

## Science

### Vision

Science has changed our lives and is vital for our future prosperity. At Columbia, we want to ignite children's curiosity about the world and help them develop the skills they need to be scientists. These include investigating, researching, observing and measuring, identifying and classifying and looking for patterns. Our curriculum ensures that children leave Columbia with a good understanding of living things (biology), materials (chemistry) and the physical world (physics). We aim to nurture the scientists of the future but we also know that science literacy will influence our children's lives on a daily basis. For example, we encourage children to apply scientific thinking to managing their health and understanding issues such as pollution and climate change. We have a gold award from Healthy Schools London. Our Edible Garden gives children and families practical experience of growing fruit and vegetables. We regularly explore solutions to health problems and pollution in the local community through assemblies and whole school initiatives such as Bike It.

### Knowledge and Skills Progression

The progression in Science skills starts in the EYFS as **Communication & Language** and **Understanding the World- The Natural World** with children exploring and grouping materials and experiencing the natural environment. Children will wonder and question using their senses to describe things they notice, describing similarities and differences.

| Knowledge             | Year 1  | Year 2  | Year 3   | Year 4  | Year 5  | Year 6   |
|-----------------------|---|---|--|---|---|--|
| <b>Living things</b>  | <ul style="list-style-type: none"> <li>Human body: our senses</li> <li>Identify &amp; name a variety of common animals including fish, birds, amphibians, reptiles, mammals</li> <li>Identify and name plants.</li> <li>Identify and describe the basic structure of plants.</li> </ul> | <ul style="list-style-type: none"> <li>Describe animals.</li> <li>Basic needs of animals</li> <li>Food chains</li> <li>Animal habitats</li> <li>Living, dead and non-living</li> <li>Describe plant growth and what they need to grow,</li> </ul> | <ul style="list-style-type: none"> <li>Animal muscles, skeletons and nutrition,</li> <li>What plants need? Function of parts of plant. Plant lifecycle.</li> </ul>                                     | <ul style="list-style-type: none"> <li>Digestion</li> <li>Living things – classification and environment</li> <li>Teeth</li> </ul>                  | <ul style="list-style-type: none"> <li>Classification</li> <li>Food chains, adaptation to environment</li> </ul>  | <ul style="list-style-type: none"> <li>Healthy lifestyles - diet and nutrition</li> <li>Healthy lifestyles - exercise, human heart and circulation</li> <li>Evolution and inheritance</li> </ul> |
| <b>Materials</b>      | <ul style="list-style-type: none"> <li>Distinguish between an object and the materials it is made from.</li> <li>Properties of materials - identify, describe and classify everyday materials</li> </ul>  | <ul style="list-style-type: none"> <li>Materials – uses, changing through bending, stretching, twisting etc.</li> </ul>   | <ul style="list-style-type: none"> <li>Rocks, fossils &amp; soil</li> </ul>  | <ul style="list-style-type: none"> <li>States of matter</li> <li>Water cycle – evaporation and condensation</li> <li>Heating and cooling</li> </ul> | <ul style="list-style-type: none"> <li>Materials – properties and uses.</li> <li>Reversible/irreversible changes, mixing dissolving, Separating mixtures</li> <li>Conductivity (electrical &amp; thermal) and response to magnets.</li> </ul> |  |
| <b>Physical World</b> | <ul style="list-style-type: none"> <li>Summarise observations about weather and seasons.</li> </ul>   | <ul style="list-style-type: none"> <li>Sound</li> </ul>   | <ul style="list-style-type: none"> <li>Light, shadows and reflections</li> <li>Forces – how things move on different surfaces, floating and sinking</li> <li>Magnetism &amp; magnetic poles</li> </ul> | <ul style="list-style-type: none"> <li>Sound and hearing</li> <li>Electricity, circuits</li> <li>Appliances</li> </ul>                              | <ul style="list-style-type: none"> <li>Simple machines - levers, gears or pulleys.</li> <li>Friction.</li> <li>Sun, Earth and Moon, Gravity</li> </ul>  | <ul style="list-style-type: none"> <li>Light and shadows</li> <li>Electrical circuit components</li> </ul>   |

| <b>Skills</b>                      | <b>Year 1</b>  | <b>Year 2</b>   | <b>Year 3</b>  | <b>Year 4</b>   | <b>Year 5</b>  | <b>Year 6</b>   |
|------------------------------------|--|---|--|---|--|---|
| <b>Asking questions</b>            | Ask simple questions and recognise that they can be answered in different ways.  | Ask simple questions and recognise that they can be answered in different ways.   | Ask relevant questions and use different types of scientific enquiries to answer them.   | Ask relevant questions and use different types of scientific enquiries to answer them.  | Plan different types of scientific enquiries to answer questions.  | Plan different types of scientific enquiries to answer questions.   |
| <b>Investigating</b>               | <p>Begin to discuss ideas about how to find things out.</p> <p>Perform simple tests with support.</p> <p>Begin to say what happened in an investigation.</p> | <p>Discuss ideas about how to find things out.</p> <p>Perform simple tests.</p> <p>Say what happened in an investigation.</p> | <p>Set up some simple practical enquiries, comparative and fair tests.</p> <p>Begin to recognise when a simple fair test is necessary and help decide how to set it up.</p> <p>Begin to think of more than one variable.</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> | <p>Set up simple practical enquiries, comparative and fair tests.</p> <p>Recognise when a simple fair test is necessary and help decide how to set it up.</p> <p>Think of more than one variable.</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> | <p>Begin to recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</p> <p>Begin to suggest improvements to tests and give reasons.</p> <p>Begin to use test results to make predictions to set up further comparative and fair tests.</p>                          | <p>Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</p> <p>Use test results to make predictions and identify when further observations, comparative and fair tests might be needed.</p>   |
| <b>Observing and measuring</b>     | <p>Observe closely.</p> <p>Use simple equipment such as hand lenses or egg timers.</p>   | <p>Observe closely.</p> <p>Use simple equipment such as hand lenses or egg timers.</p>  | <p>Make systematic and careful observations.</p> <p>Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.</p> <p>Take accurate measurements using standard units, using a range of equipment, including data loggers.</p>   | <p>Make systematic and careful observations</p> <p>Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.</p> <p>Take accurate measurements using standard units, using a range of equipment, including data loggers.</p>                               | <p>Make systematic and careful observations</p> <p>Make their own decisions about what observations to make, what measurements to use and how long to take them for.</p> <p>Begin to take measurements, using a range of scientific equipment with increasing accuracy and precision, taking repeat readings when appropriate.</p> | <p>Make systematic and careful observations</p> <p>Make their own decisions about what observations to make, what measurements to use and how long to take them for.</p> <p>Take measurements, using a range of scientific equipment with increasing accuracy and precision, taking repeat readings when appropriate.</p> |
| <b>Identifying and classifying</b> | Use simple features to compare things and, with help, decide how to sort and group them.   | Use simple features to compare things and, with help, decide how to sort and group them.                                      | Talk about criteria for grouping, sorting and classifying and use simple keys.   | Talk about criteria for grouping, sorting and classifying and use simple keys.  | Use and develop keys and other information records to identify, classify and describe materials and living things.   | Use and develop keys and other information records to identify, classify and describe materials and living things.  |
| <b>Looking for patterns</b>        | <p>Observe simple changes over time.</p> <p>Talk about what they have found out and how they found it out.</p>   | <p>Observe simple changes over time.</p> <p>Talk about what they have found out and how they found it out.</p>                | <p>Begin to see patterns in results.</p> <p>Begin to notice naturally occurring patterns and relationships.</p>  | <p>See patterns in results.</p> <p>Begin to notice naturally occurring patterns and relationships.</p>  | <p>Begin to interpret data and find patterns.</p> <p>Identify patterns that might be found in the natural environment.</p>   | <p>Interpret data and find patterns. Notice anomalies in data.</p> <p>Identify patterns that might be found in the natural environment.</p>   |

|                                |   |   |  |  |   |  |
|--------------------------------|---|---|--|--|---|--|
| <b>Concluding</b>              | Use their observations and ideas to suggest answers to questions.   | Use their observations and ideas to suggest answers to questions.   | Look for changes, patterns, similarities and differences in data in order to draw simple conclusions and answer questions.   | Look for changes, patterns, similarities and differences in data in order to draw simple conclusions and answer questions.   | Identify scientific evidence to support or refute ideas or arguments.   | Identify scientific evidence to support or refute ideas or arguments.  |
| <b>Recording and reporting</b> | Gather data with adult support.<br><br>Begin to record simple data.<br><br>Show results in a table that the teacher has provided. | Gather data with adult support.<br><br>Begin to record simple data.<br><br>Show results in a table that the teacher has provided. | Gather, record and begin to classify and present data in a variety of ways to help in answering questions.<br><br>Help to decide how to record and analyse their data – using notes, tables and standard units.<br><br>Begin to record findings using simple scientific language, drawings, keys bar charts and tables.<br><br>Begin to use a variety of ways to report findings/ results and conclusions from enquiries – oral, written, displays, presentations etc. | Gather, record, classify and present data in a variety of ways to help in answering questions.<br><br>Help to decide how to record and analyse their data – using notes, tables and standard units.<br><br>Record findings using simple scientific language, drawings, keys bar charts and tables.<br><br>Use a variety of ways of reporting findings/results and conclusions from enquiries – oral, written, displays, presentations etc. | Begin to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs.<br><br>Begin to decide how best to record and analyse data from a choice of familiar approaches.<br><br>Begin to choose how best to report findings/results and conclusions from enquiries – oral, written, displays, presentations etc. | Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs.<br><br>Decide how best to record and analyse data from a choice of familiar approaches.<br><br>Choose how best to report findings/results and conclusions from enquiries – oral, written, displays, presentations etc. |
| <b>Researching</b>             | To begin to use simple secondary sources to find answers.<br><br>To begin to find information from books and computers with help  | Begin to find information from books and computers.   | Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations.   | Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations.   | Begin to recognise which secondary sources will be most useful to research their ideas.   | Recognise which secondary sources will be most useful to research their ideas.   |