



# Our Science Curriculum

| Intent  |   |        |   |        |  |        |  |
|---|---|--------|---|--------|--|--------|--|
| <p>At Nunthorpe Primary, we teach science both as a discrete core subject and through cross-curricular linking to maths, English and foundation subjects. Our science teaching and learning is strongly based on practical activity linked to each knowledge area. It is also strongly linked to the children's experience of the world around them and seeks to expand this experience. The children develop 'working scientifically' skills progressively throughout the school, during practical investigations; scientific knowledge is taught through investigative lessons. In KS1, we have added extra chemistry and physics topics in addition to those required by the National Curriculum. This gives the children have an early chance to explore and learn about forces, light, sound and simple changes of state – we believe it necessary to include these to build on their natural curiosity about their observations of the world around them.</p> <p>Through their scientific work, children at Nunthorpe develop skills in teamwork, independent thinking and resilience. They are encouraged to challenge information given to them and to ask their own questions based on their observations.</p> |   |        |   |        |  |        |  |
|   | KS1   |        | KS2   |        |  |        |  |
|   | Year 1  | Year 2 | Year 3  | Year 4 | Year 5   | Year 6 |  |
| <b>Working Scientifically Skills Progression</b>  | <p>Children will develop practical scientific skills, processes and skills through the teaching of the knowledge themes listed in the following section:</p> <p><b>Key Skills</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> asking simple questions and recognising that they can be answered in different ways</li> <li><input type="checkbox"/> observing closely, using simple equipment</li> <li><input type="checkbox"/> performing simple tests</li> <li><input type="checkbox"/> identifying and classifying</li> <li><input type="checkbox"/> using their observations and ideas to suggest answers to questions</li> <li><input type="checkbox"/> gathering and recording data to help in answering questions.</li> </ul> <p>Children will explore the world around them and <b>raise their own questions</b>. They will <b>experience different types of scientific enquiries</b> with a <b>strong focus on practical activities</b> and begin to recognise ways in which they might answer scientific questions. They will use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, <b>begin to notice patterns and relationships</b>. They will explore physical processes through exploration and investigation of forces, electricity and light. They will be <b>encouraged to be curious</b>, ask</p> |        | <p>Children are taught to use the following practical scientific methods, processes and skills through the teaching of the knowledge content of each topic.</p> <p><b>Key Skills</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> asking relevant questions and using different types of scientific enquiries to answer them</li> <li><input type="checkbox"/> setting up simple practical enquiries, comparative and fair tests</li> <li><input type="checkbox"/> making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li><input type="checkbox"/> gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li><input type="checkbox"/> recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li><input type="checkbox"/> reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li><input type="checkbox"/> using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li><input type="checkbox"/> identifying differences, similarities or changes related to simple scientific ideas and processes</li> </ul> |        | <p>Children will <b>develop and consolidate their learning of key skills learned in years 3 and 4</b> and expand to include the following practical scientific methods, processes and skills through the teaching of the knowledge content of each topic:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li><input type="checkbox"/> taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li><input type="checkbox"/> recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li><input type="checkbox"/> using test results to make predictions to set up further comparative and fair tests</li> <li><input type="checkbox"/> reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</li> <li><input type="checkbox"/> identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul> <p>Children will use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific</p> |        |  |



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|  | <p>questions and use simple secondary sources to find answers. They will use simple measurements and equipment (for example, hand lenses, simple timers, measuring tapes) to gather data, <b>carry out simple tests, record simple data</b>, and talk about what they have found out and how they found it out. They will <b>record and communicate their findings</b> in a range of ways and begin to use <b>simple scientific language</b>.</p> | <p><input type="checkbox"/> using straightforward scientific evidence to answer questions or support their findings.</p> <p>Children will be given a range of scientific experiences to enable them to <b>raise their own questions</b> about the world around them. They will start to make their own decisions about the <b>most appropriate type of scientific enquiry</b> they might use to answer questions; <b>recognise when a simple fair test is necessary</b> and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys.</p> <p>They will begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They will 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>They will learn how to use new equipment, such as <b>data loggers</b>, appropriately. They will collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data.</p> <p>With help, pupils will look for changes, patterns, similarities and differences in their data in order to <b>draw simple conclusions and answer questions</b>. They will begin to spot and report <b>causal relationships</b></p> <p>With support, they will identify <b>new questions</b> arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.</p> <p>They will be taught to recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils will be taught to use <b>relevant scientific language</b> to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.</p> | <p>enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</p> <p>They will use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.</p> <p>They will make their own decisions about:</p> <ul style="list-style-type: none"><li>- what observations to make</li><li>- what measurements to use and how long to make them for</li><li>- whether to <b>repeat</b> measurements and explain why this is necessary</li></ul> <p>They will choose the most appropriate equipment to make measurements and explain how to use it accurately.</p> <p>They will decide how to record data from a choice of familiar approaches; look for different <b>causal relationships</b> in their data and identify <b>evidence that refutes or supports</b> their ideas.</p> <p>They will use their results to identify when <b>further tests</b> and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to <b>separate opinion from fact</b>.</p> <p>They will learn and use <b>relevant scientific language</b> and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.</p> |
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| Knowledge Themes   | KS1  |   | Lower KS2  |  | Upper KS2  |  |
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|  | Year 1   | Year 2  | Year 3   | Year 4   | Year 5   | Year 6   |
| <p>(with key facts and concepts)</p> <p>Also ref national curriculum for further detail.</p> | <p><b>Animals including Humans</b><br/>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals<br/>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.<br/>Describe and compare the structure of a variety of common animals.<br/>Name, draw, label the basic parts of the human body and say which part of the body is associated with each sense.</p> | <p><b>Plants</b><br/>Learn about the key requirements for plant growth.<br/>Over the year and across the seasons pupils will observe and describe how seeds and bulbs grow into mature plants<br/>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>                           | <p><b>Rocks</b><br/>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.<br/>Test and identify common rocks based on their properties of hardness and permeability.<br/>Describe in simple terms how fossils are formed when things that have lived are trapped within rock<br/>Recognise that soils are made from rocks and organic matter.</p> | <p><b>Healthy Eating and Digestion</b><br/>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.<br/>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p><b>Teeth and Eating Food Chains</b><br/>Identify the different types of teeth in humans and their simple functions.<br/>Learn about tooth-care and explore how a new toothpaste is developed.<br/>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p> | <p><b>Properties and Changes of Materials- Reversible and Irreversible Changes.</b><br/>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.<br/>Recognise that changes of state are reversible.</p> | <p><b>Electricity</b><br/>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit and other variables that will affect brightness or volume or speed including wire length and thickness, voltage of bulb, number of components etc. Be able to write comparative conclusions.<br/>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<br/>Use recognised symbols when representing a simple circuit in a circuit diagram.<br/>Solve problems with circuits using diagrams supported by practical work.</p> |
|  | <p><b>Everyday materials</b><br/>Distinguish between an object and the material from which it is made.<br/>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock<br/>Describe the simple physical properties of a variety of everyday materials</p>  | <p><b>Everyday Materials</b><br/>Sort materials into categories.<br/>Describe how different materials are suitable for different purposes.<br/>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.<br/>Be able to say in simple terms what a solid and</p> | <p><b>Animals inc. Humans Bones and Muscles</b><br/>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.<br/>Identify and name the main bones of the human body.<br/>Recognise that some animals have no skeleton and that some have an exoskeleton.</p>   | <p><b>Sound</b><br/>Identify how sounds are made, associating some of them with something vibrating.<br/>Recognise that vibrations from sounds travel through a medium to the ear.<br/>Learn about how we hear the vibration of the sound wave.<br/>Find patterns between the pitch of a sound and</p>   | <p><b>Forces</b><br/>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.<br/>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p>   | <p><b>Evolution and Inheritance</b><br/>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.<br/>Recognise that living things produce offspring of the same kind, but normally offspring vary</p>  |



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|  | Compare and group together a variety of everyday materials on the basis of their properties.  | liquid are and what they can and cannot do. Investigate how to make a solid melt faster.   | Identify differences in animal skeletons and relate to the type of movement.  | features of the object that produced it. Form comparative sentences based on this. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.   |   | and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.  |
|  | <p><b>Seasons</b><br/>Observe changes across the four seasons<br/>Observe and describe weather associated with the seasons and how day length varies.</p> <p><b>Plants</b><br/>Identify and name a variety of common wild and garden plants, including trees.<br/>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p> | <p><b>Living things and their Habitats</b><br/>Know differences between things that are living, dead, and things that have never been alive.<br/>Most living things live in habitats to which they are suited.<br/>Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.<br/>Identify and name a variety of plants and animals in their habitats, including microhabitats<br/>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><b>Forces- Magnetism (inc. Properties of Materials re Magnetism)</b><br/>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.<br/>Describe magnets as having two poles<br/>Predict whether two magnets will attract or repel each other, depending on which poles are facing.<br/>Recognise that magnetic forces can act at a distance.</p> | <p><b>Electricity</b><br/>Identify common appliances that run on electricity.<br/>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.<br/>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.<br/>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.<br/>Recognise some common conductors and insulators, and associate metals with being good conductors.</p> | <p><b>Earth and Space</b><br/>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.<br/>Describe the movement of the Moon relative to the Earth.<br/>Describe the Sun, Earth and Moon as approximately spherical bodies.<br/>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.<br/>Describe and demonstrate how scientific knowledge in this area has developed over time.</p> | <p><b>Animals inc Humans – Heart and Circulation</b><br/>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.<br/>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.<br/>Describe the ways in which nutrients and water are transported within animals, including humans.</p> |
|  |   | <p><b>Animals including Humans</b><br/>Notice that animals, including humans, have offspring which grow into adults</p>  | <p><b>Plants</b><br/>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p>   | <p><b>Living Things, Habitats, Environmental Change</b><br/>Recognise that living things can be grouped in a variety of ways.</p>  | <p><b>Living things in their habitat - Life Cycles – Reproduction in Plants</b><br/>Describe the differences in the life cycles of a mammal, an amphibian, an insect and</p>  | <p><b>Light</b><br/>Recognise that light appears to travel in straight lines.<br/>Use the idea that light travels in straight lines to explain that objects are</p>   |



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|  |  | <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>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.</p> <p>Investigate the way in which water is transported within plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</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>a bird.</p> <p>Describe the life process of reproduction in some plants.</p> <p>Explain how plants reproduce by sexual and asexual means including seeds, bulbs and runners.</p> <p><b>Animals inc. Humans</b><br/>Describe the changes as humans develop to old age, including puberty.</p> | <p>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><b>Light and Shadows</b><br/>Recognise that they need light in order to see things and that dark is the absence of Light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</p> <p>Find patterns in the way that the size of shadows change.</p> | <p><b>States of Matter</b><br/>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><b>Living Things and their Habitats - Classification</b><br/>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> |