



Science

Intent:

At Colyton Primary Academy, we encourage the children to see themselves as scientists and believe that the science curriculum should challenge and excite the children to investigate and make connections about the world around them. Our science curriculum provides a clear and comprehensive scheme of work that shows the progression of skills and knowledge across the EYFS, KS1 and KS2 within the strands of the National Curriculum.

We aim to provide an exciting curriculum throughout the school. From day one in the EYFS where the children experience the joy and wonder that is science to the end of Year 6 where the connections about the world are coming together in scientific understanding. Throughout their time at Colyton, children are encouraged to ask questions, and experiment with ideas, to discover how the world exists. We provide a range of practical experiences and have a firm foundations in asking questions and making links with their everyday lives. Oracy and group work plays a large part in drawing ideas out and developing their understanding of different scientific concepts. Metacognitive practices are the thread that drives the learning deeper.

To enrich the children throughout their time at Colyton there is a "hidden curriculum" that includes and develops their understanding of Science. In addition to trips, there is an annual science week. We use this to embed the Colyton habits of mind and encourage the children to work across the school and celebrate science. This gives them opportunity to present their science to the public as well as gaining a greater insight into the possible careers available to them with a scientific background.

For pupils with additional needs, there will be every opportunity to work towards the overall objectives of the year group. Pupils may be supported with their scientific learning through differentiated questioning, pre-teaching of key vocabulary, adapted work or additional time. All pupils will be able to access the trips and visitors that enrich this subject, and high expectations will challenge all children to meet their personal targets.

National Curriculum Aims for Science:

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

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EYFS:

In the EYFS children follow the Statutory Framework for the early years foundation stage. Within this there are seven areas of learning and development that must shape educational programmes in early years settings. All areas of learning and development are important and inter-connected.

Before children start school they should have had an opportunity to use all their senses in hands-on exploration of natural materials, explore collections of materials with similar and/or different properties, talk about what they see, using a wide vocabulary, begin to make sense of their own life-story and family's history, explore how things work, plant seeds and care for growing plants, understand the key features of the life cycle of a plant and an animal, begin to understand the need to respect and care for the natural environment and all living things, explore and talk about different forces they can feel and talk about the differences between materials and changes they notice. We want them to make healthy choices about food, drink, activity and toothbrushing and develop their communication and language by understanding 'why' questions, like: "Why do you think the caterpillar got so fat?"

Once they arrive at school we focus on children understanding the world. This involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

ELG & Development Matters: The Colyton Curriculum

Our EYFS Colyton curriculum takes the ELG & Development matters to create a highly ambitious and bespoke curriculum with a focus on developing high language skills and for children to become competent readers, writers and mathematicians.

Science at Colyton begins here, in the EYFS. Children are 'Exceptional Explorers' and develop awe and wonder about the Natural World.

To be successful scientists they also master skills by being an 'Independent Individual', 'Confident Communicator' and 'Magnificent Mathematician'

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EYFS: These are our ELG for our EYFS children

Exceptional Explorer

The Natural World:

I can describe what I see, hear and feel whilst outside

I can explore the natural world around me by making observations and drawing pictures of animals and plants.

I know some similarities and difference between the natural world and other environments.

I know some places that are different from the one I live in.

I can understand some important processes and changes in the natural world like the seasons and changing states of matter.

I know the different seasons and how seasons change the world around me.

Magnificent Mathematician

I know my numbers to 10 and understand the composition of each number.

I can subitise to 5.

I can recall number bonds for numbers 0–5 and some to 10.

I know double facts to 10.

I can count beyond 20 and recognise the pattern.

I can compare numbers up to 10 and recognise greater than, less than or the same.

I can explore and show patterns with numbers to 10 such as odd and even, doubles, sharing equally.

I can count objects, actions and sounds.

I can link a number symbol with its number value.

I can understand one more and one less.

I can select, rotate and manipulate shapes.

I can compose and decompose shapes.

I can continue, copy and create repeating patterns.

I can compare length, weight and capacity

Confident Communicator

I can listen carefully and know why listening is important.

I can respond with questions, comments and actions.

I can make comments and ask questions to find out more and to check I understand what has been said to me.

I can hold two-way conversation with my friends and teachers.

I can have one to one, small group and class discussions speaking and listening in turn and using new vocabulary.

I can talk to help work out problems and to explain how things work and why they might happen.

I can talk about my ideas, feelings and experiences in well-formed sentences and can connect one idea or action to another using a range of connectives and different tenses

I can learn and use new vocabulary and use it in different ways.

I can develop social phrases.

I can describe events in some detail.

Independent Individual

I can think and talk about my feelings and the feelings of others and begin to manage my own feelings.

I can set and work towards simple goals.

I can wait for things I want and control my impulses.

I can focus on what the teachers says, respond and follow instructions with several parts.

I can be confident in new activities, be independent and show resilience and perseverance in the face of challenge.

I know right from wrong and can explain why we have rules.

I can manage my own personal hygiene and needs.

I can talk about how to be healthy and have good wellbeing.

I can see myself as a valuable individual.

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Encourage positive interaction with the outside world, offering children a chance to take supported risks, appropriate to themselves and the environment which they are in.

Observe and interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object and a boat floating on water.

Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change

Select texts to share with the children about the changing seasons.

Encourage focused observation of the natural world

Name and describe some plants and animals' children are likely to see, encouraging children to recognise familiar plants and animals whilst outside

Guide children's understanding by drawing children's attention to the weather and seasonal features.

Look for children incorporating their understanding of the seasons and weather in their play

Provide children with frequent opportunities for outdoor play and exploration.

Encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences.

Offer opportunities to sing songs and join in with rhymes and poems about the natural world, including animals and plants

Listen to children describing and commenting on things they have seen whilst outside, including plants and animals.

After close observation, draw pictures of the natural world, including animals and plants.

Create opportunities to discuss how we care for the natural world around us.

Provide opportunities for children to note and record the weather

Create opportunities to discuss how we care for the natural world around us.

How is this achieved?

- Discussions at snack time of the importance of healthy food choices
- During lunch time discussions about food and choices
- Through specific story choices and circle time discussions
- PE lessons that encourage getting dressed and undressed independently
- Naming body parts through songs – Heads, shoulders, knees and toes etc
- Seasonal songs links to Harvest, Eid etc
- Growing of plants and flowers in raised beds
- Large scale building materials: blocks, bricks, wheels, planks etc in outdoor provision
- Observing changes in weather, seasons – particularly during time in woodland area
- Know about teeth and oral health
- Explore natural world including shadows and rainbows
- Exploring push and pulls; use of magnets
- RSE link – Correct naming of body parts
- Talking about pets at home
- Exploring minibeasts and recording our observations

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Long Term Overview

Physics

Biology

Chemistry



Evolution & Inheritance
Changes over time, evolution, adaptation & inheritance

Animals inc Humans
Circulatory system & impact of lifestyle choices

Living Things & Habitats
Classify plants, animals & micro-organisms

Electricity
Explore how components function & impact of voltage on them (parallel/series)

Light
Recognise how light travels - objects & shadows

Year
5/6 B

Year
5/6 A

Properties of Materials
Reversible/irreversible changes, including solubility, conductivity & magnetism

Animals inc Humans
Describe changes as humans develop to old age

Living Things & Habitats
Life cycles & reproduction of different classes of plants & animals

Forces
Explain side effects of gravity & resistance

Space & The Solar System
Describe movement of celestial bodies including how this affects seasons

States of Matter:
Solids, liquids gases & changing state

Animals inc Humans
Describe the digestive system, teeth & interpret food chains

Living Things & Habitats
Use classification keys & recognise impact of environmental change

Electricity
Name circuits & components (insulators & conductors)

Sound
How sounds are made (pitch, volume, vibrations)

Year
3/4 B

Year
3/4 A

States of Matter: Rocks & Fossils
Classify rocks & describe fossil formation

Animals inc Humans
Identify muscular-skeletal systems & nutritional needs

Plants
Name functions of parts of plants (flowers) & transportation of water

Forces & Magnets
How forces move objects (magnetic & non-magnetic forces)

Light
Name light sources & explore reflection & shadow

Everyday Materials
Name and recognise common materials and describe simple properties

Animals inc Humans
Identify & name common animal classes and compare their characteristics

Plants
Name & identify common plants & trees & their basic structure

Seasonal Changes
Describe seasonal changes weather & day length

Year
1/2 B

Year
1/2 A

Everyday Materials
Name uses of everyday materials linked to their properties

Animals inc Humans
Recognise animals & humans have offspring & describe basic needs

Plants
How plants grow and what they need

Living Things & Habitats
Name plants & animals in their habitats & describe simple food chains

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Long Term Overview – Science in the Curriculum



Science in the Curriculum

**Geography Year 1/2:
Comparing Colyton**
Substantive knowledge: Climates, habitats, temperature

**Geography Year 1/2:
Weather**
Substantive knowledge: Seasonal changes

**Geography Year 1/2:
The UK & Kenya**
Substantive knowledge: Weather & climates

**Geography Year 1/2:
Rain or Shine**
Substantive knowledge: Sustainable energy, materials & properties

**Geography Year 3/4:
Coast & Country**
Substantive knowledge: Water cycles

**Geography Year 3/4:
Rivers & Rainforests**
Substantive knowledge: Climate, homes, habitats, animals, water cycle, sustainability (hydro electric power)

**Geography Year 3/4:
Life in the Freezer**
Substantive knowledge: Climates, materials & properties, earth & space in 5/6

**Geography Year 3/4:
Discovering Europe**
Substantive knowledge: Sustainable energy, climates, homes, animals & habitats

**Geography Year 5/6:
North America**
Substantive knowledge: Climates, habitats, temperatures

**Geography Year 5/6:
Extreme Earth**
Substantive knowledge: Rock formation, volcanoes

**Geography Year 5/6:
Colyton – Local Area**
Substantive knowledge: Weather & climates, water cycles, habitats

**Geography Year 5/6:
Fair Trade**
Substantive knowledge: Sustainable energy

**History Year 1/2:
Days Through Time**
Substantive knowledge: Materials

**History Year 1/2:
Great Fire of London**
Substantive knowledge: Materials & causes of fire

**Geography Year 3/4:
Industrial Revolution**
Substantive knowledge: Electricity, generators, coal/renewable sources

**Geography Year 5/6:
Colyton – Local Area**
Substantive knowledge: Rocks & soils (Mary Anning)

**DT Year 1/2:
Fantastic Fruit**
Substantive knowledge: balanced diet, nutrition, healthy eating

**DT Year 1/2:
Sliders & Levers/Moving Books**
Substantive knowledge: Forces

**DT Year 1/2:
Moon Buggies**
Substantive knowledge: Forces

**DT Year 1/2:
Tudor Houses**
Substantive knowledge: Forces, materials

**DT Year 3/4:
Nightlights**
Substantive knowledge: Electricity, light

**DT Year 3/4:
Making Sandwiches**
Substantive knowledge: food groups, balanced & healthy diet, nutrition

**DT Year 3/4:
Leavers & Linkages**
Substantive knowledge: Forces

**DT Year 3/4:
Pneumatic Systems**
Substantive knowledge: Forces, materials

**DT Year 5/6:
Making Salsa**
Substantive knowledge: food groups, balanced & healthy diet, nutrition

**DT Year 5/6:
Anderson Shelters**
Substantive knowledge: Forces

**DT Year 5/6:
Fairground Rides**
Substantive knowledge: Forces

**DT Year 5/6:
Electrical Systems**
Substantive knowledge: Electricity

**PSHE Year 1/2:
What helps us stay safe?**
Substantive knowledge: Materials (dry fire)

**PSHE Year 1/2:
What helps us grow?**
Substantive knowledge: Nutrition, food, water, healthy eating, plants

**PSHE Year 3/4:
How should we look after our teeth?**
Substantive knowledge: Teeth, digestive system

**PSHE Year 3/4:
How our choices affect environment?**
Substantive knowledge: Water cycle, sustainability

**PSHE Year 5/6:
How do drugs affect our body?**
Substantive knowledge: Circulatory system, smoking

**PSHE Year 5/6:
Relationships & Sex Education?**
Substantive knowledge: Bodies, changes in old age, reproductive cycles

**Music Year 3/4 :
Active Signing Games**
Substantive knowledge: Sounds & vibrations

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Personal Development

At Colyton we enhance the national curriculum for our students and make our curriculum unique. We do this through looking at influential people, developing character, citizenship, SMSC, equality, diversity, confidence & resilience, wellbeing, e-safety, RSE, transitions and British Values within the units of learning that the children study.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Seasonal changes British Values: I know how the climate varies in different parts of Britain Healthy Living: I know the importance of sun cream	Materials Citizenship/sustainability: I know why and how to recycle different materials	Plants: Influential People: Joseph Banks Wellbeing: I know how to keep myself healthy and what to do to keep plants healthy		Animals including humans Wellbeing: I know how to care for different animals, including a pet	
Year 2	Materials: Charles Mackintosh Wellbeing: I know which fabrics make the best clothing and how to stay warm and dry		Animals including humans: SMSC: I can look at pictures of myself and others as a baby and recognise how we are the same and how we are different from our parents and each other.	Plants Resilience: I know what plants need to grow, I can make a link between hardy plants and human mindset	Living things and their habitat: Citizenship: I recognise different ways of supporting our local habitats (e.g. I have made a bird feeder/bug hotel/cleaned the pond)	
Year 3/4 A	Rocks Careers: I know what archaeologists and geologists do.	Light: Health & Safety: I know how to keep my eyes safe around light	Forces and magnets: Citizenship: I know where the two poles are and who some of the first people to go there were.		Plants British Values: I can name plants that are native and important in British culture.	Animals including humans: Health & Wellbeing: I know how to have a healthy and varied diet and why this is important.

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 3/4 B	Animals including humans <u>Healthy Living</u> : I know how to care for my teeth and the importance of a good diet	States of matter <u>Sustainability</u> : I know why we look after rivers and oceans	Electricity: <u>Influential People</u> Michael Faraday, Thomas Edison/Joseph Swan <u>Sustainability</u> : I know how to save energy in my home and school	Sound: <u>Diversity</u> : I know how hearing aids work and how being hearing impaired can impact on a person's life	Living things and their habitats: <u>Sustainability</u> : I know what some of the threats are to British wildlife and what I can do to help.	
Year 5/6 A	Life cycles <u>Citizenship</u> : I know the link between bee pollination and crop growth.	Forces <u>Influential People</u> : Galileo Galilei	Properties and changes of materials <u>Sustainability</u> : I know what the water cycle is, how it works and the impact of pollution on it. I know what I can do to change this.		Earth and Space <u>Careers</u> : I know what it takes to become and astrophysicist and have a career in space exploration	Animals including humans: <u>SMSC</u> : We have visited a care home and understand the importance of this on the wellbeing of others
Year 5/6 B	Evolution: <u>Equality</u> : I know that science has been a male dominated industry and how this has impacted on female scientists. E.g. Rosalind Franklin <u>SMCS</u> : I know how Charles Darwin's theories impacted Victorian society		Light: <u>Influential People</u> : Lewis Howard Latimer & Isaac Newton <u>Health & Safety/Citizenship</u> : I know how reflective clothing works and how this keeps me safe on the roads or in the dark.	Electricity: <u>Influential people</u> : Nikola Tesla <u>Health & Safety</u> : I know how to be safe around electricity.	Animals including humans: <u>Healthy Living</u> : I can talk about the impact of drugs and alcohol on my health, particularly the dangers of smoking <u>Influential People</u> : Dr Chris & Dr Z and Elizabeth Blackwell	Classification: <u>Influential People</u> : Karl Linneus <u>Citizenship</u> : I understand how global pandemics can affect all areas of our lives. <u>Health Living</u> : I know how to keep clean

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Knowledge and skills Progression:

Year ½ A



Uses of Everyday Materials (Autumn)	Living Things and their Habitats (Spring)	Plants (How they grow) (Summer)	Animals, including Humans (Life Cycles) (Summer)
SUBSTANTIVE KNOWLEDGE: I KNOW and can explain if materials (including wood, metal, plastic, glass, brick, rock, paper, cardboard) are suitable for particular uses. I KNOW that some materials can be changed shape by squashing, bending, twisting and stretching.	SUBSTANTIVE KNOWLEDGE: I CAN explore and compare the differences between things are living, dead, and things that have never been alive. I CAN identify that most living things live in habitats they are suited to. I CAN describe how different habitats provide for the needs of animals and plants, and how they depend on each other. I CAN identify and name a variety of plants and animals in their habitats, including microhabitats. I CAN describe how animals obtain their food using the idea of a food chain. I CAN name different sources of food.	SUBSTANTIVE KNOWLEDGE: I CAN observe and describe how seeds and bulbs grow into mature plants. I KNOW that plants need water, light and a suitable temperature to grow and stay healthy.	SUBSTANTIVE KNOWLEDGE: I KNOW that animals, including humans, have offspring which grow into adults. I KNOW and can describe the basic needs of animals, including humans, for survival. I KNOW the importance for humans of exercise. I KNOW why humans need to eat the right amounts of different types of food. I UNDERSTAND the importance of hygiene for humans.
DISCIPLINARY KNOWLEDGE: (Working Scientifically) Planning Enquiries: I CAN suggest resources I may need for a test. Making Predictions: I CAN begin to test predictions and later answer questions.	DISCIPLINARY KNOWLEDGE: Interpreting and Conclusion: I CAN draw a basic conclusion using scientific knowledge and observations. Evaluating: I CAN suggest some things that can be changed and evaluate why things went wrong.	DISCIPLINARY KNOWLEDGE: Recording: I CAN use prepared tables to record results. Observation/Measurement: I CAN use standard units to estimate and measure.	DISCIPLINARY KNOWLEDGE: Asking Questions: I CAN use a range of question stems to ask simple questions relevant to the topic. Recording: I CAN record my observations using photographs and/or labelled diagrams.
VOCABULARY: 3 KEY WORDS Suitable Flexible Solid	VOCABULARY: 3 KEY WORDS Habitat Micro Living/Non-living	VOCABULARY: 3 KEY WORDS Seed Bulb Germination	VOCABULARY: 3 KEY WORDS Offspring Survival Development

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Knowledge and skills Progression: Year ½ A



Everyday Materials (Autumn)	Seasonal Changes (Autumn)	Plants (Naming) (Spring)	Animals, including Humans (Herbivore/Carnivore) (Summer)
SUBSTANTIVE KNOWLEDGE: I KNOW the difference between an object and the material from which it is made. I KNOW and can name a variety of everyday materials (including wood, plastic, glass, metal, water, rock). I CAN describe the simple physical properties of a variety of everyday materials. I CAN compare and group together materials based on their properties.	SUBSTANTIVE KNOWLEDGE: I KNOW what changes happen when summer turns to autumn. I KNOW what changes happen when winter turns to spring. I CAN describe the weather that is typical of each season. I KNOW how the length of the day changes in different seasons.	SUBSTANTIVE KNOWLEDGE: I KNOW and can name a variety of common wild and garden plants. I KNOW the difference between evergreen and deciduous trees. I KNOW the basic structure of common flowering plants, including trees.	SUBSTANTIVE KNOWLEDGE: I KNOW and can name a variety of common animals (including fish, amphibians, reptiles, birds and mammals). I KNOW examples of animals which are carnivores, herbivores and omnivores. I CAN describe and compare the structure of common animals. I CAN label the basic parts of the human body. I KNOW which part of the body is associated with each sense.
DISCIPLINARY KNOWLEDGE: (Working Scientifically) Evaluating: I CAN suggest simple improvements to my enquiries. Making Predictions: I CAN make basic predictions over things I can see.	DISCIPLINARY KNOWLEDGE: Interpreting and Conclusion: I CAN begin to notice patterns and relationships. Planning Enquiries: I CAN recognise different ways I could answer scientific questions.	DISCIPLINARY KNOWLEDGE: Asking Questions: I CAN explore the world around me and ask my own questions. Observation and Measurement: I CAN use equipment such as magnifying glasses and viewers to make observations.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Recording: I CAN use sorting rings to classify in more than two groups, answering yes or no questions. I CAN sort using a simple 2 criteria Venn diagram.
VOCABULARY: 3 KEY WORDS Materials Waterproof Properties	VOCABULARY: 3 KEY WORDS Seasons Temperature Changes	VOCABULARY: 3 KEY WORDS Evergreen/Deciduous Variation	VOCABULARY: 3 KEY WORDS Carnivore Herbivore Omnivore

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Knowledge and skills Progression:

Year 3/4 A



Rocks (Autumn 1)	Light (Autumn)	Forces and Magnets (Spring)	Plants (Summer)	Animals including Humans (Skeletons) (Summer)
SUBSTANTIVE KNOWLEDGE: I KNOW three types of rock: igneous, sedimentary and metamorphic. I CAN compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. I KNOW that fossils are formed when things that have lived are trapped within rock. I KNOW that soils are made from rocks and organic matter.	SUBSTANTIVE KNOWLEDGE: I KNOW that I need light in order to see things. I KNOW that dark is the absence of light. I KNOW that light is reflected from surfaces. I KNOW that light from the sun can be dangerous, and ways to protect my eyes. I KNOW that shadows are formed when the light from a light source is blocked by an opaque object. I CAN find patterns in the way the size of shadows change.	SUBSTANTIVE KNOWLEDGE: I CAN compare how things move on different surfaces. I KNOW that some forces need contact between two objects, but magnetic forces can act at a distance. I KNOW that magnets attract or repel each other. I KNOW that magnets attract some materials (with examples) and not others. I KNOW magnets have two poles. I CAN predict whether two magnets will attract or repel, given which poles are facing.	SUBSTANTIVE KNOWLEDGE: I KNOW and can describe the functions of parts of flowering plants (roots, stem/trunk, leaves, flowers). I KNOW what plants need to survive and grow (air, light, water, nutrients from soil, room to grow), and how they vary from plant to plant. I CAN investigate how water is transported within plants. I KNOW the part that flowers play in the life cycle of plants (pollination, seed formation, seed dispersal).	SUBSTANTIVE KNOWLEDGE: I KNOW that animals, including humans, need the right types and amount of nutrition. I KNOW that animals cannot make their own food; they get nutrition from what they eat. I CAN identify that humans and some other animals have skeletons and muscles for support, protection and movement and that muscles are vital to this.
DISCIPLINARY KNOWLEDGE: (Working Scientifically) Interpreting and Conclusion: I CAN draw conclusions based on observations.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Asking Questions: I CAN decide how to gather data to answer questions.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Observation/ Measurement: I CAN take accurate measurements using standard units, to compare.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Recording: I CAN record findings using careful observational drawings.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Observing: I CAN observe what happens in different tests.
VOCABULARY: 3 KEY WORDS Metamorphic Igneous Sedimentary	VOCABULARY: 3 KEY WORDS Light Source Opaque Transparent/translucent	VOCABULARY: 3 KEY WORDS Attract Repel Force	VOCABULARY: 3 KEY WORDS MRS GREN	VOCABULARY: 3 KEY WORDS Vertebrate Contract Extend

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[Knowledge and skills Progression:](#)

[Year 3/4 B](#)

Animals, including Humans Digestive (Autumn)	States of Matter (Autumn)	Sound (Spring)	Electricity (Summer)	Living Things and their Habitats (Summer)
SUBSTANTIVE KNOWLEDGE: I KNOW the simple functions of the basic parts of the digestive system in humans. I CAN identify the different types of teeth in humans and their simple functions. I CAN construct and interpret a variety of food chains, identifying producers, predators and prey.	SUBSTANTIVE KNOWLEDGE: I KNOW what is meant by evaporation and condensation. I KNOW the part evaporation and condensation play in the water cycle. I KNOW that temperature affects the rate of evaporation.	SUBSTANTIVE KNOWLEDGE: I KNOW that sounds are made by something vibrating. I KNOW that vibrations from sound travel through a medium to the ear. I KNOW how the pitch of a sound relates to features of the object that produced it. I KNOW how the volume of a sound is related to the strength of the vibrations that produced it. I KNOW that sounds get fainter as the distance from the sound source increases.	SUBSTANTIVE KNOWLEDGE: I KNOW common appliances that run on electricity. I CAN construct a simple series circuit. I CAN name basic parts of a circuit (including cells, wires, bulbs, switches, buzzers). I KNOW whether or not a lamp will light (if a circuit is complete). I KNOW that a switch opens and closes a circuit. I KNOW some examples of common conductors and insulators, including metals as good conductors.	SUBSTANTIVE KNOWLEDGE: I KNOW that living things can be grouped in a variety of ways. I CAN use classification keys to help group, identify and name living things in the local and wider environment. I CAN that environments can change and that this can sometimes pose dangers to living things.
DISCIPLINARY KNOWLEDGE: (Working Scientifically) Asking Questions: I CAN carry out research using a small range of secondary sources.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Planning Enquiries: I CAN understand there are different variables to be controlled.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Making Predictions: I CAN add detail to my predictions using scientific knowledge.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Recording: I CAN complete a table (with given template) adding heading and results.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Observation/ Measurement: I CAN Use observations to ask questions and group objects using classification keys.
VOCABULARY: 3 KEY WORDS Systems Function Food chains	VOCABULARY: 3 KEY WORDS States Solid/Liquid/Gas Cels ius	VOCABULARY: 3 KEY WORDS Vibration Frequency Waves	VOCABULARY: 3 KEY WORDS Conductor Insulator Circuit	VOCABULARY: 3 KEY WORDS Classification Key Native Threat

Implementation:

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Knowledge and skills Progression:

Year 5/6 A



Living Things and their Habitats: Comparing Life Cycles	Forces	Materials/ Properties and Changes of Materials	Earth and Space	Animals including humans – Old Age
SUBSTANTIVE KNOWLEDGE: I CAN describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. I CAN describe the life process of reproduction in some plants and animals.	SUBSTANTIVE KNOWLEDGE: I CAN explain that unsupported objects fall towards the Earth, because of the force of gravity acting between the Earth and the falling object. I CAN identify the effects of air resistance, water resistance and friction, that act between moving surfaces. I KNOW that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	SUBSTANTIVE KNOWLEDGE: I CAN compare and group everyday materials on the basis of their properties (including hardness, solubility, transparency, thermal conductivity, electrical conductivity, response to magnets). I KNOW some materials will dissolve in liquid to form a solution. I CAN describe how to recover a substance from a solution. I KNOW how mixtures might be separated (eg filtering, sieving and evaporating). I KNOW the reasons for particular uses of everyday materials, eg metals, wood, plastic. I CAN show that dissolving, mixing and changes of state are reversible changes. I KNOW that some changes result in the formation of new materials, and this is not usually reversible (eg burning, action of acid on bicarbonate of soda).	SUBSTANTIVE KNOWLEDGE: I CAN describe the movement of the Earth, and other planets, relative to the Sun in the solar system. I CAN describe the movement of the Moon relative to the Earth. I CAN describe the Sun, Earth and Moon as approximately spherical bodies. I KNOW how the idea of the Earth's rotation can explain day and night. I KNOW how the Earth's rotation explains the apparent movement of the Sun across the sky.	SUBSTANTIVE KNOWLEDGE: I CAN describe the stages of human development. I CAN explain how babies grow. I CAN describe and explain the main changes that happen during puberty. I KNOW how people change in old age.
DISCIPLINARY KNOWLEDGE: <i>(Working Scientifically)</i> Interpreting and Conclusion: I CAN create detailed models to explain processes such as life cycles.	DISCIPLINARY KNOWLEDGE: <i>(Working Scientifically)</i> Recording: I CAN present results in a variety of ways to help in answering questions.	DISCIPLINARY KNOWLEDGE: <i>(Working Scientifically)</i> Making Predictions: I CAN make predictions from previous learning and review these predictions to state whether I was correct. Observation/Measurement: I CAN take measurements with increasing accuracy.	DISCIPLINARY KNOWLEDGE: <i>(Working Scientifically)</i> Asking Questions: I CAN raise questions about a range of phenomena, using secondary sources to research.	DISCIPLINARY KNOWLEDGE: <i>(Working Scientifically)</i> Observation/Measurement: I CAN report findings from enquires. Planning Enquiries: I can identify and control variables.
VOCABULARY: 3 KEY WORDS Puberty Elderly Adolescence	VOCABULARY: 3 KEY WORDS Gravity Mass Streamlined	VOCABULARY: 3 KEY WORDS Soluble Solute Reversible/Irreversible changes	VOCABULARY: 3 KEY WORDS Geocentric/heliocentric Orbit Axis	VOCABULARY: 3 KEY WORDS Asexual/sexual reproduction Pollination Gestation

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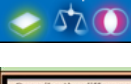
Knowledge and skills Progression: Year 5/6 B

Evolution and Inheritance	Light	Electricity	Living Things and their Habitats: Classification	Animals, including Humans: Circulatory System
SUBSTANTIVE KNOWLEDGE: I KNOW that living things have changed over time and that fossils provide information about living things from millions of years ago. I KNOW that living things produce offspring of the same kind, which normally vary and are not identical to their parents. I KNOW how animals and plants are adapted to suit their environments in different ways. I KNOW that adaptation may lead to evolution.	SUBSTANTIVE KNOWLEDGE: I KNOW that light appears to travel in straight lines. I UNDERSTAND how this explains that objects are seen because they give out or reflect light into the eye. I CAN explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. I CAN explain why shadows have the same shape as the objects that cast them.	SUBSTANTIVE KNOWLEDGE: I KNOW that the brightness of a lamp, or the volume of a buzzer, is linked to the voltage of cells in a circuit. I CAN compare and give reasons for why there are variations in components, eg the brightness of bulbs, the loudness of buzzers, the on/off positions of switches. I CAN use recognised symbols when representing a simple circuit in a diagram.	SUBSTANTIVE KNOWLEDGE: I KNOW that living things are classified into broad groups based on similarities and differences, including microorganisms, plants and animals. I CAN give reasons for classifying plants and animals based on specific characteristics.	SUBSTANTIVE KNOWLEDGE: I KNOW and can identify the main parts of the human circulatory system. I KNOW the functions of the heart, blood vessels and blood. I KNOW how diet, exercise, drugs and lifestyle affect the way my body functions. I CAN describe the ways in which nutrients and water are transported within animals, including humans. I CAN describe the changes as humans develop to old age.
DISCIPLINARY KNOWLEDGE: (Working Scientifically) Evaluating: I CAN use scientific language and evaluate how their enquiry has answered the question.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Asking Questions: I CAN raise questions to further prove or disprove a scientific enquiry.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Recording: I CAN produce my own results table, indicating cause and effect.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Observation/ Measurement: I CAN use observation skills to identify, group and classify.	DISCIPLINARY KNOWLEDGE: (Working Scientifically) Planning Enquiries: I CAN set up pair tests, explaining which variables need to be controlled and changed.
VOCABULARY: 3 KEY WORDS Evolution and Inheritance Evolution DNA Adaptation	VOCABULARY: 3 KEY WORDS Reflection Refraction Light waves	VOCABULARY: 3 KEY WORDS Voltage Parallel/Series Components	VOCABULARY: 3 KEY WORDS Organism Characteristics Mould	VOCABULARY: 3 KEY WORDS Artery/veins Bacteria/Virus Double Pump

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Knowledge and skills Progression: By Subject

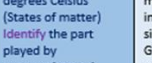
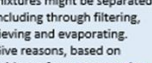
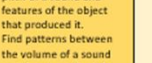
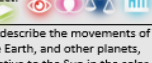
	Foundation/ EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Year Group	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants 	Natural world Explore the world around them making observations and drawings of plants. Natural world Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. Communication and language- express their ideas and feelings about their experiences using full sentences.	- Name common plants and describe the basic structure of flowering plants, including deciduous and evergreen. - Identify and describe the basic structure of a variety of common flowering plants, including trees. 	- Observe and describe how seeds and bulbs grow into mature plants. - Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 	- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. - Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. - Investigate the way in which water is transported within plants. - Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	Recognise that living things can be grouped in a variety of ways. (Living things and habitats)	Describe the differences in the lifecycles of a mammal, an amphibian, an insect and a bird. (Living things and habitats)	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics (Living things and habitats)

Seasonal Changes 	The Natural World Understand some important processes and changes in the natural world around them, including seasons. 	Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. 		Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect our eyes. Recognise that shadows are formed when the light source is blocked by a solid object. Find patterns in the way the size of the shadows change (Light)	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Forces)	Use the idea that light travels in straight lines to explain why shadows have the same shape as the object that casts them. (Light)
Earth and Space 					Earth and Space 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. Use Earth rotation to explain day and night due to the apparent movement of the sun across the sky. 	

Animals including humans. 	The Natural World Explore the natural world around them, making observations and drawing pictures of animals. Begin to make sense of their own life-story and family's history. Begin to understand the key features of the lifecycle of a plant and animal. People, culture and communities Describe their immediate environment using knowledge from observation, discussion, stories and non-fiction texts and maps. Personal, social and emotional development Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 	Notice that animals, including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement. 	Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains. Identifying producers, predators and prey. 	Describe the differences in the lifecycles of a mammal, an amphibian, an insect and a bird. Describe the life processes of reproduction in some plants and animals. (Living things and habitats) Describe the changes as humans develop from birth to old age. 	Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Identify and name the main parts of the human circulatory system and describe the function of the heart, blood vessels and blood. Describe the ways in which nutrients and water are transported within animals, including humans. 
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Knowledge and skills Progression: By Subject

Materials  Rocks and Soils 	The Natural World Understand some important processes and changes in the natural world around them, including changing states of matter. Speaking Offer explanations for why things happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems where appropriate. Understanding of the world Use all their senses in hands on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see using a wide vocabulary. Explore how things work. Talk about the difference between materials and changes they notice.	Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. 	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 	Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Forces and magnetism) Rocks and Soils Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within a rock. Recognise that soils are made from rocks and organic matter 	STATES OF MATTER Compare and group materials together, according to whether they are solids, liquids or gases (states of matter) Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (States of matter) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (states of matter)  Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. 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 gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials and this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. 	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Evolution and Inheritance)	
Light and sound 	Understanding of the world Explore materials with different properties. Talk about what they see, using a wide vocabulary. Expressive arts and design Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture form and function. Explore colour and colour-mixing. Play instruments with increasing control to express their feelings and ideas. 	Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Materials) Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. (Seasonal changes) (pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense (Animals [ogd,humans])	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (materials) Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Plants)	Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. (Plants) Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect our eyes. Recognise that shadows are formed when the light source is blocked by a solid object. Find patterns in the way the size of the shadows change 	Recognise that environments can change and that this can sometimes pose dangers to living things. (living things and habitats) SOUND To identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sound gets fainter as the distance from the sound source increases. 	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. (materials) Use Earth rotation to explain day and night due to the apparent movement of the sun across the sky. (Earth and Space)	Recognise that light travels in straight lines. Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the object that casts them. 
Forces 	Understanding the World. Explore and talk about different forces they can feel. Can talk about the differences between materials and changes they notice. 	Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Materials)	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Materials)	Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing. 	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction that act between moving surfaces. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.  To describe the movements of the Earth, and other planets, relative to the Sun in the solar system (Earth and Space)		

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Knowledge and skills Progression: By Subject

Living Things	People, culture and communities Explain some similarities and differences between life in this country and life in other countries, drawing on knowledge from stories, non-fiction texts and maps. Understanding the world Begin to understand the need to respect and care for the natural environment and all living things. Explore the natural world around them.  	Name common plants and describe the basic structure of flowering plants, including trees. (Plants) Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals) including (Animals including Humans)	Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including microhabitats. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.      	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. (Plants)	Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local environment. Recognise that environments can change and that this can sometimes pose dangers to living things.      	Describe the differences in the lifecycles of a mammal, an amphibian, an insect and a bird. Describe the life processes of reproduction in some plants and animals.      	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.    Evolution and inheritance Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.   
Electricity	Shows skills in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movement or new images.   	Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Materials)	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Materials)		Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.      	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. (Materials)	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram.      

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[Knowledge and skills Progression: By Scientific Enquiry Skills](#)

?? Asking Questions

- | | |
|----|--|
| 6 | Can raise questions about local animals and how they are adapted to their environment.
Can raise questions about a range of phenomena e.g., rainbows, colours on soap bubbles, objects looking bent in water. |
| | Asks a range of appropriate questions to group and classify into many different categories.
Can use secondary sources to research (e.g., unfamiliar animals and plants from a broad range of habitats).
Use ideas from secondary sources to support their ideas.
Can raise questions to further prove or disprove a scientific enquiry. |
| 5 | Can study and raise questions to answer (including about their local environment throughout the year, properties of materials, forces, space, animals or living things).
Can ask relevant questions and suggest reasons for similarities and differences.
Use their scientific experiences to explore ideas and raise different questions.
Can create further questions from enquiries to investigate.
Independently uses secondary sources to find relevant facts about a topic.
Raise further questions from enquiries/research. |
| | Can decide how to gather evidence to answer questions.
Raise questions to help identify and group (such as how a habitat changes, animals and living things including plants, different states of matter and how sounds are made)
Can write a range of questions using the world around them and their own scientific knowledge.
They recognise when secondary sources can be used to answer questions and can select appropriate information from sources.
Can ask a range of questions to sort and classify. |
| 3 | Raise own questions about the world around them and why this happens the way they do (e.g. the role of the roots and stem in nutrition and support, or how rocks are formed, different forces)
Recognise how and when to use secondary sources to answer questions that cannot be answered in practical science.
Can write a range of questions relevant to the topic.
Can answer questions posed by the teacher, independently or with support.
Identify new questions from data.
Can raise questions and carry out tests with support to find things out.
Can carry out research using a small range of secondary sources. |
| | Raise questions that help them become familiar with scientific processes (e.g life processes that are common to all living things, their local environment, materials)
Can ask simple questions relevant to the topic. |
| 2 | Can use a range of question stems. (e.g. Is a flame alive? Is a deciduous tree dead in winter? What makes the best habitat for a minibeast? Where in the school can we find something that is made of wood? Which animal belongs to which offspring? Do seeds grow quicker inside or out?)
Know their questions can be answered in different ways.
Use more than one secondary source to gather and present information clearly. |
| | Explore the world around them and raise own questions. (e.g growing, animals in their habitat, everyday materials, why seasons change.) |
| 1 | Can answer questions supported by the teacher, often through scenarios and recognise questions can be answered in different ways.
Can begin to ask simple questions and use simple secondary sources to find answers.
Able to ask yes and no questions to sort and classify. |
| | Shows curiosity about objects, events, plants, people and animals. |
| F. | Questions why things happen.
Asks questions to clarify understanding and aspects of their familiar world e.g. place they live or natural world.
Ask questions to find out how things work or to clarify what is happening. |

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[Knowledge and skills Progression: By Scientific Enquiry Skills](#)



Evaluating

6	Can describe and evaluate their own and other people's scientific ideas using evidence from a range of sources. Evaluate their choice of method, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources. Use scientific language and evaluate how their enquiry has answered the question. Evaluate and decide when further observations, comparative and fair tests might be needed. Evaluate different aspects of their enquiries such as equipment and accuracy of measurements.
5	State how the enquiry improves outcomes from their questions. Can relate their results to the question and state if their test has enabled them to answer it. Use a range of charts to evaluate such as ranking scales, star diagrams including those with negative numbers. Suggest next steps based on the weakest aspects and state how this will help them or the test progress or give different results. Evaluate and communicate their methods and findings.
4	Suggest ways to improve what they have already done. Begin to evaluate different aspects of their enquiries such as equipment. Begin to understand how the enquiry improves outcomes from their questions. Use different charts to evaluate such as ranking scales, star diagrams and success ladders. Suggest points for development based on the weakest aspects. Suggest improvements and raises further questions
3	Use evidence and subject knowledge to refute statements. Make suggest improvements from enquiries. Make basic statements about what worked well and what they would change. Use success ladders confidently to evaluate their tests or understanding against multiple criteria and suggest simple next steps.
2	With support can suggest improvements to their enquiries. Suggest some things that could be changed and evaluate why things went wrong. Use success ladders with multiple criteria to evaluate the test or their understanding against the learning objective. With scaffolding and prompting can suggest simple improvements to their enquiries. Talk about some changes that could be made.
1	Use simple success ladders to evaluate their tests or understanding against the learning objective.
F.	Develop own narrative and explanations by connecting ideas or events. Talk about what they have found and say what worked well. Describe how things work in simple terms and make basic alterations and suggest things that did not work (e.g. this button does not work so press this one) Question why things happen. Come up with alternative ways of doing things through exploration. They can say or indicate by smiley faces/scale if they have achieved the learning objective.

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Interpreting and Conclusion

6	Look for patterns and relationships using a suitable sample. Use oral and written forms such as displays to report conclusions, casual relationships and give an explanation of the degree of trust in their results. Children can pose further questions which can be answered by extending the enquiry. Makes suggestions for ideas that can be explored using pattern seeking. Can spot anomalies and identify results that do not fit the overall pattern. Use data to refute or support ideas or arguments. Focuses on scientific reasons for overall pattern rather than a comparison. Uses labelled diagrams to support their explanation. Use ideas from secondary sources to support their ideas, choosing appropriate websites. Create detailed models to explain processes such as circulatory system and lifecycles.
5	Identify patterns and casual relationships that may be found in the natural environment. Children interpret data to generate simple comparative statements based on evidence. Use results to draw conclusions and can identify external factors that cannot be controlled e.g. temperature inside and outside. Use scientific language and illustrations to discuss, communicate and justify scientific ideas. Use results to make predictions and identify whether further observations, comparative tests, fair tests, pattern seeking, or research might be needed. Can use comparative statements to explain results and how things work. Evaluate how effectively variables were controlled and what they may do to improve the enquiry.
4	Draws simple conclusions from results to answer questions and support their ideas. Look for casual relationships in data and identify evidence that refutes/supports ideas. Report on findings to an audience orally and in writing using appropriate scientific vocabulary for a range of audiences. Children use evidence to suggest values for different items tested using the same method. Draw conclusions based on straightforward evidence and current subject knowledge to support their findings. Suggest improvements and raise further questions.
3	Begin to look for naturally occurring patterns and relationships from data. Draws conclusions based on observations. Can compare something using results and the conclusion is consistent with the data. Able to adjust opinion and predictions based on results. Can give reasons for results including any anomalies. Uses findings and results to answer questions raised. Use simple scientific language to discuss ideas and communicate their findings in ways appropriate for different audiences orally and written. Apply their knowledge of the topic when evaluating. Explain any amendments and how this impacted the investigation/test.
2	Communicate findings to an audience using relevant scientific language and illustrations. Can identify casual relationships and patterns in results. Can identify which results do not fit the overall pattern and explain findings. Refers to the table of results when describing what has happened. Draws a basic conclusion (with support from the teacher) using own scientific knowledge, observations and comparisons. Uses results of investigations to answer enquiry questions.
1	Can use evidence from simple tests when answering questions. With help begin to notice patterns and relationships. Talk about what they have found out and how they found it out. Can make comparisons and recognise biggest/smallest, most effective/least effective from data. Can use simple models to explain processes e.g. seasonal changes, lifecycles.
F.	Offer explanations for why things happen- making use of some recently introduced scientific vocabulary. Develop own narrative and explain by connecting ideas or events. Develop vocabulary which meets the breadth of their experiences

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Making Predictions

6

Develops predictions not based on results of a scientific enquiry but using own ideas and subject knowledge.

Use evidence to support predictions.

Gathers evidence through practical science to support predictions.

Use test result to make predictions to set up further comparative and fair tests.

5

Use subject knowledge, observations, or previous learning to make predictions.

Can add further detail and explanations for their predictions. They review their predictions to state whether their predictions were correct.

Can base predictions on previous scientific enquiry.

Can identify a range of variables which could affect their investigation.

4

Use subject knowledge or research to make predictions.

Predictions are detailed and explains their thinking, they link to previous tests and use scientific language.

Raise further predictions from results based on patterns.

Make predictions for new values.

3

Uses evidence and subject knowledge to refute statements.

Make predictions from questions posed.

Add detail to their predictions giving reasons linked to own scientific knowledge.

Makes further predictions from what is observed or tested.

2

Draws on knowledge from observations to make a prediction.

Can begin to test predictions and later answer questions (predictions can be a guess).

Ask questions about what might happen in the future.

1

Can make basic predictions over things they can see or their own ideas.

Can use some scientific vocabulary.

E.

Shows curiosity about objects, events and people.

Question why things happen.

Can make simple predictions based on comparisons e.g. float or sink?

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Q Observation and Measurement

	Observation	Measurement
6	Children answer their own and others' questions on observations they have made. Their answers are based on evidence. Observe and raise questions about animals and how they are adapted to their environment. Observe properties of materials to group and classify based on their characteristics and properties. Can make accurate detailed drawings of plants and animals based on their own observations.	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate. When collecting measurements, the decide whether they need to increase sample size for validity and reliability. Can record measurements to 3dp. Can use protractors and rulers and force metres to measure accurately choosing correct units.
5	Observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world. Observe changes over a period of time. (e.g. animals) Make own decisions about what to observe. Can use observation skills and ID kits to identify different animals and minibeasts. Can use careful observations to identify different rocks and group them depending on their observable characteristics.	Take repeat measurements where appropriate. Can choose the middle value or finds mean average. Select measuring equipment to give most precise results e.g., ruler, tape measure, trundle wheels, force metres with suitable scales. Can explain advantages and disadvantages of different measuring equipment. Children make quantitative measurements about conductivity and insulation.
4	Make systematic and careful observations to identify plants and animals in their habitats and how the habitat changes throughout the year. Use observations to ask questions and group objects using classification keys. Observe closely and describe processes such as changes of state. Observe and record evaporation over a period of time. Identify differences, similarities or changes related to simple scientific ideas or processes.	Uses a range of scales. Takes and records accurate measurements using standard units. Can record measurements to 2dp. Use thermometers to explore the effects of temperature on substances. Use data loggers to record sound in decibels and notice patterns. Use volt metres to measure voltage in a circuit to observe patterns and answer questions. Begin to gather repeat readings to increase accuracy.
3	Make systematic and careful observations. Draw diagrams and pictures with detail. Select own equipment for observing e.g. magnifying glasses, viewers, microscopes, digital cameras. Look for naturally occurring patterns and relationships. Collect data from their own observations and measurements. Closely observe stages of plant lifecycle over a period of time, noting patterns. Observe how water is transported in plants. Observe patterns in the way magnets behave in relation to each other. Can make observations and decide how to record them to answer a question.	Take accurate measurements using standard units, can measure and compare. (e.g., amount of liquid and height of a plant to nearest ½ cm) Use a range of equipment for measuring time, length, capacity and temperature. Begin to use a range of scales. Can read digital measurements from data loggers appropriately.

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Planning Enquiries

6

Children choose the type of enquiry needed to carry out their investigation.
Children can pose and answer their own questions, controlling variables where necessary independently.
Decide whether they need to increase the sample size for validity.
Children understand how to gather data to prove a prediction.
Can identify a range of factors which may affect their investigation.

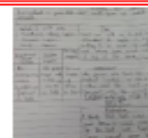


5

Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and changed.

Can identify independent and dependent variables to identify causal relationships.

Understand what type of scientific enquiry is needed to answer and prove/disprove scientific questions or phenomenon.



4

Can identify the type of enquiry needed to answer a question.

Follow a plan to carry out observations and tests.

Can select from a range of resources to gather evidence and answer questions, to classify, compare and perform fair tests.

Use post it note planning approach with more independence in identifying variables and what needs measuring. Children choose their method to carry out the investigation.



3

Perform a range of scientific investigations including different types of scientific enquiry.

Set up practical enquiries: comparative, and fair tests.

(post it note approach scaffolded by the teacher).

Children investigate and answer own questions linked to shared planning Frame e.g. post it note approach (Scan QR Code)

Understand there are different variables to be controlled. (Can identify some variables e.g. what was changed and what was kept the same)

Follow basic instructions scaffolded by the teacher to conduct investigation.

Use a range of equipment including thermometers and data loggers (with support).



We are investigating	
What we are changing	What we are keeping the same
What we will observe	What we will measure
What we will change	What we will observe
What we will observe	What we will measure
What we will change	What we will observe
What we will observe	What we will measure

2

Carry out simple comparative tests using own ideas

(May use Discovery Dog model)

Experience different types of enquiry including practical activities.

Within the planning frame can suggest resources they may need for the test.

Can carry out simple tests linked to the types of enquiry: observation, testing, pattern seeking, identifying and classifying and research.



1

Begin to recognise different ways they may answer scientific questions.

Experience different types of enquiry including practical activities.

Use practical resources provided by the teacher and can suggest some resources of their own e.g pipettes, viewers, magnifying glasses.

Can carry out simple tests to classify, compare or pattern seek.



F.

Find ways to solve problems/find new ways to do things.

Test out ideas.

Take risks through trial and error.

Engage in open ended activities.

Choose the resources they need for their chosen activity from their environment.

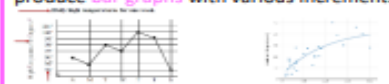
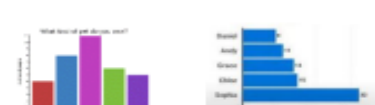
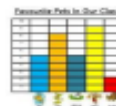
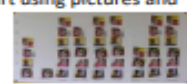


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Recording

	Recording	Tables	Sorting	Charts and Graphs
6	Children present the same data in different ways to help answering the question. Record data and results with increasing complexity e.g. accuracy of measurements, multiple data sets and different scales. Use scientific diagrams, models and labels.	They can calculate the mean and range of a set of data. Use multiple data sets.	Can use and produce classification keys independently by posing questions.	Can independently collect data and produce scatter and line graphs using various scales and multiple data. Can create bar charts and pie charts to present data. 
5	Children decide how to record data from a choice of familiar approaches. Present results in a variety of ways to help in answering questions. Can record ideas using accurately labelled diagrams using scientific language.	Can produce own results table indicating cause and effect. Records results systematically.	Use and develop classification keys and other information records to identify, classify and describe. Can classify in a number of ways.	Use line or scatter graphs to calculate range in a set of data. (Different scales used) Can produce bar graphs with various increments. 
4	Record findings using systematic and careful observational drawings and labelled diagrams. Children supported to present the same data in different ways- choice over recording.	Can create own tables with own headings. Can convert between units of measure.	Can record using classification keys. Can use Venn and Carroll diagrams for classification, choosing own criteria.	Can use discrete and continuous data, presenting data in a line/scatter graph. Can construct a pictogram/bar chart independently. 
3	Record findings using scientific language, drawings and labelled diagrams and detailed written explanations based on observations.	Can complete a table (with given template) where they add headings and results.	Can use simple classification keys and Venn diagram with 2 sorting criteria and 1 intersecting. Begin to use Carroll diagrams. Can give reasons for their sorting criteria.	Can produce vertical and horizontal bar charts adding own labels and bars. 
2	Children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing. Record findings using scientific language. Gather and record data to help in answering questions.	Count results using a tally chart. Use prepared tables to record results.	Can identify and classify. Use simple keys based and yes or no questions. Can sort into 2 groups explaining their reasons clearly.	Can record using prepared vertical bar charts. Can use results from tally charts. 
1	Begin to show accuracy in drawings, observations and simple labels. Use key scientific vocabulary provided by the teacher.	Can complete a simple table of results. (Prepared) Can add marks to a chart to collect data.	Can using sorting rings to classify in more than 2 groups answering yes or no questions. Can sort using a simple 2 criteria Venn diagram.	Can complete a prepared block graph/pictogram. 
F	Draw pictures of objects in their own environment. Can take photos of things of interest to them.	Can count results. Start to mark make to record results.	Can order items. Can sort in more than 2 groups using familiar categories.	Can create a class chart using pictures and objects. 

- ### Lesson Design:

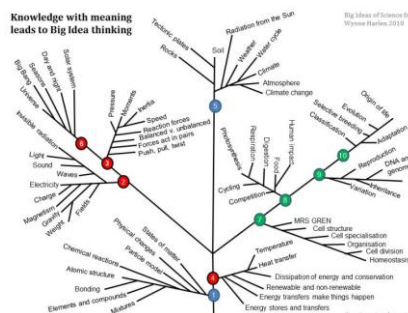
Asking Questions:

Building Knowledge:

Exploring:

Making Sense of the World:

For some students science can be seen as an endless list of unconnected ideas. At Colyton we support children to make links between ideas so that they are better able to understand some of science's **big ideas**.



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Science for learners with SEND

Inclusion in Science means: everyone feeling they can be successful, opportunities to explore their creativity from their own starting points, supporting language and communication for all learners.

Possible struggle or challenge	Scaffold or support to consider
Difficulties with language/ vocabulary	- Support students in remembering and being able to read and write key words and names of apparatus, processes etc. (taking time to introduce and explain new words, providing word banks). - Be aware of the confusion that may arise from words having more than one meaning (eg light, solution, resistance, concentration, etc). - Use speaking frames to develop understanding of scientific concepts and language (listen, imitate, innovate). - Allow time for checking understanding and repeating explanations/ modelling when appropriate. - Pacing, using a slower pace in conversation to give pupils time to think and formulate a response. - Pausing frequently and expectantly when talking to a pupil or group of pupils can encourage their participation. - Confirming, by confirming their understanding of what a child has said, adults can maintain the conversation and reassure the child that they are being listened to and understood. - Imitating, teaching staff can imitate and repeat what a pupil has said; for example, if a child says, 'Look at our bridge', the adult can respond by saying, 'Wow, look at your strong bridge'. - Commenting, adults comment on what is happening or what a child is doing. - Comments about the immediate situation can help the child to associate phrases and vocabulary with their actions or surroundings. - Extending, by repeating what a child has said, but adding some syntactic or semantic information, adults can introduce new words or grammatical structures. This should be done in a way that is immediately accessible and understandable to the child. - Labelling, you can build a child's vocabulary by providing the names of objects, actions or abstractions. - Scripting, it is helpful for adults to provide a verbal routine for activities; for example, 'First you do this, then you do that...'. Encourage pupils to talk through known routines; for example, 'Now it's practical time, what do we do first?'. - Gesture, drawings, photos, artefacts, prompt cards and where appropriate, symbols are used alongside words – oral and written. - Pre-teach key vocabulary, then ensure multiple and regular exposure to these words
Difficulties with specific literacy skills (including dyslexia)	- Use visual prompts to direct students - Give only one or two instructions at a time - Build a topic specific vocabulary guide - Provide a transcript of text on the board for the student to highlight - Encourage the use of mind maps/pictures/flow charts – this increases a spatial approach - Use lots of short activities to reinforce concepts - Offer extra time to complete work - Create over-learning opportunities for automaticity - When assessing writing – look for quality before quantity - Find ways to compensate for working memory difficulties (e.g. knowledge organisers)
Difficulties with specific mathematical skills (including dyscalculia)	- Reassurance when any mathematical skills are needed. - Use concrete apparatus to help e.g. number lines, unifix blocks. - Check the mathematical language is understood. - When organising a practical session, use templates to help drawing tables and graphs.

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Possible struggle or challenge	Scaffold or support to consider
Difficulties with engagement, resilience and self-esteem	- Create firm expectations by displaying and repeating rules clearly and reminding students of a rule when he/she starts to misbehave. - Give advance warning of any changes to regular events. - Give very clear guidelines, for instance: 'I expect you to have produced at least four sentences by ten past ten. I will be asking you then to share them with your talk partner'. - Use eye contact and non-verbal signals, wherever possible, to let the pupil know if their behaviour is inappropriate.
Processing difficulties, or struggles to retain information	- Give pupils time to think about answering questions. - Encourage discussion with peers in advance of feeding back to the group or answering questions. - Teach pupils to ask for help, using supports for this, such as prompts. - Check for understanding, perhaps involving other adults in the class. - Help students to plan effectively (eg provide instructions for them to sequence in the correct order). - Sequencing activities - writing up experiments, cycles, cut and paste. (it is perfectly acceptable for a TA to write sentences or draw diagrams for the pupil to cut and paste themselves). - Write instructions on the board - use different colours for each line, or to indicate instructions for different students. - Teach mind-maps, spider diagrams, to organise learning. - Task plans - provide instructions for a task visually using the headings, What do I need? What do I need to do? What happens after that? This can be also be used as a scaffold to support homework tasks. The student progressively is given more responsibility for creating the plan. - A visual framework can be used as a consistent guide for planning an investigation in science. Headings of what am I finding out? What I need? What will I do? What to look for? What happened? Why did it happen? Each with picture support will simplify the method, results and conclusion format for many students. - Make use of songs, rhymes and rhythm to aid learning sequences.
Sensory challenges or visual/hearing impairment	- Additional equipment such as non-slip mats and a free-standing magnifying glass may also be useful. - Measuring cylinders with large-scale readings, talking scales etc can also be considered. - Explore shape and function of any equipment - Use specialist equipment e.g. talking thermometers - Record instructions - Use equipment trays with polystyrene cut out shapes for equipment to fit in - Use large print or Braille to label chemicals - Colour water so it is easier to see - Ensure everyone follows rules e.g. to keep floors free of obstructions

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Impact:

Our approach to assessment in science is in line with John Hattie's approach about the importance of "knowing thy impact" and how feedback should work two ways; from teacher to student *and* from student to teacher. For us to know our impact, we must constantly get feedback from our students as to whether learning has or hasn't happened so that we can respond appropriately.

Short term: day-to-day assessment

Progress can be shown on a day-to-day basis, even if assessment information is more informal in nature. Formative strategies such as better questioning (challenging questions, rich questions); feedback, (including formative marking, with opportunities for students to respond and improve their work) effective self- and peer- assessment support students to make progress within planned knowledge and skills.

Each lesson has a learning question (LQ) which includes the key knowledge and enquiry skill for that lesson. Children are encouraged to self assess their understanding and confidence at the end of the lesson. Thinking frames, thinking routines and quality teaching, with a wide range of opportunities for embedding oracy skills, enables greater organisation and development of scientific ideas. Learning questions may span more than one lesson.

Medium term assessment

In order to measure the progress in knowledge between the start and the end of the unit of work an elicitation task is given to the children to enable an understanding of their current knowledge of the unit. After the unit is finished then the children complete an application task which then enables the children to show how they have developed their thinking and understanding along their learning journey through the unit and also provides feedback to the teacher about their understanding of new concepts.

Enquiry Skills:

Each lesson within a unit has a knowledge based objective and also a skills based one. The enquiry skills are therefore assessed throughout the year and teachers are able to assess children's ability in these areas based on These activities are taken from the Primary Science Teaching Trust's Teacher Assessment in Primary Science (TAPS) focused assessment tasks and allow for assessment of knowledge and of working scientifically.