cycle A	Cycle B		Cycle A	Cycle B	Cycle A	Cycle B
To know and use a range of technological toys	To know that spoons can be made from a variety of materials.	To know the best materials for specific parts of our classroom including the windows, doors, walls, rulers, scissors.	Know and experience solids, liquids and gases in everyday life.	To know that materials are solids, liquids or gases		To know how to conduct experiments to test an objects solubility, transparency, conductivity and response to magnets.	To know how to conduct experiments to test an objects solubility, transparency, conductivity and response to magnets.
To know why things happen and how things work.	To know some materials are man-made and some are natural.	To know that plastic is flexible, glass is transparent, metal is smooth and rock is hard.	Observed a boiling kettle or pan producing steam.	Know that some materials change state when they are heated or cooled and know the temperature at which this happens.		To know that solutions from water and salt or sugar and use heat to retrieve the salt and sugar.	To know that you can separate mixtures of sand/ mud and water through filtering, sand and rice through sieving and solutions through evaporating.
To know and notice changes in properties as they are transformed through becoming wet, dry, flaky or fixed.	To know the four ways of changing the shape of a solid object.	To know that wood, plastic, glass, metal, water, and rock are materials.	Know the main parts of the water cycle	Know what evaporation and condensation is and its part in the water cycle.		To know that irreversible changes form a new material such as wood to charcoal and bread to toast.	To know that mixtures and solutions are reversible changes as well as freezing and melting.
		To know that everyday materials can be compared based on whether they are stiff, flexible, transparent or hard.		Know how the rate of evaporation and temperature link.			



Core Substantive Knowledge Science Curriculum Morton Academy

Wet, dry, shiny, dull, bendy, stiff, squashy, hard/soft, lumpy, wrinkly. Smooth, rough, push, pull, twist, stretch, turn, open, lift, squeeze, pinch, flick, tap	Metal stretching squashing bending twisting	plastic stretch stiff metal liquid solid		Solid Liquid Gases Cooled Heated Water cycle Condensation Evaporation Precipitation		Solubility, soluble, transparent, transparency, conductivity, conductor, irreversible, reversible	mixture sieving solutions irreversible, reversible freezing melting
--	---	---	--	---	--	--	--

Physics – Light and sound – Earth and Space

Core substantive knowledge and **retrieval knowledge**

		Year 3 and 4					Year 5 and 6			
	Previous knowledge	Light		Previous knowledge	Sound		Previous knowledge	Earth and space		Light
		Cycle A	Cycle B		Cycle A	Cycle B		Cycle A	Cycle B	Cycle A
	Know that light comes from a range of sources (light bulb, lamp, sun, moon)		To show how we see using light and that darkness is the absence of light.	Will know that sound travels.	To know that sounds are caused by vibration.		Will know that the earth is a planet in our solar system	To know that the Earth and other planets orbit, the Sun.		To show that light travelling in straight lines using mirrors.
	Will know what a reflection is in a mirror/ surface of water		To prove that light can be reflected from surfaces.	Will know that volume means louder or quieter.	To know that vibrations can move through the air, water and other materials.		Will have experienced the moon and other celestial bodies such as mars	To know that the Moon orbits the Earth		To know that we see by light reflecting into the eye.
	Have worn sunglasses		To form shadows of different lengths by moving the angle of the torch.	Will have heard thunder and noticed that it gets quieter as it moves away,	To know that the pitch of a sound refers to the size of the vibrations.		Will have seen pictures of the earth from space	Know that the Sun, Earth and Moon are spherical bodies		To know that shadows have the same shape as the object that casts them because the light travels in straight lines.
	Will have experienced shadows of themselves		To explain the difference between convex (curves out) and concave (curves in)		To know that the volume of sounds is linked to the strength of the vibrations that produced it.		Will know that the day length changes in accordance to the season	Know that day and night are caused by the Earth's rotation, explain the apparent movement of the sun across the sky.		

Core Substantive Knowledge Science Curriculum Morton Academy

				To know that sound gets fainter the further away it is.					
		Reflection, shadows, opaque, refraction Convex, concave		Pitch, volume Vibrating, frequency Hammer, sound wave			Friction, gravity air resistance water resistance pulley, lever		Retina, cornea Iris, pupil, lens light wave

Physics – Forces and electricity									
	Year 3 and 4					Year 5 and 6			
Core Knowledge and retrieval knowledge									
Previous knowledge	Forces and magnets		Previous knowledge	Electricity		Forces		Electricity	
	Cycle A	Cycle B		Cycle A	Cycle B	Cycle A	Cycle B	Cycle A	Cycle B
Have experienced how different materials have specific properties for making different objects	To know that different surface can affect how things move.		Know that a plug socket powers everyday objects		To know common conductors and insulators.		To know that gravity is a downward force that moves an object towards the Earth's centre due to its mass.	To know that brightness and volume link directly to the number and voltage of cells used.	
Experienced toys that contain magnets	To know that pushes and pulls need contact between two objects. (gravity, friction, water resistance)		Have used switches in everyday life		To know that a circuit must be part of a complete loop with a battery to light a bulb.		To know that air resistance, water resistance and friction slows a moving object down by acting in the opposite direction.	To know and recognise symbols in a simple circuit diagram	
	To know that magnetic forces can act at a distance.								
	To know that magnets attract/repel each other, and some other materials made from iron or steel.		Will have investigated materials and their properties.		To know that a switch opens and closes a circuit.		To know that a levers, gears and pulleys work by minimising weight and increasing the force exerted		
	To know some magnetic materials.								

Core Substantive Knowledge Science Curriculum Morton Academy

	To know the poles of a magnet								
	Force, repel Attract, surface Pole magnetism				Circuit, conductor Insulator, battery Cells, appliance		Friction, gravity air resistance water resistance pulley, lever	series circuits voltage, socket generator turbine, fuses	

Working scientifically - disciplinary knowledge (Core)

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Be curious and make comments and ask questions about aspects of their familiar world (such as the place where they live) or the natural world.	Be curious and ask simple questions related to their science area of study. Begin to understand that these can be answered in different ways.	Ask simple questions related to their science teaching and recognise that they can be answered in different ways.	To experience different types of scientific enquiry	Ask relevant questions and use different types of scientific enquiries to answer them.	Begin to plan scientific enquiries that involve a number of variables.	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables.
Use their senses to recognise the world around them. Observe people, vehicles and animals.	Being to use simple equipment to observe scientific processes.	Closely observe in science investigations using relevant, simple equipment.	To experience comparative and fair testing,	To set up simple practical enquiries, comparative and fair tests	Set up a series of comparative or fair tests.	Use test results to make predictions to set up further comparative and fair tests
To find ways to solve problems, find new ways to do things or test their ideas.	To begin to discuss my ideas about how to find things out.	To begin use prior understanding to predict the outcomes of an investigation when performing simple tests.	Use straightforward scientific evidence to answer questions or to support their findings.	Identify differences, similarities or changes related to simple scientific ideas and processes.	Identify relevant scientific evidence related to their scientific enquiry.	Identify scientific evidence that has been used to support or refute ideas or arguments.
To know some similarities and differences in relation to places, objects, materials and living things	To begin to use simple features to compare objects, materials and living things and, with help, decide how to sort and group them.	To observe and identify, classify, compare and describe using simple features.	Take accurate measurements using a range of equipment including data loggers and thermometers.	Make systematic and careful observations and take accurate measurements using standard units and a range of equipment, including thermometers and data loggers	Report and present findings from enquiries, including conclusions and causal relationships.	Define the degree of trust in results, in oral and written forms such as displays and other presentations.
Be curious and find answers to talk about changes and why things occur.	To begin to describe an experiment and say what surprised me and what I observed.	Using their observations and ideas to suggest answers to questions	Report on findings from enquiries, including oral and written explanations, displays, or presentations of results and conclusions	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	Record data and results of increasing complexity using tables, scatter graphs, bar and line graphs	Record data and results of increasing complexity using scientific diagrams, labels and classification keys.

Core Substantive Knowledge Science Curriculum Morton Academy

To explain and or record their answers in a range of ways.	To gather and record data to help in answering questions.	To record and communicate their findings in a range of ways.	Gather, record, classify and present data in a variety of ways to help in answering questions	Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	Experience using a range of scientific equipment and taking a number of readings to increase accuracy.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
--	---	--	---	--	--	--