

Science  
Regis Manor Primary School



Swale  
ACADEMIES  
TRUST

# Intent

The PKC Science curriculum will lay the foundation for pupils to understand what the discipline of science tells us about the world. We aim to ignite children's love for science by showing them what fascinating things the human race has learned about the world.

Within our carefully planned curriculum, children are introduced to including the inner workings of the human body, animals and the environments they live in, plants and their features, forces of nature, what lies beyond the visible world. Children are taught to apply their knowledge and conduct their own scientific enquiries to answer questions, working scientifically to develop essential skills in science.

Our science curriculum builds knowledge incrementally year on year to revisit and build upon children's knowledge and understanding of key concepts. Pupils also study the lives and achievements of a diverse range of scientists including Lewis Howard Latimer, Thomas Edison, Jabir ibn Hayyan. Their disciplinary knowledge will flourish over time enabling them to see the importance of science as a subject and how it translates into the world of research and work, what scientists do and how they impact upon our lives.



Collaboration - Empathy - Independence - Creativity - Perseverance



# Intent

## **Progression in the PKC Science: Summary**

Our curriculum has been designed to be the 'progression model' by setting out the specific knowledge we want children to learn, ordering it coherently and building in opportunities to check that children are remembering what they have been taught. This means that as children progress from unit to unit, year to year, they will be learning more and remembering more in science.



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# Implementation

Science lessons are taught once a week in all year groups in KS1 and 2 for a minimum of one hour. In EYFS, Science is embedded within the learning.

All year groups follow PKC Science plans. Lessons begin with prior learning, introduction to vocabulary, include talk tasks and group work and end with an assessment/reflection task.



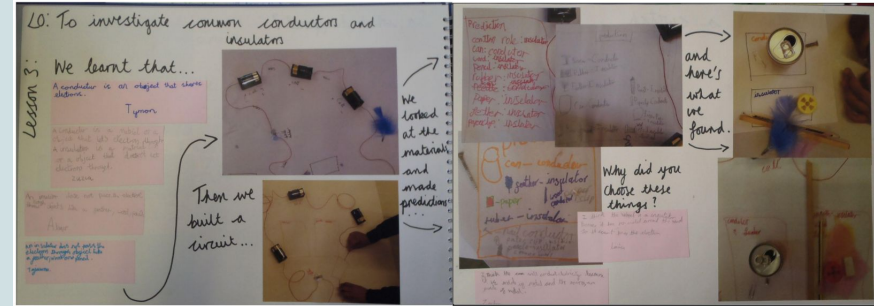
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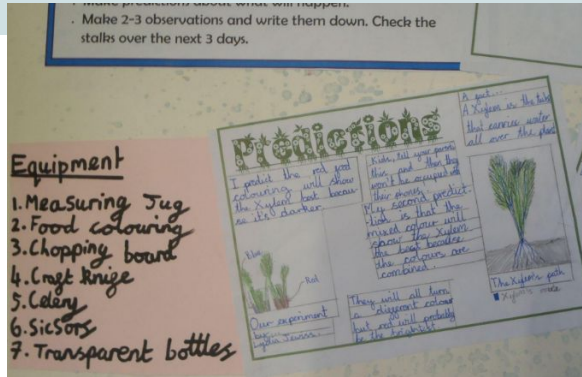
# Implementation

The images on this page and the next show working scientifically requirements:

- Use different types of scientific enquiry
- Setup practical enquiries
- Record and present data in a variety of ways
- Record findings using simple scientific language and tables
- Report findings in displays or presentations



Investigations



Making predictions



# Implementation

Cross curricular links:

The image displays a collection of student work related to a torch experiment. At the top, five simple addition problems are shown:

$$\begin{array}{r} 126 \\ + 23 \\ \hline 149 \\ \hline 68 \end{array}$$

$$\begin{array}{r} 229 \\ + 18 \\ \hline 247 \\ \hline 56 \end{array}$$

$$\begin{array}{r} 132 \\ + 21 \\ \hline 153 \\ \hline 71 \end{array}$$

$$\begin{array}{r} 125 \\ + 21 \\ \hline 146 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 133 \\ + 12 \\ \hline 145 \\ \hline 63 \end{array}$$

Below these are three long division problems, each labeled with a torch type:

**Lazer:**  $3 \overline{) 22.6} = 7.5333$  (labeled as 68.0)

**Mini:**  $3 \overline{) 18.6} = 6.2$  (labeled as 56.0)

**Ipod:**  $3 \overline{) 23.6} = 7.8666$  (labeled as 71.0)

**Torch 2:**  $3 \overline{) 21.3} = 7.1$  (labeled as 64.0)

**Torch 3:**  $3 \overline{) 21} = 7$  (labeled as 63)

Text on the page includes:

- "According to the maths shown on the left, the torch 1 (mini) was the most effective and the Ipod was the least effective."
- "Torch 3 was a close contender to being the most effective but wasn't."
- "I added the scores from each activity and divided the answer by 3 because I wanted to find the mean."
- Handwritten predictions and reflections from students like Ish, J.B., and JONIS.
- Small images of the torches used in the experiment.

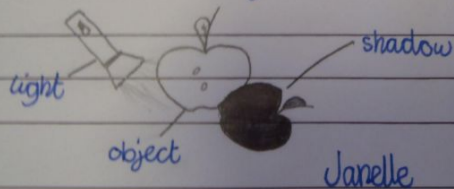
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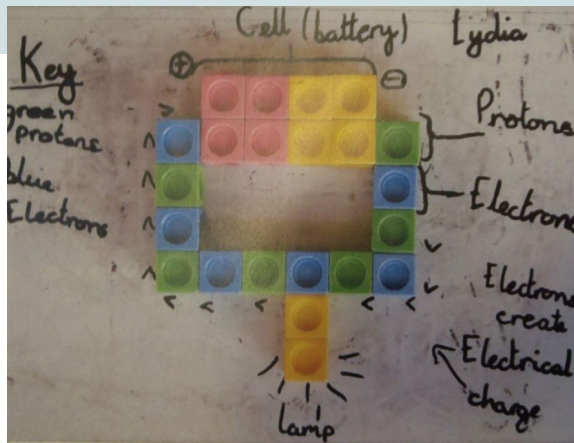
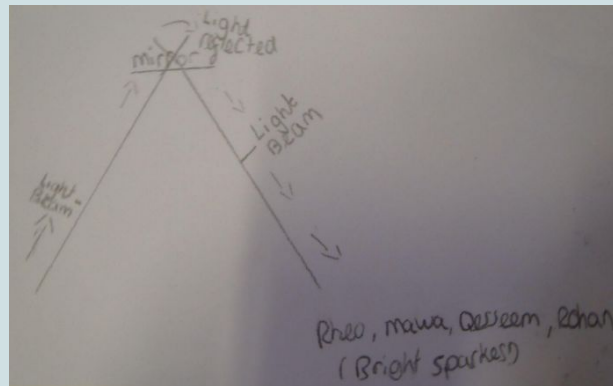
# Implementation

What is a shadow?

A shadow is a dark shape that falls on a surface when something is inbetween the surface and a light.

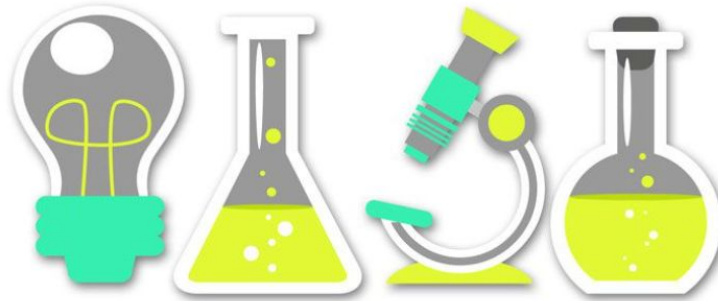


Recording data and ideas in a variety of ways,  
Reporting findings and presenting enquiries and answering questions  
Using scientific enquiry.



# Inclusive Practice

Lessons are differentiated and scaffolded to ensure all pupils can access content and build skills. Planning allows for individual learning styles and challenge is embedded to develop and build on learning. Talk time is embedded in every lesson sequence and discussion is strongly encouraged. Lessons contain a mix of hands on discovery and expression of learning whereby pupils are allowed to present their new knowledge in a way that suits their learning style. Pupils are encouraged to question concepts and to prove theories and conjectures.



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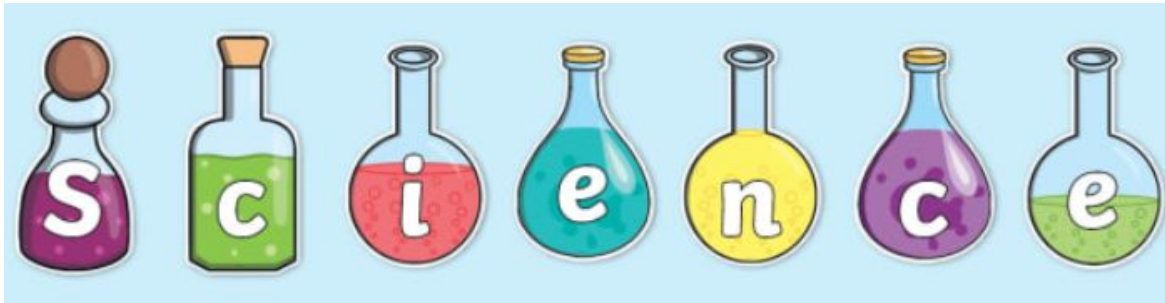


# Impact of the Science curriculum

Children are naturally curious. Science at primary school should nurture this curiosity and allow them to ask questions and develop the skills they need to answer those questions.

Primary science helps pupils to:

- investigate problems
- learn how science works
- discover why science matters in the world.



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	Autumn A	Autumn B	Spring A	Spring B	Summer A	Summer B
Year 1	<b>The Human Body</b> 1. Introduction to Our Body and Our Senses 2. Eyes and Sight 3. Ears and Hearing 4. Touch, Taste and Smell 5. Understanding Sensory Impairment	<b>Animals and their Needs</b> 1. Common Animals 2. Grouping Animals: Fish, Amphibians, Reptiles, Birds and Mammals 3. Grouping Animals: Carnivores, Herbivores and Omnivores 4. Animals as pets 5. Describing Animals	<b>Seasons and Weather</b> 1. The Four Seasons 2. Tools to Record the Weather 3. Using a graph to show information about the weather 4. Clouds: cirrus, cumulus and stratus 5. Weather Forecasting	<b>Taking Care of the Earth</b> 1. Taking Care of the Earth 2. Earth's Natural Resources 3. Logging 4. Pollution 5. Recycling	<b>Plants</b> 1. What Plants Need 2. Parts of Plants 3. Seeds 4. Deciduous and Evergreen Plants 5. Plants We Eat	<b>Materials and Magnets</b> 1. Everyday Materials 2. Properties of Materials 3. Uses of Materials 4. Magnets 5. Investigation
Year 2	<b>The Human Body</b> 1. Survival and Offspring 2. The Skeletal System, The Muscular System and Exercise 3. The Digestive system and Healthy Eating 4. The Circulatory system 5. Germs, Diseases and Preventing Illness	<b>Living Things in their Environments</b> 1. Dead or Alive 2. What is a habitat? 3. Rainforest and Desert Habitats 4. Meadow habitats 5. Underground habitats	<b>Electricity</b> 1. Introduction to Electricity 2. Safety 3. Exploring Circuits (A) 4. Exploring Circuits (B) 5. Investigating Conductive and Non-Conductive Materials	<b>Plants</b> 1. Plants around us 2. Seeds and bulbs 3. Comparative Test 1 4. Comparative Test 2 5. Food and Farming	<b>Materials and Matter</b> 1. Materials and Their Uses 2. George de Mestral and Velcro 3. Matter Under the Microscope 4. Changing Solid Objects 5. Liquids and Their Properties	<b>Astronomy</b> 1. Introduction to Astronomy 2. Model the Solar System 3. Orbit and Rotation 4. The Moon and its Phases 5. Constellations
Year 3	<b>The Human Body</b> 1. The Muscular System 2. The Skeletal System 3. The Nervous System 4. Nutrition 5. The Digestive System	<b>Cycles in Nature</b> 1. The Four Seasons 2. Seasonal Cycles in Plants 3. Life Cycle of a Plant 4. Animal Migration 5. Life Cycle of a Frog	<b>Rocks</b> 1. Sorting Rocks 2. How Rocks are Formed 3. Permeability 4. Fossils 5. Soil	<b>Forces and Magnets</b> 1. Forces (Gravity) 2. Friction 3. Magnet 4. Magnetic Poles and Fields 5. Investigating the Strength of Magnets	<b>Plants</b> 1. Botany and Flowering Plants 2. Requirements for Life and Growth 3. Water Transportation in Plants 4. Pollination in Flowering Plants 5. Seed Dispersal	<b>Light</b> 1. Light and Dark 2. Transparent and Opaque 3. Mirrors and Reflection 4. Shadows 5. Finding Patterns in Changing Shadows

	Autumn A	Autumn B	Spring A	Spring B	Summer A	Summer B
Year 4	<p><b>The Human Body</b></p> <ol style="list-style-type: none"> <li>1. Cells and Nutrients</li> <li>2. Teeth and Senses</li> <li>3. Digestion</li> <li>4. Preparing to Eat</li> <li>5. Vitamins and Minerals</li> </ol>	<p><b>Classification of Plants and Animals</b></p> <ol style="list-style-type: none"> <li>1. Introduction to Classification</li> <li>2. Classes of Vertebrates: Fish and Amphibians</li> <li>3. Classes of Vertebrates: Reptiles, Birds and Mammals</li> <li>4. Classes of Invertebrates: Insects, Arachnids and Molluscs</li> <li>5. Classification of Plants</li> </ol>	<p><b>Ecology</b></p> <ol style="list-style-type: none"> <li>1. Living Things and Habitats</li> <li>2. Natural Cycles</li> <li>3. Web of Living Things</li> <li>4. Air Pollution: A Human Threat to the Environment</li> <li>5. Ecology in our Local Area</li> </ol>	<p><b>Sound</b></p> <ol style="list-style-type: none"> <li>1. What is Sound?</li> <li>2. Speed of Sound</li> <li>3. Qualities of Sound - Pitch and Volume</li> <li>4. Human Voice</li> <li>5. Ears - How We Hear</li> </ol>	<p><b>The Water Cycle</b></p> <ol style="list-style-type: none"> <li>1. States of Matter</li> <li>2. Evaporation</li> <li>3. Condensation</li> <li>4. Precipitation</li> <li>5. The Water Cycle</li> </ol>	<p><b>Electricity</b></p> <ol style="list-style-type: none"> <li>1. Electrical Safety</li> <li>2. Parts of a circuit</li> <li>3. Switches</li> <li>4. Thomas Edison and Lewis Latimer</li> <li>5. Investigating Conductive and Non-Conductive Materials</li> </ol>
Year 5	<p><b>The Human Body</b></p> <ol style="list-style-type: none"> <li>1. Gestation and Infancy</li> <li>2. Adolescence and Puberty</li> <li>3. Slowing Down</li> <li>4. Growth in Humans and Animals</li> <li>5. Preparation for Assessment (Research and Scientific Drawing)</li> </ol>	<p><b>Materials</b></p> <ol style="list-style-type: none"> <li>1. Properties of Materials</li> <li>2. Which material is best?</li> <li>3. Solubility - which materials are most soluble/what solubility means</li> <li>4. Separating Mixtures - sieving, filtering, evaporating</li> <li>5. Reversible Changes - dissolving, mixing, change of state</li> </ol>	<p><b>Living Things</b></p> <ol style="list-style-type: none"> <li>1. Life Cycles of Plants and Animals in Our Local Area</li> <li>2. Life Cycles of Mammals and Amphibians</li> <li>3. Life Cycles of Insects and Birds</li> <li>4. Reproduction in Plants</li> <li>5. The Work of David Attenborough and Jane Goodall</li> </ol>	<p><b>Forces</b></p> <ol style="list-style-type: none"> <li>1. Forces including Gravity</li> <li>2. Air Resistance, Water Resistance and Friction</li> <li>3. Guided Investigation: Paper Drop</li> <li>4. Guided investigation: Paper Drop</li> <li>5. Pulleys, Gears and Levers</li> </ol>	<p><b>Astronomy</b></p> <ol style="list-style-type: none"> <li>1. The Big Bang and the Expanding Universe</li> <li>2. Gravity</li> <li>3. Our Solar System</li> <li>4. The Moon</li> <li>5. Our Galactic Neighbourhood</li> </ol>	<p><b>Meteorology</b></p> <ol style="list-style-type: none"> <li>1. Meteorology and the Atmosphere</li> <li>2. The Ozone Layer</li> <li>3. Air Movement</li> <li>4. Cold and Warm Fronts</li> <li>5. Thunder and Lightning</li> </ol>
Year 6	<p><b>The Human Body</b></p> <ol style="list-style-type: none"> <li>1. The Heart: Circulation of the Blood</li> <li>2. Blood Vessels and Transport</li> <li>3. Blood Pressure and Heart Rate</li> <li>4. Heart Rate - An Investigation</li> <li>5. Heart Rate - An Investigation</li> </ol>	<p><b>Classification of Living Things</b></p> <ol style="list-style-type: none"> <li>1. Classifying Organisms</li> <li>2. Cells: Plant and Animal cells</li> <li>3. Taxonomy</li> <li>4. Vertebrates</li> <li>5. Invertebrates</li> </ol>	<p><b>Electricity</b></p> <ol style="list-style-type: none"> <li>1. Simple Series Circuits</li> <li>2. Voltage</li> <li>3. Switches</li> <li>4. Planning an Investigation</li> <li>5. Investigation</li> </ol>	<p><b>Light</b></p> <ol style="list-style-type: none"> <li>1. How Light Travels</li> <li>2. How We See</li> <li>3. Shadows and Their Shapes</li> <li>4. The Colour of Light</li> <li>5. Making a Periscope</li> </ol>	<p><b>Reproduction</b></p> <ol style="list-style-type: none"> <li>1. Asexual Reproduction</li> <li>2. Sexual Reproduction in Non-Flowering Plants</li> <li>3. Sexual Reproduction in Flowering Plants</li> <li>4. Reproduction in Animals</li> <li>5. Growth Stages</li> </ol>	<p><b>Evolution</b></p> <ol style="list-style-type: none"> <li>1. Fossils</li> <li>2. Inheritance</li> <li>3. Adaptation</li> <li>4. Charles Darwin</li> <li>5. Alfred Wallace</li> </ol>

# Skills Progression

The Primary Knowledge Curriculum builds knowledge incrementally. Pupils have multiple opportunities to secure and build upon their knowledge by revisiting subject content at carefully sequenced points throughout the curriculum. By building upon their knowledge in a cumulative manner, the curriculum ensures pupils secure greater breadth and depth in their understanding of scientific knowledge, skills and the discipline of science. The Human Body strand taught in all year groups is a prominent example of how pupils' understanding progresses over time to achieve this. This progression helps children to master the knowledge and concepts whilst simultaneously building up an extended subject-specific vocabulary that enables them to communicate their knowledge. This incremental approach helps teachers to identify knowledge gaps and easily look back at previous content to see what they need to address.

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# Skills Progression

Working Scientifically KS1  Statutory	Year 1						Year 2					
	The Human Body	Animals and their Needs	Seasons and Weather	Taking Care of the Earth	Plants	Materials and Magnets	The Human Body	Living Things and their Environments	Electricity	Plants	Materials and Matter	Astronomy
asking simple questions and recognising that they can be answered in different ways		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
observing closely, using simple equipment	✓		✓		✓	✓		✓	✓	✓	✓	
performing simple tests	✓		✓		✓	✓		✓	✓	✓	✓	
identifying and classifying	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
using their observations and ideas to suggest answers to questions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
gathering and recording data to help in answering questions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
<b>Notes and guidance (non-statutory)</b>												
use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ask people questions and use simple secondary sources to find answers	✓		✓	✓		✓	✓	✓	✓		✓	
use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out	✓		✓		✓	✓		✓	✓	✓	✓	
record and communicate their findings in a range of ways and begin to use simple scientific language (with help)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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# Skills Progression

Working Scientifically Lower KS2  Statutory	Year 3						Year 4					
	The Human Body	Cycles in Nature	Plants	Light	Rocks	Forces and Magnets	The Human Body	Classification	Ecology	Sound	States of Matter and the Water cycle	Electricity
asking relevant questions and using different types of scientific enquiries to answer them	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
setting up simple practical enquiries, comparative and fair tests		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers		✓	✓	✓	✓	✓			✓	✓	✓	✓
gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions		✓	✓	✓	✓	✓	✓	✓		✓		✓
identifying differences, similarities or changes related to simple scientific ideas and processes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
using straightforward scientific evidence to answer questions or to support their findings.	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
<b>Notes and guidance (non-statutory)</b>												
recognise when a simple fair test is necessary and help to decide how to set it up			✓	✓	✓	✓	✓			✓	✓	✓
talk about criteria for grouping, sorting and classifying, and use simple keys	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
how to use new equipment, including thermometers and data loggers		✓			✓	✓	✓			✓	✓	✓
collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done									✓	✓		✓
recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	✓	✓	✓		✓			✓	✓		✓	
use relevant scientific language to discuss their ideas and communicate their findings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

# Skills Progression

Working Scientifically Upper KS2	Year 5						Year 6					
	Human Body	Materials	Living Things	Forces	Astronomy	Meteorology	The Human Body	Classification	Electricity	Light	Reproduction	Evolution
<b>Statutory</b>												
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, causal 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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Notes and guidance (non-statutory)</b>												
plan the most appropriate type of scientific enquiry to use to answer scientific questions	✓	✓	✓	✓			✓		✓	✓	✓	
recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why	✓	✓		✓			✓		✓	✓	✓	
use and develop keys and other information records to identify, classify and describe living things and materials	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓
make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them		✓		✓			✓		✓	✓	✓	
choose the most appropriate equipment to make measurements and explain how to use it accurately		✓		✓		✓	✓		✓			
decide how to record data from a choice of familiar approaches	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
look for different causal relationships in their data and use relevant scientific language and illustrations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
use their results to identify when further tests and observations might be needed	✓	✓		✓			✓		✓	✓		
talk about how scientific ideas have developed over time	✓		✓		✓	✓	✓	✓	✓	✓		✓

# Assessment

Every lesson begins with recalling prior learning and ends with a question for pupils to share their learning.

Each unit has 6 lessons and lesson 6 in each is an assessment lesson. Along with a multiple choice question task, pupils will show their understanding by completing tasks such as enquiry questions, extended writing, creating knowledge organisers and many more.

What did the universe begin with?	A	The Sun	
	B	The Big Bang	
	C	A large explosion	
	D	Earth	
What effect does gravity have?	A	Speeds objects up	
	B	Changes shape of an object	
	C	Pulls objects together	
	D	Slows an object down	
How many planets are there in The Solar System?	A	Seven	
	B	Eight	
	C	Nine	
	D	Ten	
Who was the first man on the Moon?	A	Buzz Armstrong	
	B	Isaac Newton	
	C	Neil Armstrong	
	D	Buzz Aldrin	
What is our galaxy called?	A	Mars	
	B	Milky Way	
	C	Andromeda	
	D	Solar system	
What is a supercluster a huge group of?	A	Moons	
	B	Planets	
	C	Stars	
	D	Galaxies	