

Year	Topic	Topic	Topic	Topic	Topic
1	Plants (Identifying Plants)	Seasonal changes	Animals, including humans (Identifying Animals)	Everyday materials	
2	Plants (Growing Plants)	Living things and their habitats (Living in Habitats)	Animals, including humans (Growth and Survival)	Uses of everyday materials (Exploring Everyday Materials)	
3	Plants (How Plants Grow)	Light (Light and Shadow)	Animals, including humans (Health and Movement)	Rocks (Rocks, Fossils and Soils)	Forces and magnets
4	Sound	Living things and their habitats (Living in Environments)	Animals, including humans (Eating and Digestion)	States of matter	Electricity (Circuits and Conductors)
5	Earth and space	Living things and their habitats (Life Cycles curriculum links to Sex Ed/RSE)	Animals, including humans (Changes and Reproduction)	Properties and changes of materials	Forces (Forces in Action)
6	Evolution and inheritance	Living things and their habitats (Classifying Organisms)	Animals, including humans (Healthy Bodies)	Light (Seeing Light)	Electricity (Changing Circuits)

Progression in Working Scientifically;

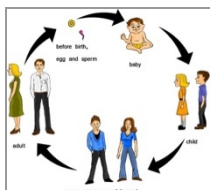
Upper KS2 (for pupils working towards Year 5 and 6 Curriculum):	Check list
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	
Using test results to make predictions to set up further comparative and fair tests.	
Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	
Identifying scientific evidence that has been used to support or refute ideas or arguments.	



Year 5 – Earth and Space

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Describe the movement of the Earth and other planets, relative to the Sun in the solar system - Describe the movement of the Moon, relative to the Earth - Describe the Sun, Earth and Moon as approximately spherical bodies - Describe the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. - I can name and describe features of the planets in our solar system. - I can order the planets in our solar system. - I can explain why we know the Sun, Earth and Moon are spherical. - I can describe the movement of the Earth and other planets, relative to the Sun in the solar system - I can use scientific evidence to explain the movement of the solar system. - I can use the Earth's rotation to explain how daytime and night-time occur. - I can investigate night and day in different parts of the Earth and share my findings. - I can explain the movement of the Moon.	Children must know and understand that: - Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance. - 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. - 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.	- How does temperature/size/day length/year length change as you get closer/further to the sun? - How does distance from a light source affect how much light hits an object? - Does having more moons result in more light hitting a planet? How could you test this? - How does speed/size of a meteorite affect the size of the moon crater formed? - If the moon became heavier as a result of meteorite collisions, what would happen to its position relative to Earth? - If the mass of the Earth is 80x that of the moon, why is the gravity at the Earth's surface only 6x greater than at the surface of the moon? - Why do we have day/night/months/years/seasons? - Why do the length of the days change? - Why do shadow sizes change over the course of a day?

I can describe the movement of the Moon relative to the Earth.	Using and Applying knowledge: - Create a model of the Earth to show it’s movement around the Sun, and the Moon around the Earth, in space. - Use the existing model above to show how daytime and night-time occur. - Observe how shadows are formed throughout the day.	PLAN Resources for Assessment (via Canvas): - Progression in working scientifically skills Year 5&6 - Working scientifically skills Year 5&6 - PLAN Primary Science – Supporting Assessment (Earth and Space Year 5 – Isabella)			
Prior Learning In Key Stage 1 and in Year 3 children should: - Understand changes in weather patterns and seasons. - Compare how things move on different surfaces. - Notice that some forces need contact between two objects, but magnetic forces can act at a distance. - Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing eachother.	Misconceptions: - The Earth is flat. - The Sun is a planet. - The Sun rotates around the Earth. - The Sun moves across the sky during the day. - The Moon appears only at night. - Night-time is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.	In KS3 Children will: - Know that Gravity is weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) - Our Sun as a star, other stars in our galaxy, other galaxies - The seasons and the Earth’s tilt, day length at different times of year, in different hemispheres the light year as a unit of astronomical distance			
Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]: Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, waxing, waning, crescent, gibbous. Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, planets, solar system, day, night, rotate, orbit, axis, spherical, geocentric, heliocentric.					
Teaching Ideas (examples) – Year 5 & 6 Working Scientifically					
Ask questions	Observing closely	Performing test	Identifying & classifying	Gathering & recording data	Using observation to suggest answers to questions
What will happen if we do not have the Moon? [No tides, consequence?]	Do shadows in one place stay or change throughout the day?	Using models, can explain why we have different time zones?	Identify which planets are made up of physical components? Gas?	Observe amd record shadows in one place throughout the day, measure these and gather findings.	Why does the length of the day change in the summer and in the winter?



Year 5 – Living things and their habitats (Life Cycles)

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. - Describe the life process of reproduction in some plants and animals. I can describe the life cycles of different mammals. I can compare the life cycles of amphibians and insects. I can compare the life cycles of a mammal, an amphibian, an insect and a bird. I can describe how some plants reproduce [recall from year 3 Plants]. I can describe how some animals reproduce.	Key Learning:	Key Question(s):
	Children must know and understand that: - Animals, plants and humans reproduce to survive - The life cycle varies from one animal to another - Habitats/Environment/Climate do affect how animals and humans reproduce - The differences between life cycles and the reproduction cycles	- What food chains and webs are there in our local habitat? - How does energy move through the food chain? - How does the removal of one species from an environment, affect others? (keystone species) - How does environmental change affect different organisms? - What are the most important things we could do to improve our outside area? (big hotels, pond, compost, wildflowers) - How does human activity affect our environment (ferries on the Solent? Sandown Airport? KFC?)
	Using and Applying knowledge:	PLAN Resources for Assessment (via Canvas):
	- With support, research the life cycle of a particular animal - Compare the gestation time for mammals and look for patterns e.g. in relation to size of animal, or length of dependency after birth - Look at patterns between the sizes of animals and their expected life span - Grow and observe plants that reproduce asexually e.g. strawberries [extension]	- Progression in working scientifically skills Year 5&6 - Working scientifically skills Year 5&6 - PLAN Primary Science – Supporting Assessment (Living things and their Habitats Year 5 - Shannon)
Prior Learning	Misconceptions:	

In Year 4 Children should: • Group living things by their characteristics/features. • Explain the differences between vertebrates and invertebrates. • Create a classification key. • Use classification keys to identify, classify and group living things. • Use a key to identify invertebrates. • Describe how changes in environment can have on endangered species. • Present findings in writing and in BSL.	• All plants start out as seeds • All plants have flowers • Plants that grow from bulbs do not have seeds • Only birds lay eggs	<i>In Year 6 children will (Living things & their Habitats):</i> • Classify living things into broad groups according to observable characteristics and based on similarities and differences. • Give reasons for classifying plants and animals based on specific characteristics.
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Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]:

Variation Organisms Populations. Classification Characteristics Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation. Classify, compare, bacteria, microorganism, organism, invertebrates, vertebrates, Linnaean.

Year 5 and 6 Sex Education Curriculum (overview)

5/6 weeks Sex Education Curriculum will be delivered in Summer Term as additional Curriculum to enable pupils to learn;

- Growth from babies to adults
- Differences between different stages of growth
- Identify and label body parts (internal and external), be able to differentiate and explain its functions
- Puberty – the changes in our body and why, importance of personal hygiene, our hormones/feelings/emotions
- Male and Female Reproduction Systems
- Concept of love, healthy relationships, friendships, different families

Teaching Ideas (examples) – Year 5 & 6 Working Scientifically

Ask questions	Observing closely	Performing test	Identifying & classifying	Do practical enquiry, comparative and fair tests Gathering & recording data	Using observation to suggest answers to questions
	Observe at patterns between the size of an animal and its expected life span.		Compare the life cycles of a mammal, an amphibian, an insect and a bird.		



Year 5 – Animals, including humans (Change and Reproduction)

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Describe the changes as humans develop to old age. <i>Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.</i> <i>Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.</i> <i>Some elements of the curriculum will be covered in year 5 & 6 Sex Education/PSHE Curriculum as part of the new statutory requirements for RSE policy/curriculum.</i> [Cross-reference to Sex Ed, RSE and PSHE Curriculum] - I can draw, label and describe the 7 stages of human development (from baby to old person). - I can explain how babies are developed. - I can describe what changes girls and boys go through during puberty. - I can describe the life cycles of different living things e.g. mammals, amphibians, birds. - I can explain the differences in the life cycles of mammals, amphibians, and birds. - I can draw and explain how plants reproduce (recall Plants Year 3).	Children must know and understand that: - Different animals mature at different rates and live to different ages. - Puberty is something we all go through, a process which prepares our bodies for adulthood, and reproduction. - Hormones control these changes; which can be physical and/or emotional. - Some organisms reproduce sexually where offspring inherit information from both parents. - Some organisms reproduce asexually by making a copy of a single parent. - Environmental changes can affect how well an organism is suited to its environment. - Different types of organisms have different lifecycles.	- What do humans look like? - Do all animal embryos look the same? - How do humans change? - Why do humans change? - What is a life cycle? What types of life cycles are there? - Are life cycles the same? - What causes puberty? - What changes do we go through during puberty? - Are there any patterns between vertebrate animals and their gestation periods? - Do plants reproduce in the same way as humans? - How do plants spread their seeds?
	Using and Applying knowledge:	PLAN Resources for Assessment (via Canvas):
	- Can explain the changes that takes place in boys and girls during puberty - Can explain how a baby changes physically as it grows and the stages a baby goes through to grow e.g. relies on parents to feed and look after, then develops independence skills, and so on.	- Progression in working scientifically skills Year 5&6 - Working scientifically skills Year 5&6 - PLAN Primary Science – Supporting Assessment (Animals including humans Year 5 – Melissa)

Prior Learning		Misconceptions:			
In Year 4 Children should: - I can draw and label the main parts of the human digestive system (focus on mouth, oesophagus, stomach, liver, small/large intestines and rectum). - I can explain the functions of the digestive system. - I can explain the basic function/s for each part of the digestive system (e.g. stomach breaks down food, liver cleans blood, etc). - I can identify and label different types of teeth. - I can identify and explain the functions for each type of teeth. - I can do a scientific experiment on tooth decay. - I can create a simple food chain containing one producer, and two consumers. - I can identify the producer and consumer (predator and prey) in food chains. - I can create a food web of plants and animals we find in a forest.		- A baby grows in a mother’s tummy - A baby is “made” or delivered by a “stork”		<i>In Year 6 Children will:</i> - Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. - Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. - Describe the ways in which nutrients and water are transported within animals, including humans.	
Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]:					
Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty, Hormone, Physical, Emotional, Sexual, Asexual, Pollination, Dispersal, reproduction, cell, fertilisation, pollination, male, female, pregnancy, young, mammal, metamorphosis, amphibian, insect, egg, embryo, bird, plant					
Teaching Ideas (examples) – Year 5 & 6 Working Scientifically					
Ask questions	Observing closely	Performing test	Identifying & classifying	Do practical enquiry, comparative and fair tests Gathering & recording data	Using observation to suggest answers to questions
Why do people have grey/white hair when they get older?	How long does it take for a baby (ies) to grow in a uterus?	How does age affect human’s reaction time to catching a fallen pencil?	Can you identify all the stages in the human life cycle?	Based on observations, gather information and compare gestation periods between humans and mammals e.g. whale, elephant, dog.	Do all plantas and animals reproduce the same way?

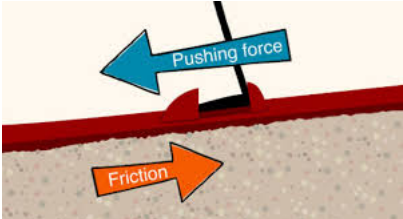


			Compare this with animals based on similarities and differences in their lifecycles.		
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Year 5 – Forces (Forces in Action)

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object, and the impact of gravity on our lives. - Identify the effects of air resistance, water resistance and friction, which act between moving surfaces. - Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. I can identify forces acting on objects. I can identify and describe forces as pushes and pulls. I can explain the effect of gravity on unsupported objects. I can briefly explain Issac Newton's role in developing the theory of gravity. I can identify the effects of air resistance, water resistance and friction, that act between moving surfaces. I can explain how air resistance affects moving objects. I can do investigations on the effects of air and water resistance and friction. I can explain the effects of friction on a moving vehicle.	Children must know and understand that: - Air and water resistance are forces against motion caused by objects having to move air and water out of their way. - Friction is a force against motion caused by two surfaces rubbing against each other. - Some objects require larger forces to make them move; gears, pulley and levers can reduce the force needed to make things move.	- What actually is a force? - How can a force act on an object? - How can we see forces? - How can we measure forces? - How does the saltiness (salinity) of water affect the water resistance? - How does the length of a paper helicopter's wings affect the time it takes to fall? - How does the changing the shape of plasticine affect water resistance? - How does adding holes to a parachute affect the time it takes to fall? - How does the amount/depth of tread affect the friction between a shoe and a surface? - How can we use levers to lift more? - What is the most effective way to move an object? - How do see-saws work? - Can you create a pulley system to lift a given load?
	Using and Applying knowledge:	PLAN Resources for Assessment (via Canvas):

• I can do an investigation on the effect of air or water resistance. • I can do an investigation on the effects of friction created by different materials.	• Investigate the effects of friction in a range of contexts e.g. trainers, bathmats. • Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water. • Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. • Explore how levers, pulleys and gears work. • Create a timer that uses gravity to move a ball. • Research the work of scientists - Issac Newton and Galileo Galilei and how they developed their theories of gravity.	• Progression in working scientifically skills Year 5&6 • Working scientifically skills Year 5&6 • PLAN Primary Science – Supporting Assessment (Forces Year 3 – Jimmy)
Prior Learning	Misconceptions:	
In Year 3 Children should: • Compare how things move on different surfaces. • Observe that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other, attract some materials and not others. • Describe magnets as having two poles. • Draw and describe magnets with two poles (North and South poles). • Describe what happens if they put two magnets with same or opposite poles together. • Predict whether two magnets will attract or repel each other, depending on which poles are facing each other. • Compare and group everyday materials on whether they are attracted to a magnet, and identify some magnetic materials.	Misconceptions: • The heavier the object the faster it falls, because it has more gravity acting on it. • Forces always act in pairs which are equal and can be opposite each other. • Smooth surfaces have no friction. • Objects always travel better on smooth surfaces. • A moving object has a force which is pushing it towards and it stops when the pushing force wears out. • A non-moving object has no force acting on it. • Heavy objects sink and light objects float. 	<i>In KS3 Children will learn about:</i> • Gravity forces: weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) • Our Sun as a star, other stars in our galaxy, other galaxies. • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres and the light year as a unit of astronomical distance.

Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]:

Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys, force, push, pull, opposing, streamline, brake, mechanism, lever, cog, machine, pulley.

Teaching Ideas (examples) – Year 5 & 6 Working Scientifically

Research	Observing closely	Performing simple test	Identifying & classifying	Gathering & recording data	Using observation to suggest answers to questions
How do submarines sink if they are full of air?	How long does a pendulum swing for before it stops?	How does the angle of a launch affect how far a paper rocket will go?	Can you label and name all the forces acting on objects?	Investigate the effects of friction created by different materials.	How and why do objects move?



Year 5 – Properties and changes of materials

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. - Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. - Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including by filtering, sieving and evaporating. I can compare and group everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. I know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. I can use my knowledge of solids, liquids and gases to decide how mixtures might be separated, including by filtering, sieving and evaporating. I can give reasons based on evidence from comparative and fair tests, of everyday materials, including metals, wood and plastic.	Children must know and understand that: - When two or more substances are mixed and remain present, the mixture can be separated. - Some changes are reversible and some are not. - Materials change states by heating and cooling.	- What are 'mixtures'? - What does 'dissolve' mean? - Which of the following dissolves in water: sugar, bicarbonate of soda, oil, chocolate, coffee, dark vinegar and wax? - How does the amount of water used affect how much sugar will dissolve in it? - Which sweets will dissolve in water? - How can we separate mixtures? - How can we clean our dirty water?
	Using and Applying knowledge: - Investigate properties of different materials in order to identify which material is recommended for specific purposes/actions, based on their properties e.g. test waterproofness, suitable fabric for a winter coat - Explore adding a range of solids to water and other liquids e.g. cooking oil - Investigate which materials can dissolve e.g. sugar, salt, sand - Separate mixtures by sieving, filtering and evaporation (with adult support/observation), choose suitable method and equipment to do the tests	PLAN Resources for Assessment (via Canvas): - Progression in working scientifically skills Year 5&6 - Working scientifically skills Year 5&6 - PLAN Primary Science – Supporting Assessment (Properties and Change of Materials Year 5 - Diogjena)

- I can demonstrate that dissolving, mixing and changes of states can be reversible. - I can explain that some changes will result in the formation of new materials, and that this kind of change is not usually reversible. This includes changes associated with burning and the action of acid on bicarbonate of soda.	- Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning, toasting. - Carry out comparative and fair tests involving non-reversible changes e.g. what affects the rate of rusting?				
Prior Learning	Misconceptions:				
In Year 4 Children should: - Describe and sort materials into groups: solids, liquids and gases. - Investigate solids and explain their properties. - Investigate liquids and explain their properties. - Investigate gases and explain their properties. - Investigate materials which change states when heated or cooled and share their findings, using scientific vocabulary. - Explore how water changes state. - Investigate how water evaporates. - Identify and describe the different stages of the water cycle.	- Lots of misconceptions exist around reversible and irreversible changes, including the permanence or impermanence of the change. - There is confusion between physical/chemical changes and reversible/irreversible changes e.g. physical changes are often reversible but may not be permanent. Cutting a loaf of bread is still bread but no longer a loaf. The shape, but not the material has been changed. However, if you toast the slice of bread, it is an irreversible change. Some children think; - Thermal insulators keep cold in or out - Thermal insulators warm things up - Solids dissolved in liquids have vanished and so you cannot get them back - Lit candles only melt, which is reversible change	<i>In Key Stage 3 children will learn about:</i> - the concept of pure substances mixtures, including dissolving - diffusion in terms of the particle model - simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography - the identification of pure substances			
Vocabulary [TA to create a key list of vocabulary, add sign graphics AND pictures next to each word]:					
Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection					
Teaching Ideas (examples) – Year 5 & 6 Working Scientifically					
Ask questions	Observing over time	Performing test	Identifying & classifying	Do practical enquiry, comparative and fair tests Gathering & recording data	Using observation to suggest answers to questions

Can pupils explain the differences between melting and dissolving?	How does a nail in salt water change over time?	Look at the foods and liquids (burning wood, cooking an egg, melting ice-cream, boiling water, melting chocolate, toasting bread, cooking meat, baking a potato and melting butter) – which are reversible/irreversible? Make predictions first before exploring the results.	Identify and classifying foods and liquids that are reversible/irreversible through the changes.	To investigate factors which affect the speed of dissolving.	Which sugar (white and brown) dissolves the fastest in water?
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