**National Curriculum:**

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

**EYFS**

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| **Vocabulary**  **By the end of EYFS they will be able touse the words:** | **Outcomes for the end of EYFS. Children will be able to:** |
| **Plants**  Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud  **Animals inc. Humans**  Head, body, eyes, ears, mouth, teeth, leg,  Parts of the body including those linked to Managing Self teaching  Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue  **Seasonal Changes**  Weather (sunny, rainy, windy, snowy etc.)  Seasons (winter, summer, spring, autumn)  Sun, sunrise, sunset, day length | **The Natural World**  Explore the natural world around them, making observations and drawing pictures of animals and plants  Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class  Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter  **Managing Self**  Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices |

**KEY STAGE 1**

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

‘Working scientifically’ is described separately in the programme of study, but must always be taught through and clearly related to the teaching of 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 at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

**Key Stage 1 - Working Scientifically**

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

**Programme of Study**

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| --- | --- | --- | --- | --- | --- |
| KS1 | **Plants** | **Animals inc. Humans** | **Materials** | **Living Things & Their Habitats** | **Seasonal Changes** |
| Y1 | **🗸** | **🗸** | **🗸** |  | **🗸** |
| Y2 | **🗸** | **🗸** | **🗸** | **🗸** |  |

**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.

**Lower Key Stage 2 - Working Scientifically**

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 questions or to support their findings.

**Programme of Study**

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| LKS2 | **Plants** | **Animals inc. Humans** | **Materials** | **Living Things & Their Habitats** | **Light** | **Forces & Magnets** | **Sound** | **Electricity** |
| Y3 | **🗸** | **🗸** | **🗸 (Rocks)** |  | **🗸** | **🗸** |  |  |
| Y4 |  | **🗸** | **🗸 (States of Matter)** | **🗸** |  |  | **🗸** | **🗸** |

**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.

**Upper Key Stage 2 - Working Scientifically**

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 a 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

**Programme of Study**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UKS2 | **Animals inc. Humans** | **Materials** | **Living Things & Their Habitats** | **Light** | **Forces** | **Earth & Space** | **Electricity** | **Evolution & Inheritance** |
| Y5 | 🗸 | 🗸 (Properties & Changes) | 🗸 |  | 🗸 | 🗸 |  |  |
| Y6 | 🗸 |  | 🗸 | 🗸 |  |  | 🗸 | 🗸 |

**Cycle A, Autumn 2 2023**

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| **EYFS, Year 1** | **Lesson 1** | **Lesson 2** | **Lesson 3** | **Lesson 4** | **Lesson 5** | **Lesson 6** |
| Seasonal changes  Light and Dark | Flash back:  Is your footprint longer or shorter than your partner’s?  How many knees/elbows do you have? | Flash back:  What body part have I drawn? (teacher to draw on IWB) | Flash back:  What is your eye colour?  How are your eyes like your partner’s?  How are your eyes different to your partner’s? | Flash back:  Which body part do you use to hear?  What sounds can you hear in the classroom?  How can you describe each sound? | Flash back:  What are the five basic tastes?  Which is your favourite / least favourite taste? | Flash back:  Which part of the body do you use to touch?  Is it easier or harder to touch when you wear the gloves? Why? |
| Autumn  By the end of the lesson, I will know that a year is split into 4 seasons and that in Autumn some trees lose their leave, that amount of daylight received gradually decreases and the weather is starting to become cooler | Autumn  By the end of the week, I will be able to describe and record the changes in weather over a week | Light and Dark  By the end of the lesson, I will know the difference between day and night and why the length of day changes | Light and Dark  By the end of the lesson, I will understand how shadows are formed. | Winter  By the end of the lesson, I will learn that in winter the amount of daylight received is less and the nights are longer. The weather is colder and some trees have lost all their leaves. | Winter  By the end of the week, I will be able to describe and record the changes in weather over a week l |
| Key questions  How many seasons are there in one year?  What are the names of the seasons?  What happens to some trees in autumn?  What is the weather like in autumn?  How does the daylight change in autumn?  What clothes would you wear outside in autumn?  How is the day length changing? Enquiry question  What are the main changes in each season? | Key questions  What are the names of the seasons?  What happens to some trees during autumn?  What is the weather like today?  Is the weather the same or different from yesterday?  How many times did it rain this week?  How many times was it sunny this week?  How often was it windy this week?  How is the day length changing? Enquiry question Things to look out for  What are the main changes in each season? | Key Questions:  What is sunrise and sunset  Why does the length of day change?  What is Summer Solstice?  What is winter solstice? | Key Questions  What happens if I move the light source?  Can I make the shadow bigger or smaller?  Can I change the shape of my shadow?  Can I make my shadow move? | Key questions  How many seasons are there in one year?  What are the names of the seasons?  What happens to some trees in winter? What is the weather like in winter?  How does the daylight change in winter?  What would you wear to play outside in winter?  How is the weather similar to autumn?  How is the weather different from autumn? Enquiry question  What are the main changes in each season? | Key questions  How many seasons are there in one year?  What are the names of the seasons?  What is the weather like today?  Is the weather the same as yesterday or different?  How is the day length changing?  How is winter similar/different to autumn?  Did you spot any animals outside in winter?  Why do you think there are fewer animals outside in winter? Enquiry question  What are the main changes in each season? |
| Key vocabulary:  Season  Autumn  Daylight  Night  Weather | Key vocabulary:  Autumn  Rainfall  Rain gauge  Weather | Key Vocabulary  Day  Night  Sunrise  Moon  Stars | Key vocabulary:  Light source  Shadow  Dark  Light  Torch  Shadow puppets | Key vocabulary:  Season  Winter  Daylight  Weather  Night | Key vocabulary:  Rain  Cloud  Frost  Sun  snow |

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| **Year 2, Year 3** | **Lesson 1** | **Lesson 2** | **Lesson 3** | **Lesson 4** | **Lesson 5** | **Lesson 6** | **Lesson 7** | **Lesson 8** |
| Materials | Flash back:  What do all mammals need to survive? | Flash back:  What does a carnivore eat?  What does a herbivore eat?  What does an omnivore eat? | Flash back:  What features do fish have?  What do fish need to survive? | Flash back:  What features do reptiles have?  What do reptiles need to survive? | Flash back:  What do babies need to survive? What do adults need to survive? | Flash back:  What features do amphibians have? | Flash back:  How are the needs of birds similar to the needs of mammals? | Flash back:  What features do all birds have?  How do mammals that live in water breathe air? |
| By the end of the lesson, I will be able to identify, group and sort materials know that paper and cardboard are made from trees and perform simple tests on each material to learn more about its structure and properties. | By the end of the lesson, I will know that rocks are a natural material found on and underneath the Earth’s surface and that brick is a man-made building material. And, explore the simple properties of glass and plastic and use this information to discuss the suitability of these materials for different objects. | By the end of the lesson, I will know a range of metallic objects and perform simple tests to further understand the properties of metals and , I will name and identify a range of natural and man-made fabrics and understand that they all have different properties and uses. | By the end of the lesson I will knoe that objects can be made from different materials depending on their usage | By the end of the lesson, I will be able to carry out simple tests to discover whether they can change the shape of a solid material through bending, squashing, twisting and stretching | By the end of the lesson, I will be able to plan a comparative test, identifying what I will change and keep the same when carrying out an experiment | By the end of the lesson, I will carry out a comparative test to explore which material would be the best for an umbrella | Movement:  By the end of the lesson, I will be able to identify two different joint types – hinge and ball and socket joints, name and identify the hips, elbows, knees and shoulder joints and describe whether these are examples of hinge or ball and socket joints.  I will also learn that muscles pull on bones to create movement. |
| Key questions  What are natural or man-made materials?  What does “recyclable” mean?  Is a recyclable material?  How can we sort and group these materials? How many ways can you think of?  What two words can you use to describe wood, paper or cardboard?  Can you change the shape of paper, cardboard or wood? How?  Which material would be most suitable for a ? Why?  Which material would be unsuitable for a ? Why? | Key Questions:  What are rocks/bricks?  Are rocks/bricks a natural or man-made material  Why would builders choose to build a house with bricks?  Would it be more suitable to build a statue from rock or bricks? Why do you think this?  What words could you use to describe plastic/glass?  What are the similarities/differences between plastic and glass?  What does “transparent”/”translucent”/”opaque” mean?  When would glass/plastic be a suitable material for an object?  When would glass/plastic be an unsuitable material for an object? | Key Questions:  What objects can be made from metal?  Are all metals rigid? Why do you think this?  Are all metals silver? How many metallic objects can you find that are not silver?  Why is metal a suitable material for ?  Why is metal an unsuitable material for ?  How can you group these metal objects? Can you group them another way?  What are natural fabrics?  How many natural fabrics can you name?  What are man-made fabrics?  How many man-made fabrics can you name?  Are all fabrics soft?  What fabric would be the best for a coat?  What fabric would be the best for a PE kit?  Which fabric would be the most suitable for ?  Which fabric would be unsuitable for ? | Key Questions:  What material is the object made from?  What is the object?  What other material can this object be made from?  Where have you seen this material before?  What is similar about these materials?  What is different about these materials?  Why is a suitable material for this object?  Why is an unsuitable material for this object? | Key questions:  What material is this?  What is the texture of this material?  Does the material bend?  Does the material squash?  Does the material twist?  Does the material stretch?  Can the material change shape?  Can the material change back to its original shape?  How can you sort these materials? How many ways can you think of? | Key questions:  What will you change in your experiment?  What will you keep the same in your experiment? What materials and equipment are needed?  Which material do you predict will be the best for an umbrella? Why? Enquiry question  Which material would be the best for an umbrella? | Key Questions:  What will you change in your experiment?  What will you keep the same in your experiment? What was your prediction? Was it correct or incorrect?  Can you rank the materials from least to most suitable for an umbrella? Enquiry question Which material would be the best for an umbrella? | Key questions  What is a joint?  Why do we have joints?  Where are your knee, hip, shoulder and elbow joints?  What movement does a ball and socket joint allow?  What movement does a hinge joint allow?  Do all joints allow the same movement?  Are humans the only animals with joints? Explain your thinking.  What would happen if a skeleton did not have joints?  What are the names of three bones in the human body? What are the names of two joint types in the human body?  Where are your biceps?  Where are your triceps?  What joints are your biceps and triceps attached to?  What does “contract” mean? What does “relax” mean?  How do muscles work in pairs to allow movement? What would happen if humans had no muscles/joints/skeleton? |
| Key vocabulary:  material  natural material  man-made material  recycle  smooth  rough  flexible  rigid | Key vocabulary:  Rock  Stone  Pebble  Brick  Material  Brittle  Flexible  Transparent  Translucent  Opaque | Key vocabulary:  Hard  Flexible  Shiny  Dull  Rigid  Fabric  Tough  Lightweight | Key vocabulary:  Tough  Brittle  Hard  Soft  Flexible | Key vocabulary:  Squah  Bend  Twist  stretch | Key vocabulary:  Independent variable  Dependent variable  Controlled variable | Key vocabulary:  Waterproof  Light  Strong  Breakable | Key vocabulary:  Joints  Hinge joint  Ball and socket joint  Skeleton  Muscle  Bicep and tricep  Contracting  Relaxing |

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| **Year 4, 5 and 6 will complete the same baseline of work.**  **There will be additional challenges tied into the objectives for year 5 and 6, planned by class teachers.**  **There will be significant differences in the expectations of the way that the different year groups record their work.** | | | | | | | | |
| **Year 4, Year 5 & Year 6** | **Lesson 1** | **Lesson 2** | **Lesson 3** | **Lesson 4** | **Lesson 5** | **Lesson 6** | **Lesson 7** | **Lesson 8** |
| Space | Flash back:  How are amphibians and reptiles similar? How are they different? | Flash back:  What is a vertebrate?  What is an invertebrate?  What is an exoskeleton? | Flash back:  What is a classification key?  Why would scientists use a classification key? | Flash back:  What is the difference between deciduous and evergreen trees? | Flash back:  What is Pollination?  What are the female or male reproductive parts in plants called? | Flash back:  What features do insects have?  What features do spiders have? | Flash back:  What features do birds have?  What features do fish have? | Flash back:  What are the female or male reproductive parts in plants called?  What is an exoskeleton? |
| Space  By the end of the lesson, I will understand that the Solar System is made up of the Sun, celestial bodies, eight planets and their moons. | Space  By the end of the lesson, I will know that there are eight planets in the Solar System and their features. | Space  By the end of the lesson, I will know how to use models as representations of the Solar System and planets. | Space  By the end of the lesson, I will know about the movement of the Earth and the other planets in the Solar System. | Space  By the end of the lesson, I will have explored how ideas of the Solar System have changed over time. I will know how different scientists and mathematicians have contributed to our understanding of the Solar System, including the positioning of the Sun and planets. | By the end of the lesson, I will understand that the Earth completes a full rotation on its axis once every 24 hours. This is why we have a 24 hour day | By the end of the lesson, I will understand the concept of night and day and how they occur with reference to the rotation of the Earth around its axis. | By the end of the lesson, I will know the features of the moon. |
| Key questions  How many planets are there in the Solar System?  What is the order of the planets?  What do the planets orbit in the Solar System?  What is similar about the first four planets? What are the differences?  What is similar about the last four planets? What are the differences? | Key questions  How many planets are there in the Solar System?  What is the order of the planets?  What do the planets orbit in the Solar System?  What is similar about the first four planets? What are the differences?  What is similar about the last four planets? What are the differences? Enquiry question  How have our ideas about the Solar System changed over time? | Key questions  What is a model in science?  Why are models used in science?  What does the model of the Solar System help to show?  What are the advantages of the Solar System model?  What are the disadvantages of the Solar System model?  Which is a better representation of the Solar System and why?  Enquiry question  How have our ideas about the Solar System changed over time? | Key questions  What do the Earth and planets in the Solar System orbit?  How is the Sun able to keep the planets in orbit?  Why does Mercury take the least amount of time to orbit the Sun?  Why does Neptune take the longest time to orbit the Sun?  What would happen if the Sun was not present in the Solar System? Enquiry question  How have our ideas about the Solar System changed over time? | Key questions  Who was Aristotle/Ptolemy/Copernicus and what ideas did he have about the Solar System?  What are the similarities and differences between the geocentric and heliocentric models?  How have Galileo and Sir Isaac Newton improved our understanding of the Solar System? Enquiry question  How have our ideas about the Solar System changed over time? | Key questions  What does the Earth orbit?  What is the Earth’s axis?  What is meant by the Earth rotating “on its axis”?  How long does it take for the Earth to rotate once on its axis?  What are the names of the four seasons on Earth?  How do the seasons occur on Earth? Sustainability link  What is global warming? | Key questions  How long does it take for the Earth to rotate around its axis?  What causes day and night?  Why do people in different countries not experience day at the same time? • Why do people in different countries not experience night at the same time?  What would happen if the Earth did not rotate around its axis? Does the sun rise in the morning and set in the evening? Explain your thinking. | Key questions  What is a satellite  What does the Moon orbit?  How long does the Moon take to orbit the Earth?  How is the Moon able to orbit the Earth?  What is “gravitational pull”?  Is the Moon’s gravitational pull weaker than the Earth’s? How do you know?  What would happen to the Moon if the Earth did not have a gravitational pull?  Is Earth the only planet with a moon? |
| Key vocabulary:  The Solar System  Planets  Spherical  Stars  Sun | Key vocabulary:  Planets  Orbit  Surface  Appearance | Key vocabulary:  Sun  Planets  Model  Orbit | Key vocabulary:  Gravity  Gravitational pull  Orbit  Heliocentric | Key vocabulary:  Geocentric  Heliocentric  Spherical  Planets | Key vocabulary:  Axis  Rotation  North Pole  South Pole  Orbit | Key vocabulary:  Axis  Rotation  Night  Day | Key vocabulary:  Satellite  Moon  Gravity  Gravitational pull  Orbit |

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| Lesson Design for all Key stages | | |
| Recall : | Substantive: | Disciplinary: |
| Last week, Last Term, Last Time? | Pre-assess: What do children already know?  Teach knowledge objectives | ‘Work Like Scientists’ – set context for lesson question  > Identify Enquiry Type  > Teach Working Scientifically Skills |
|  | Complete Learning Activities | |
| Review Learning & Progress | |