**Science:**

**Purpose of study / Development of skills through Braeburn Primary and Nursery academy**

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world’s future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

**Aims**

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

develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics

develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them

are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

**Scientific knowledge and conceptual understanding**

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils’ engagement with and motivation to study science.

**The nature, processes and methods of science**

‘Working scientifically’ specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how ‘working scientifically’ might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. ‘Working scientifically’ will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

**Spoken language**

The national curriculum for science reflects the importance of spoken language in pupils’ development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

**Attainment targets**

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

**Key stage 1 programme of study**

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| **Statutory requirements** |
| During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:  asking simple questions and recognising that they can be answered in different ways  observing closely, using simple equipment  performing simple tests  identifying and classifying  using their observations and ideas to suggest answers to questions  gathering and recording data to help in answering questions. |
| **Notes and guidance (non-statutory)** |
| Pupils in years 1 and 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.  These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **YEAR 1: SCIENCE** | | **Planned / Covered** | | | | **Working scientifically Collect evidence Observing closely Performing tests**  **Identifying and classifying Recording findings** | | **Au** | **Sp** | **Su** | | **S1** | With help and encouragement I ask simple questions that begin with why, what if, how or when. |  |  |  | | **S2** | I make suggestions about how to do things when we plan a simple test. |  |  |  | | **S3** | With help, I use simple equipment and non-standard units to find things out. |  |  |  | | **S4** | I observe using my senses. |  |  |  | | **S5** | With help, I can gather and record data to help me answer my questions |  |  |  | | **S6** | I talk about what happened and/or what I saw. |  |  |  | | **S7** | I talk about what I did. |  |  |  | | **Plants and animals (including humans)** | | | | | | **S8** | identify and name a variety of common wild and garden plants, including deciduous and evergreen trees |  |  |  | | **S9** | identify and describe the basic structure of a variety of common flowering plants, including trees. |  |  |  | | **S10** | identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals |  |  |  | | **S11** | identify and name a variety of common animals that are carnivores, herbivores and omnivores |  |  |  | | **S12** | describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) |  |  |  | | **S13** | identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. |  |  |  | | **Everyday materials:** | | | | | | **S14** | distinguish between an object and the material from which it is made |  |  |  | | **S15** | identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock |  |  |  | | **S16** | describe the simple physical properties of a variety of everyday materials |  |  |  | | **S17** | compare and group together a variety of everyday materials on the basis of their simple physical properties. |  |  |  | | **Seasonal changes** | | | | | | **S18** | observe changes across the four season |  |  |  | | **S19** | name the four seasons in order |  |  |  | | **S20** | observe and describe weather associated with the seasons and how day length varies. |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | **YEAR 2: SCIENCE** | | **Planned / Covered** | | | | **Working scientifically Collect evidence Observing closely Performing tests**  **Identifying and classifying Recording findings** | | **Au** | **Sp** | **Su** | | **S1** | I ask simple questions and recognise these questions can be answered in different ways. |  |  |  | | **S2** | I decide with help, what to find out, observe or measure. |  |  |  | | **S3** | I observe closely, using simple equipment and non-standard units. |  |  |  | | **S4** | I can identify and classify. |  |  |  | | **S5** | I can perform a simple test. |  |  |  | | **S6** | I gather data and record data to help me answer my questions. |  |  |  | | **S7** | I record what I have found out using e.g. words or pictures, tables or simple prepared formats. |  |  |  | | **S8** | I use my observations and ideas to suggest answers to my questions. |  |  |  | | **S9** | I talk about how I found out what I found out. |  |  |  | | **Living things and their habitats:** | | | | | | **S10** | explore and compare the differences between things that are living, dead, and things that have never been alive |  |  |  | | **S11** | identify that most living things live in habitats to which they are suited |  |  |  | | **S12** | identify and name a variety of plants and animals in their habitats, including micro-habitats |  |  |  | | **S13** | using the idea of a simple food chain, and identify and name different sources of food. |  |  |  | | **Plants and Animals including humans:** | | | | | | **S14** | observe and describe how seeds and bulbs grow into mature plants |  |  |  | | **S15** | find out and describe how plants need water, light and a suitable temperature to grow and stay healthy |  |  |  | | **S16** | notice that animals, including humans, have offspring which grow into adults |  |  |  | | **S17** | find out about and describe the basic needs of animals, including humans, for survival (water, food and air) |  |  |  | | **S18** | describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene |  |  |  | | **Use of everyday materials** | | | | | | **S19** | identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses |  |  |  | | **S20** | find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching |  |  |  |   **Science: Purpose of study / Development of skills through Braeburn Primary and Nursery academy**  A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world’s future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.  **Aims**  The national curriculum for science aims to ensure that all pupils:  develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics  develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them  are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.  **Scientific knowledge and conceptual understanding**  The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.  Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils’ engagement with and motivation to study science.  **The nature, processes and methods of science**  ‘Working scientifically’ specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how ‘working scientifically’ might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. ‘Working scientifically’ will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.  **Spoken language**  The national curriculum for science reflects the importance of spoken language in pupils’ development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.  **Attainment targets**  By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.   |  | | --- | | **Lower key stage 2** |   The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.  ‘Working scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.  Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.   |  | | --- | | **Statutory requirements** | | During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:  asking relevant questions and using different types of scientific enquiries to answer them  setting up simple practical enquiries, comparative and fair tests  making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers  gathering, recording, classifying and presenting data in a variety of ways to help in answering questions  recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables  reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions  using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions  identifying differences, similarities or changes related to simple scientific ideas and processes  using straightforward scientific evidence to answer | | **Notes and guidance (non-statutory)** | | They should learn how to use new equipment, such as data loggers, appropriately. They should 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. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions 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. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.  These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study. |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | **YEAR 3: SCIENCE** | | **Planned / Covered** | | | | **Working scientifically:**  • Asking relevant questions and using different types of scientific enquiries to answer them  • Setting up simple practical enquires, comparative and fair tests  • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers  • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions  • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, tables  • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions  • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions  • Identify differences, similarities or changes related to simple scientific ideas and processes  • Using straightforward scientific evidence to answer questions to support their findings | | **Au** | **Sp** | **Su** | | **S1** | I can ask questions and I recognise that there are different types of enquiry. |  |  |  | | **S2** | I can set up a simple practical enquiry and I am beginning to understand how to make a test fair. |  |  |  | | **S3** | I make suggestions about what observations and measurements to make and what equipment I need. |  |  |  | | **S4** | I am beginning to make systematic and careful observations.  I sometimes use standard units. |  |  |  | | **S5** | With help I can use information sources provided to find things out. |  |  |  | | **S6** | I gather data and using a pre-prepared table I can record data. |  |  |  | | **S7** | I record my findings using a drawing and/or words. |  |  |  | | **S8** | With help, I can present my data. |  |  |  | | **S9** | I can use my results when I talk about what happened. |  |  |  | | **S10** | I can talk about what went wrong! |  |  |  | | **S11** | I have ideas about what else I would like to find out. |  |  |  | | **Plants and animals including humans:** | | | | | | **S12** | identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers |  |  |  | | **S13** | 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 |  |  |  | | **S14** | investigate the way in which water is transported within plants |  |  |  | | **S15** | explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. |  |  |  | | **S16** | 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 |  |  |  | | **S17** | identify that humans and some other animals have skeletons and muscles for support, protection and movem |  |  |  | | **Rocks** | | | | | | **S18** | compare and group together different kinds of rocks on the basis of their appearance and simple physical properties |  |  |  | | **S19** | describe in simple terms how fossils are formed when things that have lived are trapped within rock |  |  |  | | **S20** | recognise that soils are made from rocks and organic matter |  |  |  | | **Light:** | | | | | | **S21** | notice that light is reflected from surfaces |  |  |  | | **S22** | recognise that light from the sun can be dangerous and that there are ways to protect their eyes |  |  |  | | **S23** | recognise that shadows are formed when the light from a light source is blocked by a solid object |  |  |  | | **S24** | find patterns in the way that the size of shadows change |  |  |  | | **Forces and magnets:** | | | | | | **S25** | compare how things move on different surfaces |  |  |  | | **S26** | notice that some forces need contact between two objects, but magnetic forces can act at a distance |  |  |  | | **S27** | observe how magnets attract or repel each other and attract some materials and not others |  |  |  | | **S28** | 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 |  |  |  | | **S29** | predict whether two magnets will attract or repel each other, depending on which poles are facing. |  |  |  |      |  |  |  |  |  | | --- | --- | --- | --- | --- | | **YEAR 4: SCIENCE** | | **Planned / Covered** | | | | • Asking relevant questions and using different types of scientific enquiries to answer them  • Setting up simple practical enquires, comparative and fair tests  • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers  • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions  • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, tables  • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions  • Using results to draw simple conclusions, make predictions for new values, suggest improvements, raise further questions  • Identify differences, similarities or changes related to simple scientific ideas and processes  • Using straightforward scientific evidence to answer questions to support their findings | | **Au** | **Sp** | **Su** | | **S1** | I ask relevant questions and use different types of scientific enquiries to answer them. |  |  |  | | **S2** | I can set up simple practical enquiries, comparative or fair tests. |  |  |  | | **S3** | I decide what observations and measurements to make and what equipment to use. |  |  |  | | **S4** | I use a range of equipment (including thermometers and dataloggers) |  |  |  | | **S5** | I make systematic and careful observations and take accurate measurements using standard units. |  |  |  | | **S6** | I use information sources provided to find things out. |  |  |  | | **S7** | I gather, record and classify data in a variety of ways to help me answer my questions. |  |  |  | | **S8** | I record my findings using simple scientific language, tables, drawings and labelled diagrams |  |  |  | | **S9** | I present my data in a variety of ways using e.g. Venn diagrams, bar charts, simple scatter graphs, keys |  |  |  | | **S10** | I use my results to draw simple conclusions and I make predictions for new values. |  |  |  | | **S11** | I communicate what I have found out using straightforward scientific ideas and I report my findings using oral and written explanations and displays. |  |  |  | | **S12** | I suggest improvements to the way I carried out the enquiry. |  |  |  | | **S13** | I suggest further questions to investigate. |  |  |  | | **Animals, including humans:** | | | | | | **S14** | describe the simple functions of the basic parts of the digestive system in humans |  |  |  | | **S15** | identify the different types of teeth in humans and their simple functions |  |  |  | | **S16** | construct and interpret a variety of food chains, identifying producers, predators and prey. |  |  |  | | **Living things and their habitats:** | | | | | | **S17** | recognise that living things can be grouped in a variety of ways |  |  |  | | **S18** | explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment |  |  |  | | **S19** | recognise that environments can change and that this can sometimes pose dangers to living things. |  |  |  | | **States of matter / Materials** | | | | | | **S20** | compare and group materials together, according to whether they are solids, liquids or gases |  |  |  | | **S21** | 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) |  |  |  | | **S22** | identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. |  |  |  | | **Sound:** | | | | | | **S23** | identify how sounds are made, associating some of them with something vibrating |  |  |  | | **S24** | recognise that vibrations from sounds travel through a medium to the ear |  |  |  | | **S25** | find patterns between the pitch of a sound and features of the object that produced it |  |  |  | | **S26** | find patterns between the volume of a sound and the strength of the vibrations that produced it |  |  |  | | **S27** | recognise that sounds get fainter as the distance from the sound source increases. |  |  |  | | **Electricity:** | | | | | | **S28** | identify common appliances that run on electricity |  |  |  | | **S29** | construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers |  |  |  | | **S30** | 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 |  |  |  | | **S31** | recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit |  |  |  | | **S32** | recognise some common conductors and insulators, and associate metals with being good conductors |  |  |  | | **S33** | predict whether two magnets will attract or repel each other, depending on which poles are facing. |  |  |  |   **Science: Purpose of study / Development of skills through Braeburn Primary and Nursery academy**  A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. 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The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils’ engagement with and motivation to study science.  **The nature, processes and methods of science**  ‘Working scientifically’ specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how ‘working scientifically’ might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. ‘Working scientifically’ will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.  **Spoken language**  The national curriculum for science reflects the importance of spoken language in pupils’ development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.  **Attainment targets**  By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.   |  | | --- | | **Upper key stage 2** |   The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.  ‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.  Pupils should read, spell and pronounce scientific vocabulary correctly   |  | | --- | | **Statutory requirements** | | During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:  planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary  taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate  recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs  using test results to make predictions to set up further comparative and fair tests  reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations  identifying scientific evidence that has been used to support or refute ideas | | **Notes and guidance (non-statutory)** | | Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should 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. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. |      |  |  |  |  |  | | --- | --- | --- | --- | --- | | **YEAR 5: SCIENCE** | | **Planned / Covered** | | | | **Working scientifically:**   * Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary * Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate * Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs * Using test results to make predictions to set up further comparative and fair tests * Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations * Identifying scientific evidence that has been used to support or refute ideas or arguments | | **Au** | **Sp** | **Su** | | **S1** | I ask relevant questions (containing scientific knowledge and understanding) and with help I recognise which type of enquiry is best to answer a question. |  |  |  | | **S2** | I decide what observations and measurements to make (controlling variables with help where necessary) and what equipment to use to make my measurements and observations. |  |  |  | | **S3** | I use a range of equipment independently. |  |  |  | | **S4** | The series of observations and measurements I take are adequate for the task. |  |  |  | | **S5** | I use information sources provided to find things out. |  |  |  | | **S6** | I identify possible risks to myself and others. |  |  |  | | **S7** | I gather and record non-complex results (data and observations) using e.g. tables /scientific diagrams. |  |  |  | | **S8** | I present the results (data and observations) in a range of formats e.g. bar and line graphs, simple scatter graphs, keys and frequency charts. |  |  |  | | **S9** | I draw conclusions from my data and observations. |  |  |  | | **S10** | I begin to use basic scientific evidence to support or refute the ideas or arguments for my conclusion. |  |  |  | | **S11** | I look at my results and decide if any observations or measurements are unsuitable. |  |  |  | | **S12** | I use what I have found out to suggest improvements to my work giving reasons. |  |  |  | | **S13** | I can set up further questions to investigate. |  |  |  | | **Living things and their habitats (and humans)** | | | | | | **S14** | describe the life process of reproduction in some plants and animals. |  |  |  | | **S15** | describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird |  |  |  | | **S16** | describe the changes as humans develop to old age. |  |  |  | | **Earth and Space** | | | | | | **S17** | describe the movement of the Earth, and other planets, relative to the Sun in the solar system |  |  |  | | **S18** | describe the movement of the Moon relative to the Earth |  |  |  | | **S19** | describe the Sun, Earth and Moon as approximately spherical bodies |  |  |  | | **S20** | use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky. |  |  |  | | **Properties and changes of materials** | | | | | | **S21** | compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets |  |  |  | | **S22** | know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution |  |  |  | | **S23** | use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating |  |  |  | | **S24** | give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic |  |  |  | | **S25** | demonstrate that dissolving, mixing and changes of state are reversible changes |  |  |  | | **S26** | 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. |  |  |  | | **Forces:** | | | | | | **S27** | explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object |  |  |  | | **S28** | identify the effects of air resistance, water resistance and friction, that act between moving surfaces |  |  |  | | **S29** | recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. |  |  |  |      |  |  |  |  |  | | --- | --- | --- | --- | --- | | **YEAR 6: SCIENCE** | | **Planned / Covered** | | | | **Working scientifically:**   * Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary * Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate * Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs * Using test results to make predictions to set up further comparative and fair tests * Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations * Identifying scientific evidence that has been used to support or refute ideas or arguments | | **Au** | **Sp** | **Su** | | **S1** | I ask relevant questions (containing scientific knowledge and understanding). |  |  |  | | **S2** | I recognise which type of enquiry is best to answer a question. |  |  |  | | **S3** | I can plan different types of science enquiries to answer questions. I recognise and control variables where necessar |  |  |  | | **S4** | I decide what observations and measurements to make and what equipment to use (giving reasons) to make my measurements and observations. |  |  |  | | **S5** | I take measurements, using a range of scientific equipment with increasing accuracy and precision. |  |  |  | | **S6** | I take repeat readings when appropriate. |  |  |  | | **S7** | I use relevant information sources to find things out |  |  |  | | **S8** | I identify possible risks to myself and others. |  |  |  | | **S9** | I record data and results of increasing complexity using e.g. scientific diagrams and labels and tables |  |  |  | | **S10** | I choose a method to suit the results, e.g. a two column table |  |  |  | | **S11** | I present the data and results in suitable formats using e.g. line graphs, bar graphs, scatter graphs and classification keys. |  |  |  | | **S12** | From my data and observations I draw valid conclusions (i.e. consistent with the evidence) including causal relationships. |  |  |  | | **S13** | I identify scientific evidence to support or refute the ideas or arguments for my conclusion. |  |  |  | | **S14** | I look at my results and decide if any observations or measurements are unsuitable and need to be carried out again. |  |  |  | | **S15** | I offer simple explanations for differences in results. |  |  |  | | **S16** | I use my test results to make predictions to set up further enquiries e.g. comparative and fair tests and suggest how my working methods could be improved, with reasons. |  |  |  | | **Living things and their habitats** | | | | | | **S17** | describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants, animals |  |  |  | | **S18** | give reasons for classifying plants and animals based on specific characteristics. |  |  |  | | **Electricity** | | | | | | **S19** | associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit |  |  |  | | **S20** | 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 |  |  |  | | **S21** | use recognised symbols when representing a simple circuit in a diagram. |  |  |  | | **Evolution and inheritance** | | | | | | **S22** | recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago |  |  |  | | **S23** | recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents |  |  |  | | **S24** | identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. |  |  |  | | **Animals, including humans** | | | | | | **S25** | identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood |  |  |  | | **S26** | recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function |  |  |  | | **S27** | describe the ways in which nutrients and water are transported within animals, including humans. |  |  |  | |