



# **Primary Science Curriculum**





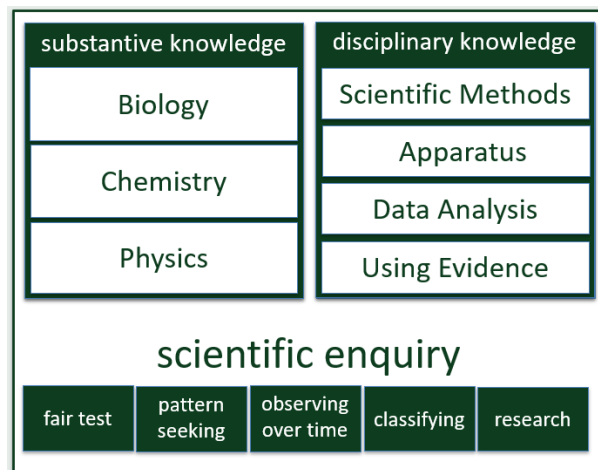
## Primary Science

### Science Vision Statement

A high-quality science education introduces children to the awe and wonder of the world around them.

At TGSA, we enable children to be curious and ask big questions as they study the disciplines of Chemistry, Biology and Physics. Our curriculum carefully sequences the substantive and disciplinary knowledge that children require to carry out scientific enquiries. Engaging, hands on learning inspires a love of science and encourages our children be excited about the phenomena that they observe or even aspire to careers in scientific fields.

We recognise the core status of Science within our curriculum and this is supported by specialist knowledge and resources from our secondary colleagues within the Trust.



### Substantive Knowledge:

Substantive knowledge in science (referred to as scientific knowledge and conceptual knowledge in the national curriculum) is the knowledge of the products of science, such as the concepts, laws, theories and models. The distinct disciplines within science are covered through the units of learning that are revisited throughout Primary:

- Biology: Living things and their environments; Reproduction, inheritance and evolution
- Chemistry: States of matter; Materials (properties and changes)
- Physics: Energy, Forces, Space and Weather

### Disciplinary Knowledge:

Disciplinary knowledge (identified in the 'working scientifically' sections of the national curriculum) is the knowledge of the practices of sciences and can be divided into four content areas:

- Scientific methods used to answer questions: ask scientific questions, make predictions, plan an enquiry, make observations,
- Apparatus and techniques: take measurements, use equipment,
- Data Analysis: record results, present results, interpret results,
- Use of evidence to develop explanations: draw conclusions, evaluate an enquiry, report findings

### Types of Enquiry:

Scientific enquiry integrates substantive and disciplinary knowledge into an overall strategy to answer scientific questions.

- Classification
- Research/Using secondary sources
- Observation over time (one variable over time)
- Comparative/fair test (controlled variables)
- Pattern Seeking (uncontrollable variables)



Progression of Substantive Knowledge:

|           | Year 1                                                                                                                                                                                                 | Year 2                                                                                                                                                                                                                                                 | Year 3                                                                                                                                                                                                                     | Year 4                                                                                                                                                                                     | Year 5                                                                                                                                                                                                                                    | Year 6                                                                                                                                                                                                                                                                       |
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| Biology   | <b>Plants:</b><br>common wild and garden plants (including trees)<br>basic structure of plant<br><b>Animals:</b><br>common animals<br>animal diets<br>structure<br>body parts (including sense organs) | <b>Plants:</b><br>Seeds and bulbs<br>Conditions for growth<br><b>Animals</b><br>Offspring to adult<br>Survival needs<br>Exercise, diet and hygiene<br><b>Living things and their habitats:</b><br>alive, dead, never living<br>habitats<br>food chains | <b>Plants:</b><br>functions of parts of flowering plants<br>requirements for life and growth<br>transport of water within plants<br>life cycle of flowering plants<br><b>Animals:</b><br>Nutrition<br>Skeleton and muscles | <b>Animals:</b><br>Digestive system<br>Teeth<br>Food chains<br><b>Living things and their habitats:</b><br>Classification – mammal, reptile, amphibian, bird, fish<br>Environmental change | <b>Animals:</b><br>Changes from birth to old age (including puberty)<br><b>Living things and their habitats:</b><br>Life cycles of mammals, amphibians, insects and birds<br>Reproduction in plants and animals.                          | <b>Animals:</b><br>Circulatory system<br>Diet, exercise, drugs and lifestyle<br>Transport of nutrients and water within animals<br><b>Living things and their habitats:</b><br>Classification<br><b>Evolution and Inheritance:</b><br>Fossil record<br>Offspring<br>Adaption |
| Chemistry | <b>Everyday materials:</b><br>object vs material<br>properties of materials                                                                                                                            | <b>Uses of everyday materials</b><br>suitability for specific use<br>squashing, bending, twisting, stretching                                                                                                                                          | <b>Rocks:</b><br>Different kinds of rocks<br>Fossils<br>Soil                                                                                                                                                               | <b>States of Matter:</b><br>solids, liquids, gasses<br>changing state<br>evaporation and condensation (water cycle)                                                                        | <b>Properties and changes of materials:</b><br>properties of materials<br>formation of solutions<br>separating mixtures<br>reversible irreversible changes                                                                                |                                                                                                                                                                                                                                                                              |
| Physics   | <b>Seasonal Changes</b><br>4 seasons<br>Weather and day length                                                                                                                                         |                                                                                                                                                                                                                                                        | <b>Forces and magnets:</b><br>Movement on different surfaces<br>Magnets<br><b>Light:</b><br>Light to see<br>Darkness<br>Light is reflected<br>Dangers of sun<br>Shadows                                                    | <b>Sound:</b><br>Sound as vibration<br>Pitch and volume<br><b>Electricity:</b><br>Electric appliances<br>Simple circuits<br>Conductors and insulators                                      | <b>Forces:</b><br>Gravity<br>Air resistance, water resistance and friction<br>Levers, pulleys and gears<br><b>Earth and Space:</b><br>Movement of planets around sun<br>Movement of moon around Earth<br>Earth's rotation – night and day | <b>Light:</b><br>Travels in straight lines<br>Reflected light necessary for sight<br>Shadows<br><b>Electricity:</b><br>Impact of voltage of cells<br>Use symbols<br>(Electrical safety)                                                                                      |



**Progression of disciplinary knowledge:**  
(Maths National Curriculum objectives)

| Key Stage 1              | Methods used to answer questions                                              |                                                                                                                                                                                                                                                                                                      |                                                                                                       |                                                              | Apparatus and Techniques                                                                                                                                                                      |                                                         | Data Analysis                                                                                                                   |                                                                                   |                                                                                    | Use of evidence to develop explanations                                                                                                                                                                                                                        |                                                                                                                                               |
|--------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
|                          | Questions                                                                     | Predictions                                                                                                                                                                                                                                                                                          | Plan enquiry                                                                                          | Observations                                                 | Measurements                                                                                                                                                                                  | Equipment                                               | Record data                                                                                                                     | Present data                                                                      | Interpret results                                                                  | Conclusions                                                                                                                                                                                                                                                    | Evaluate                                                                                                                                      |
| Classifying              | Ask yes/no question to aid sorting                                            | Children in KS1 are not expected to make scientific predictions as they do not have the subject knowledge to do this. That does not mean that you should not ask children what they think may happen or introduce the word 'predict', but this will be based on experience or may simply be a guess. | Identify the headings for two groups                                                                  | Compare objects based on obvious, observable characteristics |                                                                                                                                                                                               |                                                         |                                                                                                                                 | Sort items into two groups using basic Venn diagram or simple table               | Talk about the number of items in each group i.e. which has more/fewer             | Children in KS1 are not expected to draw conclusions. They are expected to make observations which will help them to answer questions. They do not have the subject knowledge to give reasons for what they observe so they cannot draw scientific conclusions | Children in KS1 are not expected to evaluate. However, children should be encouraged to consider their method and adapt this where necessary. |
| Researching              | Ask simple questions linked to a topic.                                       |                                                                                                                                                                                                                                                                                                      |                                                                                                       |                                                              |                                                                                                                                                                                               |                                                         |                                                                                                                                 | Present what they have learnt verbally, using pictures or as an information text. | Be able to answer their question using simple sentences.                           |                                                                                                                                                                                                                                                                |                                                                                                                                               |
| Observing over time      | Ask a question about what might happen based on an observation                |                                                                                                                                                                                                                                                                                                      | Choose equipment from a range and decide what to do or what to observe in order to answer a question. | Make observations linked to answering a question             | Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit. | Use rulers, scales, thermometers and measuring vessels. | Construct simple pictograms, tally charts, block diagrams and simple tables.<br><br>Record pictorially or by taking photographs | Present what they have learnt verbally, using pictures or block diagrams          | Answer their question in simple sentences using their observations or measurements |                                                                                                                                                                                                                                                                |                                                                                                                                               |
| Comparative/Fair Testing | Identify the question to investigate from a scenario or from a range provided |                                                                                                                                                                                                                                                                                                      |                                                                                                       |                                                              |                                                                                                                                                                                               |                                                         |                                                                                                                                 | Present what they have learnt verbally or using pictures.                         |                                                                                    |                                                                                                                                                                                                                                                                |                                                                                                                                               |
| Pattern Seeking          | Ask a question that is looking for a pattern based on observation             |                                                                                                                                                                                                                                                                                                      |                                                                                                       |                                                              |                                                                                                                                                                                               |                                                         |                                                                                                                                 | Present what they have learnt verbally                                            |                                                                                    |                                                                                                                                                                                                                                                                |                                                                                                                                               |



| Lower Key Stage 2   | Methods used to answer questions               |                                                                                |                                                               |                                                                                                         | Apparatus and Techniques                                                                                                                                                                                        |                                                                                                                                               | Data Analysis                     |                                                                                         |                                                                                                                                                       | Use of evidence to develop explanations                                   |                                                                                                                                     |
|---------------------|------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|                     | Questions                                      | Predictions                                                                    | Plan enquiry                                                  | Observations                                                                                            | Measurements                                                                                                                                                                                                    | Equipment                                                                                                                                     | Record data                       | Present data                                                                            | Interpret results                                                                                                                                     | Conclusions                                                               | Evaluate                                                                                                                            |
| Classifying         | Ask a range of yes/no questions to aid sorting |                                                                                | Identify the headings for two groups (it is..., it is not...) | Be able to compare objects based on obvious, observable features e.g. size, shape, colour, texture etc. |                                                                                                                                                                                                                 |                                                                                                                                               |                                   | Sort objects and living things into groups using intersecting Venn and Carroll diagrams | Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs                           | Draw simple conclusions, when appropriate, for patterns                   | Suggest improvements a wider range of objects – only looked at British trees. Suggest new questions arising from the investigation. |
| Researching         | Ask a range of questions linked to a topic     |                                                                                |                                                               |                                                                                                         |                                                                                                                                                                                                                 |                                                                                                                                               |                                   | Present what they learnt verbally, using labelled diagrams or as information text.      | Be able to answer their questions using simple scientific language                                                                                    |                                                                           | Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation.                                   |
| Observing over time |                                                | Use results from an investigation to make a prediction about a further result. | Decide what to change and what to measure or observe          | Make observations linked to answering the question                                                      | Measure using standard units (m/cm/mm, kg/g, l/ml) where not all the numbers are marked on the scale, and take repeat readings where necessary. Record and compare time in terms of seconds, minutes and hours. | NC (including non-statutory):<br>Thermometers<br>Data loggers<br>Magnets<br>Cells, wires, bulbs, switches, buzzers<br>Hand lens<br>Microscope | Prepare own tables to record data | Present data in time graphs [Year 4]                                                    | Refer directly to their evidence when answering their question<br><br>Interpret discrete and continuous data from bar charts and time graphs [Year 4] | Where appropriate provide oral or written explanations for their findings | Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.                   |

**Commented [RE1]:** Need to identify core pieces of equipment that all children should be able to use. No published list.



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|--------------------------|--|--|-------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------|--|--|-----------------------------------------------------|--|--|--|--|
| Comparative/Fair Testing |  |  | Decide what to measure or observe.<br>Decide how often to take a measurement. |  | Measure using standard units where not all the numbers are marked on the scale. Use dataloggers to measure over time. |  |  | Present data in line graphs [Year 4] or bar charts. |  |  |  |  |
| Pattern Seeking          |  |  | Decide what to measure or observe                                             |  | Measure using standard units where not all the numbers are marked on the scale.                                       |  |  |                                                     |  |  |  |  |



| Upper Key Stage 2        | Methods used to answer questions                                                                                                          |                                                                 |                                                                                                 |                                                                                                                | Apparatus and Techniques                                                        |                                                                                   | Data Analysis                                                                   |                                                                                                        |                                                                                                                                   | Use of evidence to develop explanations                                                                                                            |                                                                                                                                                            |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          | Questions                                                                                                                                 | Predictions                                                     | Plan enquiry                                                                                    | Observations                                                                                                   | Measurements                                                                    | Equipment                                                                         | Record data                                                                     | Present data                                                                                           | Interpret results                                                                                                                 | Conclusions                                                                                                                                        | Evaluate                                                                                                                                                   |
| Classifying              | Be able to ask a range of Yes/No questions to aid sorting and decide which ways of sorting will give useful information                   |                                                                 | Identify specific clear questions that will help to sort without ambiguity                      | Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry |                                                                                 |                                                                                   |                                                                                 | Create branching databases (tree diagrams) and keys to enable others to name living things and objects | Be able to talk about the features that objects and living things share and do not share based on the information in the key etc. | Be able to use data to show that living things and materials that are grouped together have more things in common than with things in other groups | Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for   |
| Researching              | Ask a range of questions recognising that some can be answered through research and others may not                                        |                                                                 | Choose suitable sources to use                                                                  |                                                                                                                |                                                                                 |                                                                                   |                                                                                 | Present what they learnt in a range of ways e.g. different graphic organisers                          | Be able to answer their questions using scientific evidence gained from a range of sources                                        |                                                                                                                                                    | Be able to talk about their degree of trust in the sources they used                                                                                       |
| Observing over time      | Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results. | Use test results to make predictions for further investigations | Recognise and control variables where necessary (NB: Variable has a different meaning in Maths) |                                                                                                                | Measure using standard units using equipment that has scales involving decimals | NC (including non-statutory): Filters, Levers, pulleys, gears, Buzzers and motors | Prepare own tables to record data, including columns for taking repeat readings | Choose an appropriate form of presentation, including line graphs                                      | Be able to answer their questions, describing the change over time                                                                | Provide oral and written explanations for their findings                                                                                           | Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled, and accuracy of results |
| Comparative/Fair Testing |                                                                                                                                           |                                                                 |                                                                                                 |                                                                                                                | Use standard units, using decimal notation to up to three decimal places        |                                                                                   | Prepare own tables to record data                                               | Construct pie charts and line graphs                                                                   | Be able to answer their question, describing causal relationships                                                                 |                                                                                                                                                    |                                                                                                                                                            |
| Pattern Seeking          |                                                                                                                                           |                                                                 | Recognise variables and understand that they cannot be completely controlled.                   |                                                                                                                |                                                                                 |                                                                                   |                                                                                 |                                                                                                        | Be able to answer their questions identifying patterns                                                                            |                                                                                                                                                    |                                                                                                                                                            |

**Commented [EB2]:** Teachers need to be aware that the variable has a different meaning in maths

**Commented [EB3]:** Reading and creating tables is also a maths skill

**Commented [EB4]:** This is a key maths skill and is an important component of mathematical thinking so worth flagging



**Primary Science**



**Tudor Grange  
Academies Trust**

# **Curriculum Map**



| EYFS                  | 0 – 3 Preschool                                                                                                                                                                                                                                                                                                                                                                                                                          | 3 – 4 EYFS 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Reception EYFS 2                                                                                                                                                                                                                                                                       | Links to KS1 Curriculum                                                                                                                                                                                                                                                                                                                |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EYFS area of Learning | Understanding the World: The Natural World                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                        |
| Fundamental Knowledge | <p>Repeat actions that have an effect whilst exploring materials inside and outside with different properties.</p> <p>Explore and respond to different natural phenomena in their setting or on trips.</p>                                                                                                                                                                                                                               | <p>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.</p> <p>Explore how things work. Plant seeds and care for growing plants.</p> <p>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.</p> <p>Talk about the differences between materials and changes they notice.</p> | <p>Explore the natural world around them and describe what they see, hear and feel while they are outside.</p> <p>Recognise some environments that are different to the one in which they live.</p> <p>Understand the effect of changing seasons on the natural world around them.</p> | <p>Ask simple questions and recognising that they can be answered in different ways. Use their observations and ideas to suggest answers to questions.</p> <p>Observing closely, using simple equipment. Performing simple tests. Identifying and classifying.</p> <p>Gathering and recording data to help in answering questions.</p> |
| Early Learning Goal   | <p>Explore the world around them, making observations and drawing pictures of animals and plants.</p> <p>Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and know what has been read in class.</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                        |



| Year 1                       | Autumn                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                       | Spring                                                                                                                                                                                                                                                                                                                                                                    | Summer                                                                                                                                                                                                                                                               | Throughout Year                                                                                                                                                                                                                                        |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>National Curriculum</b>   | Identify, name and label the basic parts of the body and say which part of the body is associated with which sense.                    | 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). | 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 name a variety of common wild and garden plants, including deciduous and evergreen trees.<br><br>Identify and describe the basic structure of a variety of common flowering plants, including trees.                                                    | Observe changes across the 4 seasons<br>Observe and describe weather associated with the seasons and how day length varies.                                                                                                                            |
| <b>Year 1</b>                | <b>Animals (including humans)</b>                                                                                                      |                                                                                                                                                                                                                                                                                                                                       | <b>Everyday Materials</b>                                                                                                                                                                                                                                                                                                                                                 | <b>Plants</b>                                                                                                                                                                                                                                                        | <b>Seasonal Changes</b>                                                                                                                                                                                                                                |
| <b>Substantive knowledge</b> | Identify and name key body parts (see vocabulary below)<br><br>Humans (and other animals) find out about the world using their senses. | Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. Key features can be used to identify a                                                                                                                                        | Objects are made of one or more material. Identify and name common materials (see vocabulary below) Some objects can be made from different materials e.g. plastic,                                                                                                                                                                                                       | Name trees and other plants that they see regularly<br><br>Describe some of the key features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom Identify trees which lose their leaves and those that keep them the whole year | Name the four seasons and identify when in the year they occur Describe weather in different seasons over a year Describe days as being longer (in time) in the summer and shorter in the winter. Describe other features that change through the year |

**Commented [KG5]:** The geography NC for KS1 is *identify seasonal and daily weather patterns in the United Kingdom and the location of hot and cold areas of the world in relation to the Equator and the North and South Poles*

which is really similar! something that has been flagged in Y1 due to the topic being taught at the same time. Is this something to link together to save some curriculum teaching time or do we take the approach of teaching a t different times with a different emphasis to check learning and retention of knowledge?

**Commented [RE6R5]:** I think it would make sense to look at weather in Science and the climate of hot/cold areas in Geography. I don't think it makes sense to cover local weather in both subjects. I agree with your idea of splitting this into ongoing learning throughout the year rather than a specific unit on weather.



|                               |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                       |                                                                                                                                                                                                      |                                                                                                                   |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                               | <p>Humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body.</p> <p>The bodies of boys and girls are different. Children should know the names of penis, testicles and vagina (refer to lesson within PSHE scheme and school RSE policy)</p> | <p>range of common animals.</p> <p>Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals.</p> <p><i>[The children need to be able to name and identify a range of animals in each vertebrate group. They do <b>not</b> need to use the terms mammal, reptiles etc. or know the key characteristics of each. Children are being introduced to the concept of carnivore, herbivore and omnivore diet – they do <b>not</b> yet have the knowledge to sort into these categories.]</i></p> | <p>metal or wooden spoons.</p> <p>Describe materials by obvious properties (see vocabulary below).</p> <p>Some materials (e.g. plastic) can be in different forms with very different properties.</p> | <p>Identify and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green</p>                                                                  |                                                                                                                   |
| <b>Disciplinary Knowledge</b> | <p>Ask questions about what they can see, hear, taste, feel and smell.</p> <p>Observe the way in which blocking their</p>                                                                                                                                                                                        | <p>Make first-hand, close observations of animals from each of the groups.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>With support, create a question to investigate.</p> <p>With support, decide how to test</p>                                                                                                        | <p>Observe changes to fruiting trees over the course of a year (blossom, fruit, leaf colour change, leaf drop).</p> <p>Record changes to a specific tree each month (or other regular interval).</p> | <p>Ask simple questions such as:</p> <p>Which is the warmest season?</p> <p>Is it always sunny in the summer?</p> |



|                           |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                               |                                                                                                                                                  |                                                                                                                                                                                                                   |
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|                           | <p>vision impacts on their hearing. Decide which equipment to use to block their vision (e.g. blindfold, dark glasses) and what equipment to use to test their hearing (e.g. musical instruments). Record observations in a simple, preprepared table. Answer the inquiry question either verbally or using simple written sentences.</p> | <p>Identify animals by matching them to named images. Compare two animals from the same or different groups. Classify animals using a range of features. Classify animals according to what they eat.</p> <p>Use a range of sources (books, videos, first hand observation) to find out about an animal</p> | <p>absorbency of different materials. Observe which materials absorb water.</p> <p>Fill in preprepared table to show results.</p> <p>Answer the enquiry question verbally or in simple written sentences.</p> | <p>Record changes to tree pictorially using drawings of photographs.</p> <p>Describe the changes verbally or in simple written sentences.</p>    | <p>Use a range of sources (books, videos, first hand observation) to find out about the seasons.</p>                                                                                                              |
| <b>Scientific Enquiry</b> | <p>Pattern Seeking:</p> <p>Is our sense of hearing better when we can't see?</p>                                                                                                                                                                                                                                                          | <p>Classifying</p>                                                                                                                                                                                                                                                                                          | <p>Comparative/Fair Testing</p> <p>Which materials would make waterproof shoes?</p>                                                                                                                           | <p>Observing Change over Time</p> <p>How does a tree change during the year?</p>                                                                 | <p>Research</p> <p>What happens in each season?</p>                                                                                                                                                               |
| <b>Curriculum Links</b>   | <p>In EYFS, children begin by exploring the world around them. They describe what they see, hear and feel outside. In 2.1, children will notice that animals, including humans, have offspring. They will also look deeper into the basic needs of animals.</p>                                                                           |                                                                                                                                                                                                                                                                                                             | <p>In EYFS, children start by exploring their world and observing closely. In 2.3 and 2.4, children will begin looking at the sustainability of everyday materials.</p>                                       | <p>In EYFS, children begin by exploring the world around them. In 2.5, children will delve deeper into what a plant needs to grow healthily.</p> | <p>In EYFS, children will gain an understand the effects of the changing seasons on the natural world around them. In 2.6, children will learn about how climate change effects the weather around the world.</p> |



| Assessments           | TAPS Focused Assessment Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                |                                                                                  |                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------|------------------------------------------|
|                       | <a href="#">Body Parts</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <a href="#">Waterproof</a>     |                                                                                  | <a href="#">Seasonal Change</a>          |
| Enriching Experiences | Art – Tiger in a Tropical Storm - Henri Rousseau                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Art - Mona Lisa – Jane Perkins | Design – Honeysuckle – William Morris<br>Poetry – Daffodils (William Wordsworth) | Poem – Six weather Haiku – George Hunter |
| Vocabulary            | <p>head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves,<br/> names of animals experienced first-hand from each vertebrate group,<br/> senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ear, tongue<br/> penis, testicles, vagina [in line with school RSE policy]<br/> object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay,<br/> hard, soft, fragile, stretchy, stiff, bendy, waterproof, absorbent, rough, smooth, shiny, dull, transparent<br/> leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, bud<br/> Names of trees in the local area<br/> Names of garden and wild flowering plants in the local area<br/> weather, sun, rain, wind, snow, thunder, lightning, clouds, frost, rainbow,<br/> seasons, winter, summer, spring, autumn,</p> |                                |                                                                                  |                                          |

**Commented [RE7]:** Assessments recommended by ASE. Could eventually be replaced with our own.

**Commented [RE8]:** Based on ASE lists. Probably needs to be reduced. Forms a good content guide for teachers but possibly too many for children to learn?



| Year 2                       | Autumn                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Spring                                                                                                                                                                                                                                                                                                               | Summer                                                                                                                                                                                   |
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| <b>National Curriculum</b>   | <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>Notice that animals, including humans, have offspring which grow into adults.</p> | <p>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.</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats.</p> <p>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</p> <p>Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> | <p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> | <p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>  |
| <b>Year 2</b>                | <b>Animals (including humans) (Growing Up)</b>                                                                                                                                                                                                                                                                                     | <b>Living Things and their Habitats (Local Habitats)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Use of Everyday Materials</b>                                                                                                                                                                                                                                                                                     | <b>Plants</b>                                                                                                                                                                            |
| <b>Substantive Knowledge</b> | All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To                                                                                                                                                                                              | Animals and plants live in a habitat to which they are suited, which means that animals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All objects are made of one or more materials that are chosen specifically because they have suitable properties for a task. For example, a water bottle is made of plastic because it is transparent                                                                                                                | Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then |



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| <p>grow into healthy adults, they also need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses. All objects are either living, dead or have never been alive. [Dead things include parts of plants and animals that are no longer attached e.g. leaves shells, fur, feathers. An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive] Living animals show a range of characteristics; they: move, breathe, grow, reproduce and eat [this is a simplification but suitable for Year2]</p> <p>Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not</p> | <p>have suitable features that help them move and find food and plants have suitable features that help them to grow well.</p> <p>A habitat provides the basic needs of the animals and plants – shelter, food and water and that within a habitat there are different micro-habitats [e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves.] Plants and animals in a habitat depend on each other for food and shelter etc.</p> <p>The way that animals obtain their food from plants and other animals can be shown in a food chain.</p> | <p>allowing you to see the drink inside and waterproof so that it holds the water.</p> <p>When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials.</p> <p>Objects made of some materials can be changed in shape by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness.</p> | <p>develop into seeds, berries, fruits etc. Different parts of plants can be eaten. Seeds and bulbs need to be planted outside at particular times of the year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in the shade. Plants also need different amounts of water and space to grow well and stay healthy. Some plants grow in extreme conditions.</p> |
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|                               | look like their parents e.g. tadpoles.                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Disciplinary Knowledge</b> | <p>Ask simple questions linked to the topic of healthy living. Use a variety of sources of information.</p> <p>Present what they have learnt verbally, using pictures or as an information text.</p> <p>Ask yes/no question to aid sorting.</p> <p>Sort objects into living /dead/ never alive</p> <p>Discuss reasons for placing items in each group.</p> | <p>Ask a question about where animals choose to live that is looking for a pattern based on observation.</p> <p>Decide what equipment to use from a choice e.g. magnifying glass.</p> <p>Observe where they find most animals (e.g. worms, ants) and record in premade table.</p> <p>Record data using tally chart, pictogram or block chart.</p> <p>Present results orally and using pictures and simple sentences.</p> | <p>Identify the question to investigate from a scenario or from a range provided.</p> <p>Choose equipment from a range and decide what to do or what to observe in order to answer the question.</p> <p>Make observations linked to answering a question.</p> <p>Present results orally and using pictures and simple sentences.</p> | <ul style="list-style-type: none"> <li>- Ask simple questions about what might happen and consider how we might answer them - What might happen if we grow seeds without watering them? What might happen if we put our growing seeds in the dark?</li> <li>- Make a simple prediction.</li> <li>- Observe development of plants grown in different conditions. Begin to introduce the concept of a 'fair test' by explaining the use of the same compost, pot size, seed etc. Compare with the growth of a bulb.</li> <li>- Record development of seed and bulb pictorially using drawings or photographs. Measure the height of each plant using standard measurements and record these in a prepared table. Take repeated readings over time.</li> <li>- Describe the observed changes verbally or in simple written sentences.</li> </ul> |
| <b>Scientific Enquiry</b>     | <p>Research</p> <p>What food do you need in a healthy diet and why?</p> <p>Classifying</p>                                                                                                                                                                                                                                                                 | <p>Pattern Seeking</p> <p>What conditions do ants prefer to live in?</p>                                                                                                                                                                                                                                                                                                                                                 | <p>Comparative/Fair Test</p> <p>Which material would be best for the roof of the little pig's house?</p>                                                                                                                                                                                                                             | <p>Observing over time – What happens to my bean after I have planted it?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Curriculum Links</b>       |                                                                                                                                                                                                                                                                                                                                                            | <p>Year 1: Animals (including humans), Plants</p> <p>Year 4: Animals (including humans), Living things and their habitats</p>                                                                                                                                                                                                                                                                                            | <p>Y1: Everyday materials</p> <p>Y3: Rocks, Forces and Magnets</p> <p>Y5: Properties and changes of materials</p>                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



| Formative Assessment Tasks | TAPS Focused Assessment Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                               |                                           |                                        |
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|                            | <a href="#">Sorting Living and Non-Living</a>                                                                                                                                                                                                                                                                                                                                                                                                                       | <a href="#">Woodlouse Habitat</a>                                                                                                             | <a href="#">Ways to Test Transparency</a> | <a href="#">Comparing Plant Growth</a> |
| Enriching Experiences      | Poetry – The Owl and the Pussycat (Edward Lear)                                                                                                                                                                                                                                                                                                                                                                                                                     | <a href="https://www.naturespot.org.uk/become-a-naturespotter">https://www.naturespot.org.uk/become-a-naturespotter</a> (or local equivalent) | Poetry – Woolly Saucepan (Michael Rosen)  |                                        |
| Vocabulary                 | 2.1.1 reproduction,<br>names of animals and their babies (e.g. chick/hen, kitten/cat. Caterpillar/butterfly)<br>investigate, habitat, microhabitat, conditions, shelter, survive, food chain<br>2.3 property (of a material), observe, opaque, transparent and translucent, reflective, non-reflective, flexible, absorbent<br>2.4 heartbeat, breathing, hygiene, germs, disease<br>2.5 seed, bean, bulb, germinate, shoot, seedling, shade, sample, compost, wilt, |                                                                                                                                               |                                           |                                        |



| Year 3                       | Autumn 1 (3.1)                                                                                                                                                                                                                                                                         | Autumn 2 (3.2)                                                                                                                                                                                                                                                                                                                                                                                              | Spring 1 (3.3)                                                                                                                                                                                                                                                                       | Spring 2 (3.4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Summer 1 (3.5) | Summer 2 (3.6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <b>National Curriculum</b>   | 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 rock. Recognise that soils are made from rocks and organic matter. | 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 their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change. | 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. | 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. |                | Compare how things move on different surfaces. Notice that some forces need contact between 2 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 2 poles. Predict whether 2 magnets will attract or repel each other, depending on which poles are facing. |
|                              | <b>Rocks and Fossils</b>                                                                                                                                                                                                                                                               | <b>Light</b>                                                                                                                                                                                                                                                                                                                                                                                                | <b>Animals (including humans)</b>                                                                                                                                                                                                                                                    | <b>Plants</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                | <b>Forces and magnets</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Substantive Knowledge</b> | Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. [The rock cycle and the formation of igneous, sedimentary                                                                             | We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects are sources of light.                                                                                                                                                                                                                                              | Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars,                                               | Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. Roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and                                                                                                                                                        |                | A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes.                                                                                                                                                                                                                                                                            |



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|                               | <p>and metamorphic rocks is not required at this level] Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed a long time ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter was replaced by minerals from the water.</p> | <p>Objects are easier to see if there is more light. Some surfaces reflect light. The light from the sun can damage our eyes and therefore we should not look directly at the sun and should protect our eyes in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.</p> | <p>water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.</p> | <p>seed dispersal. The leaves use sunlight and water to produce the plant's food. [No further knowledge of photosynthesis required at this stage] Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.</p> | <p>A magnet attracts magnetic material. Iron and nickel and other materials containing these are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. Like poles repel. Unlike poles attract. For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.</p> |
| <b>Disciplinary Knowledge</b> | <p>Ask a range of yes/no questions to aid sorting of rock samples. Use a classification key to</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>Ask a range of questions linked to a topic. Decide what to measure or observe.</p>                                                                                                                                                                                                                                                                                                                                                                             | <p>Ask a range of questions linked to the foods we eat.</p>                                                                                                                                                                                        | <p>Ask a range of questions linked to plants. Decide what to measure or observe e.g. what happens to the</p>                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>Ask a range of questions linked to magnets. Decide what to measure or observe to determine whether</p>                                                                                                                                                                                                                                                                                                                                                                            |



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|                                   | <p>identify rock types. Decide ways in which rocks can be sorted. Compare rocks based on obvious observable characteristics. Suggest improvement e.g. a wider range of objects. Suggest new questions arising from the investigation.</p> | <p>Decide how often to take a measurement. Make observations linked to answering the question. Use results from first two measurements to make a prediction about further results. Refer directly to their evidence when answering their question. Produce a written explanation of their investigation. Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.</p> | <p>Present what they learnt about food groups as information text including a labelled diagram of the proportions needed in a healthy diet. Suggest limitations to research e.g. number of sources of evidence, etc. Suggest new questions arising from the investigation.</p> | <p>celery, how far the colour moves up the stem, difference between different thicknesses of celery etc. Make observations linked to answering the question and record these in a table that they have drawn. Measure using standard units where not all the numbers are marked on the scale, and take repeat readings where necessary. Refer directly to their evidence when answering their question. Produce written description of findings. Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.</p> | <p>the size and shape of magnets affect their strength. Make observations linked to answering the question. Measure using standard units where not all the numbers are marked on the scale. Prepare own tables to record data. Refer directly to their evidence when answering their question. Produce written explanation of findings. Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation. Use results from this investigation to make a prediction about a further result.</p> |
| <b>Scientific Enquiry</b>         | Classifying                                                                                                                                                                                                                               | Comparative Test/Fair Test<br>How does the distance between the shadow puppet and the screen affect the size of the shadow?                                                                                                                                                                                                                                                                                                    | Research<br>Why do different types of vitamins keep us healthy and which foods can we find them in?                                                                                                                                                                            | Observe over time<br>What happens when celery is left in a glass of coloured water?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Pattern Seeking<br>Does the size and shape of a magnet affect how strong it is?                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Curriculum Links</b>           |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | English: Iron Man (Trust Core Text)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Formative Assessment Tasks</b> | TAPS Focused Assessment Tasks                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



## Primary Science



Tudor Grange  
Academies Trust

|                              | <a href="#">Rock Report</a>                                                                                                                                                                                                                                                                                                                                                                                                             | <a href="#">Can Everything Make Shadows?</a>                | <a href="#">Skeleton Research</a> | <a href="#">Function of a Plant Stem</a> | <a href="#">What is the strongest magnet?</a> |
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| <b>Enriching Experiences</b> | Visit to the                                                                                                                                                                                                                                                                                                                                                                                                                            | Attraction (Shadow theatre group from Britain's Got Talent) |                                   |                                          |                                               |
| <b>Vocabulary</b>            | pollen, insect/wind pollination, male, female, seed dispersal (wind dispersal, animal dispersal, water dispersal), nutrients, minerals, soil, absorb, transport<br>Nutrition, carbohydrates, sugars, protein, vitamins, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine<br>Light source, shadow, opaque, reflective<br>attract, repel, magnetic material, poles, north pole, south pole |                                                             |                                   |                                          |                                               |



| Year 4                     | Autumn 1 (4.1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Autumn 2 (4.2)                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Spring 1 (4.3)                                                                                                                                                                                                                                                                                                                                                                                                         | Spring 2 (4.4)                                                                                                                                                               | Summer 1 (4.5)                                                                                                                                                                                                                                                                                                                                                                                                                    | Summer 2 (4.6) |
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| <b>National Curriculum</b> | <p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>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.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with</p> | <p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as the distance from the sound source increases.</p> | <p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>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 (°C).</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> | <p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions</p> | <p>Recognise that living things can be grouped in a variety of ways.</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey</p> |                |



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|                              | being good conductors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                              | <b>Electricity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Sound</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>States of Matter</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Animals Including Humans</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Living Things and their Habitats</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Substantive Knowledge</b> | Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity. | A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects | A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0°C. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100°C. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more | Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; | Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year. Living things can be classified as producers, predators and prey according to their place in the food chain. |



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|                               |                                                                                                                                                                                                                                                                                                            | producing the sounds. For example, smaller objects usually produce higher pitched sounds                                                                                                                                                                                                                                                                   | quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle. | and molars and premolars for grinding (chewing).                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Disciplinary Knowledge</b> | Ask a range of questions linked to electrical circuits. Decide what to measure or observe. Make observations linked to answering the question. Measure using standard units where not all the numbers are marked on the scale. Use dataloggers with light sensor if available. Present data in line graph. | Ask a range of questions linked to the topic of sound. If there is a pattern, is it the same in every area of the school? Decide what and where to measure. Take measurements linked to answering the question. Use dataloggers to measure over time. Refer directly to their evidence when answering their question. Provide oral or written explanations | Ask a range of questions linked to the topic of States of Matter. Decide what to measure or observe. Make observations linked to answering the question. Measure using standard units where not all the numbers are marked on the scale, and take repeat readings where necessary. Prepare own tables to record data. Present data in time graphs. Refer directly to evidence when answering question. Provide oral or written explanations for findings. Suggest improvements e.g. to method of taking measurements. Suggest new  | Ask a range of questions linked to topic of teeth. Research work of dentist from range of sources (including a visit from a dentist if possible). Present what they learnt verbally, using labelled diagrams or as information text. Be able to answer their questions using simple scientific language. Suggest limitations e.g. limited range of evidence. Suggest new questions arising from the investigation. | Ask a range of yes/no questions to aid sorting. Use a classification key to identify animals found during playground or pond investigation. Decide ways in which animals can be sorted. Compare animals based on obvious observable characteristics. Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs. Draw simple conclusions for patterns Suggest improvement e.g. a wider range of animals. Suggest new questions arising from the investigation. |



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|                                   | Refer directly to their evidence when answering their question. Produce written explanation of findings. Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation. Use results from first two measurements to make a prediction about further results. | for findings. Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation. Use results from investigation to make a prediction about a further result. | questions arising from the investigation. Use results from investigation to make a prediction about a further result. |                                               |                                          |
| <b>Scientific Enquiry</b>         | Comparative test/Fair test<br>How does the thickness of a conducting material affect how bright the lamp is?                                                                                                                                                                                                   | Pattern Seeking<br>Is there a link between how loud it is in school and the time of day?                                                                                                                    | Observing over time<br>How does the level of water in a glass change when left on the windowsill?                     | Research<br>How do dentists fix broken teeth? | Classification                           |
| <b>Curriculum Links</b>           |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                             |                                                                                                                       |                                               |                                          |
| <b>Formative Assessment Tasks</b> | TAPS Focused Assessment Tasks                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                             |                                                                                                                       |                                               |                                          |
|                                   | <a href="#">Does it conduct electricity?</a>                                                                                                                                                                                                                                                                   | <a href="#">Investigating Pitch</a>                                                                                                                                                                         | <a href="#">Drying Materials</a>                                                                                      |                                               | <a href="#">Local Environment Survey</a> |



| Enriching Experiences |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |
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| Vocabulary            | Classification, classification keys, environment, human impact, migrate, hibernate<br>Digestive system, digestion, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain<br>solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle<br>Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, insulation<br>Electricity, electrical appliance/device, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol |  |  |  |  |



| Year 5                       | Autumn 1 (5.1)                                                                                                                                                                                                                             | Autumn 2 (5.2) | Spring 1 (5.3)                                                                                                                                                                                                                                                                                                                                                            | Spring 2 (5.4)                                                                                                                                                                                                                                                                                                                                                                           | Summer 1 (5.5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Summer 2 (5.6) |
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| <b>National Curriculum</b>   | <p>Describe the changes as humans develop to old age.</p> <p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p> <p>Describe the life process of reproduction in some plants and animals.</p> |                | <p>Describe the movement of the Earth and other planets relative to the sun in the solar system.</p> <p>Describe the movement of the moon relative to the Earth.</p> <p>Describe the sun, Earth and moon as approximately spherical bodies.</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p> | <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</p> <p>Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.</p> <p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> | <p>Compare and group together everyday materials on the basis of their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</p> <p>Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</p> |                |
| <b>Year 5</b>                | <b>Life Cycles &amp; Human Development (Puberty)</b><br><b>Animals including humans</b>                                                                                                                                                    |                | <b>Earth &amp; Space</b>                                                                                                                                                                                                                                                                                                                                                  | <b>Forces</b>                                                                                                                                                                                                                                                                                                                                                                            | <b>Materials</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |
| <b>Substantive Knowledge</b> | <p>As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg.</p>                                                      |                | <p>The Sun is a star. It is at the centre of our solar system. There are 8 planets [can choose to name them, but not essential]. These travel</p>                                                                                                                                                                                                                         | <p>A force causes an object to start moving, stop moving, speed up, slow down or change direction.</p>                                                                                                                                                                                                                                                                                   | <p>Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |



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|  | <p>Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults.</p> <p>Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis.</p> <p>Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.</p> <p>When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills.</p> <p>At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. [Further details of content to be found in Changing Me unit in PSHE]</p> | <p>around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical (i.e. we do not have a flat Earth). Our knowledge of the solar system have developed from geocentric to heliocentric through the work of scientists such as Ptolemy, Alhazen and Copernicus.</p> | <p>Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.</p> <p>Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object.</p> <p>A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.</p> | <p>solution while others are insoluble and form sediment. Mixtures can be separated by filtering, sieving and evaporation. Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.</p> |
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| <b>Disciplinary Knowledge</b> | <p>Ask a range of questions and identify the type of enquiry that will help to answer the questions. Decide how often to make observations and how these should be recorded. Be able to answer their questions, describing the change over time. Provide oral and written explanations for their findings. Create labelled diagram of life cycle of butterfly using own observations. Explain their degree of trust in their results e.g. were all stages observed. Use results to make predictions</p> | <p>Ask a range of questions and identify the type of enquiry that will help to answer the questions. Recognise variables [country where found, nocturnal/diurnal etc] and understand that they cannot be completely controlled. Prepare own tables to record data. Be able to answer their questions identifying patterns. Provide oral and written explanations for their findings. Explain their degree of trust in their results e.g. range of animals surveyed, variables that may not have been controlled</p> | <p>Ask a range of questions (recognising that some can be answered through research and others may not). Choose suitable sources to use. Present research in a range of ways e.g. different graphic organisers. Be able to answer question using scientific evidence gained from a range of sources. Be able to talk about degree of trust in the sources used.</p> | <p>Ask a range of questions and identify the type of enquiry that will help to answer questions. Recognise and control variables. Measure using standard units using equipment that has scales involving decimals. Prepare own tables to record data. Choose an appropriate form of graph or chart to present results. Be able to answer question, describing causal relationships. Provide oral and written explanations for findings. Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled, and accuracy of results. Ask further questions based on results.</p> | <p>Be able to ask a range of Yes/No questions to aid sorting materials and decide which ways of sorting will give useful information. Identify specific clear questions that will help to sort materials without ambiguity. Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry. Be able to use data to show that materials that are grouped together have more in common than with items in other groups. Be able to explain using evidence that the branching database or classification key will only work for the materials it was created for.</p> |
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|                                   | about other life cycles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                              |                                                                          |                                                                            |                                   |
| <b>Enquiry Type</b>               | Observation over time<br>How does a butterfly change as it develops from egg to adult?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Pattern Seeking<br>Is there a relationship between a mammal's size and its gestation period? | Research<br>How have our ideas about the solar system changed over time? | Comparative/Fair Test:<br>Which shape parachute takes the longest to fall? | Classification                    |
| <b>Curriculum Links</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                              |                                                                          |                                                                            |                                   |
| <b>Formative Assessment Tasks</b> | TAPS Focused Assessment Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                              |                                                                          |                                                                            |                                   |
|                                   | <a href="#">Different Life Cycles</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <a href="#">Growth Survey</a>                                                                | <a href="#">Solar System Research</a>                                    | <a href="#">Aquadynamic</a>                                                | <a href="#">Sugar Cube Stacks</a> |
| <b>Enriching Experiences</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                              |                                                                          |                                                                            |                                   |
| <b>Vocabulary</b>                 | life cycle, reproduce, sexual, fertilises, asexual, runners, tubers, bulbs, cuttings<br>[Vocabulary from Changing Me unit in PSHE curriculum – to be taught in line with academy RSE policy: puberty menstruation periods sanitary towels sanitary pads tampons ovary vagina womb/uterus sperm semen testicles/testes erection ejaculation wet dream larynx facial hair growth spurt hormone]<br>Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting,<br>Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), Solar System, rotate, star, orbit<br>Force, gravity, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears |                                                                                              |                                                                          |                                                                            |                                   |



| Year 6                       | Autumn 1 (6.1)                                                                                                                                                                                                                                                                                      | Autumn 2 (6.2)                                                                                                                                                                                                                                                                                                                                                                                                                                       | Spring 1 (6.3)                                                                                                                                                                                                                                     | Spring 2 (6.4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Summer 1 (6.5)                                                                                                                                                                                                                                                                                                                                                                        | Summer 2 (6.6)                                                                                         |
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| <b>National Curriculum</b>   | <p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p> | <p>Recognise that living things have changed over time and fossils provide information about living things that inhabited the earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p> | <p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p> | <p>Recognise that light appears to travel in straight lines.</p> <p>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.</p> <p>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.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p> | <p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit.</p> <p>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.</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</p> | <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function.</p>   |
| <b>Year 6</b>                | <b>Classification</b>                                                                                                                                                                                                                                                                               | <b>Evolution and Inheritance</b>                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Animals including Humans / Circulatory System</b>                                                                                                                                                                                               | <b>Light</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Electricity</b>                                                                                                                                                                                                                                                                                                                                                                    | <b>Diet &amp; Healthy Living</b>                                                                       |
| <b>Substantive Knowledge</b> | Living things can be formally grouped according to characteristics. Plants and animals are two                                                                                                                                                                                                      | All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due                                                                                                                                                                                                                                                                                                                                  | The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon                                                                                                                                              | Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The                                                                                                                                                                                                                                                                                                                                                                                      | Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer                                                                                                                                                                                                                                                                                    | Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how |



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|  | <p>main groups but there are other living things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms. Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.</p> | <p>to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how</p> | <p>dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.</p> | <p>light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.</p> | <p>make a louder sound. The same thing happens if a battery with a higher voltage is used. Adding more bulbs, motors or buzzers to a circuit will make each bulb less bright, each motor spin more slowly and each buzzer quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. Recognised circuit symbols can be used to draw simple circuit diagrams.</p> | <p>well out heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. [Further details of content to be found in Healthy Me unit of PSHE curriculum]</p> |
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|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               |                                                                                                                                                                                                                                                                                                                                                 | they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth a long time ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics. |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                         |
| <b>Disciplinary Knowledge</b> | Be able to ask a range of Yes/No questions to aid sorting and decide which ways of sorting will give useful information. Identify specific clear questions that will help to sort without ambiguity. Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry. Create branching databases | Ask a range of questions (recognising that some can be answered through research and others may not). Choose suitable sources to use. Present research in a range of ways e.g. different graphic organisers. Be able to answer question using evidence gained from a range of sources.                                                                                           | Ask a range of questions and identify the type of enquiry that will help to answer the questions. Recognise and control variables where possible. Prepare own tables to record data, including columns for taking repeat readings. Choose an appropriate form of presentation, including line graphs. | Ask a range of questions about the formation of shadows and identify the type of enquiry that will help to answer the questions e.g. Recognise variables and understand that they cannot be completely controlled. Prepare own tables to record data. Be able to answer their questions identifying patterns. Provide oral and | Ask a range of questions and identify the type of enquiry that will help to answer the questions. Recognise and control variables. Measure using light sensor (if available). Prepare own tables to record data. Be able to answer their question, describing causal relationships. Provide oral and | Ask a range of questions (recognising that some can be answered through research and others may not). Choose suitable sources of information. Choose how to present learning e.g. different graphic organisers. Be able to answer their questions using |



|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                              |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                 |                                                                                                                                |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|                                   | (tree diagrams) and keys to enable others to name living things. Be able to talk about the features that living things share and do not share based on the information in the key. Be able to use data to show that living things that are grouped together have more things in common than with things in other groups. Be able to explain using evidence that the branching database or classification key will only work for the living things it was created for. | Be able to talk about degree of trust in the sources used.                   | Provide oral and written explanations for their findings. Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled, and accuracy of results. Use test results to ask further questions and make predictions for further investigations. | written explanations for their findings. Explain their degree of trust in their results e.g. precision in taking measurements, variables that could not be controlled, and accuracy of results. Use test results to ask further questions and make predictions for further investigations. | written explanations for their findings. Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled, and accuracy of results. Use test results to ask further questions and make predictions for further investigations. | scientific evidence gained from a range of sources. Be able to talk about their degree of trust in the sources they have used. |
| <b>Scientific Enquiry</b>         | Classify                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Research<br>What happened when Charles Darwin visited the Galapagos islands? | Observation over time<br>How does my heart rate change over the day?                                                                                                                                                                                                                                             | Pattern Seeking<br>How are shadows affected by the type of material that an object is made from?                                                                                                                                                                                           | Fair test<br>Does the length of the wire affect the brightness of the bulb in a circuit?                                                                                                                                                                                                        | Research<br>How might diet choices impact on our ability to learn?                                                             |
| <b>Curriculum Links</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                              | English: Pig Heart Boy                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                 |                                                                                                                                |
| <b>Formative Assessment Tasks</b> | TAPS Focused Assessment Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                              |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                 |                                                                                                                                |
|                                   | <a href="#">Invertebrate Research</a>                                                                                                                                                                                                                                                                                                                                                                                                                                 | <a href="#">Fossil Habitats</a>                                              | <a href="#">Heart Rate Pose</a>                                                                                                                                                                                                                                                                                  | <a href="#">Light Questions</a>                                                                                                                                                                                                                                                            | <a href="#">Bulb Brightness</a>                                                                                                                                                                                                                                                                 |                                                                                                                                |



| Enriching experiences |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |  |  |  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| Vocabulary            | vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, warm-blooded, cold-blooded, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers<br>Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system<br>offspring, sexual reproduction, vary, characteristics, adapted, environment, inherited, species, fossils, evolve, evolution<br>Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage [use of term but not full understanding of voltage]<br>Transparent, translucent |  |  |  |  |  |



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# **Planning Templates**



| 1. Links to prior learning (rationale for sequencing):                                                                                                                                                                                                                          |                                                                    | 2a. National Curriculum minimum expectations:                                                                 |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--|
| <p>[Hyperlink learning journey]<br/>What do children already know? What will this prepare them for? Consider what is being over learnt and what is new knowledge. Consider what will be considered in retrieval practice.<br/><a href="#">PLAN Progression of Knowledge</a></p> |                                                                    | National curriculum objectives]                                                                               |  |
|                                                                                                                                                                                                                                                                                 |                                                                    | 2b. Trust plus:                                                                                               |  |
|                                                                                                                                                                                                                                                                                 |                                                                    | How does your curriculum go above and beyond the NC?                                                          |  |
| 3. Knowledge:                                                                                                                                                                                                                                                                   |                                                                    |                                                                                                               |  |
| (Link to Ofsted/EEF subject reviews- using your subject disciplinary sub-headings)                                                                                                                                                                                              |                                                                    |                                                                                                               |  |
| 4a. Assessment Tasks: Formative (incremental preparation for summative)                                                                                                                                                                                                         | 4b. Assessment Tasks: Summative                                    | 5. Common Misconceptions to address:                                                                          |  |
| Add Hyperlinks                                                                                                                                                                                                                                                                  | Add Hyperlinks                                                     | Refer to subject association support and previous assessment outcomes                                         |  |
| 6. Reading, writing, vocabulary and numeracy outcomes                                                                                                                                                                                                                           | 7a. Enriching Experiences                                          | 7b. Personal and Character Development                                                                        |  |
| Consider what texts will be read, what writing opportunities will be completed and what Tier 2/3 vocabulary will be explicitly learnt.                                                                                                                                          | Consider trips, visits, visitors, clubs and classroom experiences. | Consider British Values, Protected Characteristics, Careers, Personal Development, and Character development. |  |



Component [number]

[Component question or objective]



|                      |           |             |
|----------------------|-----------|-------------|
| Lesson Content       |           |             |
|                      |           |             |
| Formative Assessment |           |             |
|                      |           | Bromcom:    |
| Vocabulary           | Resources | Scaffolding |
|                      |           |             |
| Retrieval            |           |             |
|                      |           |             |



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# **External Resources**



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<https://www.planassessment.com/>



<https://explorify.uk>



<https://pstt.org.uk/>



<https://www.ogdentrust.com/>



<https://www.educationnaturepark.org.uk/>