**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**

|  |  |
| --- | --- |
| **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**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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**

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

**Cycle A, Spring 1 2023**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | |
| **EYFS, Year 1** | **Lesson 1** | **Lesson 2** | **Lesson 3** | **Lesson 4** | **Lesson 5** |
| Planting  Animals | Flash back:  See Power point – Seasons / Body parts | Flash back:  See Power point – Seasons / Body parts | Flash back:  See Power point – Seasons / Body parts | Flash back:  See Power point – Seasons / Body parts | Flash back:  See Power point – Seasons / Body parts |
| Planting:  I will be able to plant seeds and observe any changes in growth over the rest of the term. | Animals – Mammals  I will know that a mammal is an animal that has fur or hair on its body.  I will learn difference between mammals that can be kept as pets and mammals that live in the wild  I will be able to name a variety of common mammals. | Animals – Birds  I will be able to explore and identify different birds and their features.  I will know that birds have wings, a beak and feathers.  I will recognise that some birds can fly and some cannot. | Animals – fish  I will be able to explore different types of fish and their features.  I will learn that fish live in water, have fins to help them swim and most have scales on their bodies.  I will learn that most fish breathe with gills. | Animals – Amphibians  I will be able to explore different amphibians and their features.  I will know that an amphibian is an animal that lives both on land and in water. |
| Key Questioning:  Where are the roots/stems/leaves/flowers? What equipment will you use to plant the seeds?  Where will you keep the planted seeds?  What will happen to the seeds over time?  How often will you look for any changes?  What will your plant look like in one week/two weeks/ three weeks?  Why have you kept your plant inside during winter? | Key Questioning  Are all animals the same?  What is a mammal?  What mammals are shown?  Is a a mammal? How do you know?  Does a have fur?  Can all mammals be pets? How do you know?  Can all mammals live in the wild? How do you know?: | Key Questioning:  Are all animals the same?  What features do all birds have?  Is a a bird? How do you know?  Does a have feathers?  Can all birds fly? How do you know?  What birds are shown?  Which birds can swim?  What are the differences between these two birds? | Key Questioning:  Are all animals the same?  What features do fish have?  What fish are shown?  Is a a fish?  What do fish have to help them swim?  What do fish have to help them breathe underwater?  How is a fish different from a mammal?  How is a fish similar to a bird? | Key Questioning:  Are all animals the same?  Is a an amphibian?  What features do amphibians have?  What amphibian is this?  Where do amphibians live?  What are the differences between a fish and an amphibian?  How is an amphibian similar to a mammal/bird/fish?  How is an amphibian different from a mammal/bird/fish? |
| Key Vocabulary:  Plant  Flower  Leaf  Stem  Roots  Seed  Soil | Key Vocabulary:  Animal  Mammal  Fur  Wild mammal  Pet | Key Vocabulary:  Bird  Wing  Beak  Feathers  Flipper  Webbed feet | Key Vocabulary:  Fish  Fin  Tail  Scales  Gills | Key Vocabulary:  Amphibian  Frog  Toad  Newt  Webbed feet |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | |
| **Year 2, Year 3** | **Lesson 1** | **Lesson 2** | **Lesson 3** | **Lesson 4** | **Lesson 5** |
| Plants – Light and Dark  Skeletons | Flash back:  See Power point | Flash back:  See Power point | Flash back:  See Power point | Flash back:  See Power point | Flash back:  See Power point |
| Plants – Light and Dark  Explore plants  I will be able to closely observe a diverse selection of plants, which can include flowering plants, fruit, vegetables and herbs.  I will be able to sort and group these plants using different criteria or categories. | Plants – Light and Dark  Plant parts  I will be able to name and identify the parts of common plants and trees.  I will be able to recap the parts of flowering plants and trees and identify similarities and differences between plant parts. | Plants – Light and Dark  What do plants need to grow?  I will explore the conditions plants need in order to grow.  I will know that plants need water, light and to be kept at the correct temperature in order to grow and stay healthy. | Plants – Light and Dark  DOUBLE LESSON NEEDED  Plan / investigation  I will be able to plan a comparative test to explore whether plants grow healthier in light or darkness  I will be able to carry out a comparative test to explore whether plants grow healthier in the light or dark. | Skeletons  Name and identify bones in the human body  I will be able to explore the human skeleton for the first time by naming and identifying bones  I will be able to name and locate the skull, femur, pelvis, spine and ribcage |
| Key Questions:  What is similar about these plants?  What is different about these plants?  How did you group the plants? Can you group them another way? How many ways can you think of?  What are fruits?  What are vegetables?  How many fruits and vegetables can you name? | Key Questions:  Where is the stem/roots/leaves/petals?  Where is the trunk/branches/leaves/blossoms?  What is similar/different about these plant parts?  What patterns can you spot with the petals?  What is similar between plants and trees?  What are the differences between plants and trees?  Are there any similarities between these tree parts and parts of other plants?  What is different about tree parts and other plant parts? | Key Questions:  Do plants grow healthier in the light or dark?  Why do plants need water?  What happens if plants do not receive enough water? How does water help plants grow?  Why do plants need sunlight? What happens if plants do not receive enough sunlight?  How does sunlight help plants grow? | Key Questions:  What do plants need to grow and stay healthy?  How can we make sure one plant gets sunlight and the other does not?  How often should we observe the plants?  What things should we keep the same for both plants?  What will we change?  What do you think will happen to the plants? Will the plant in the light or the one in the dark grow better? Why?  What do you predict will happen to the plants in the light?  What do you predict will happen to the plants kept in the dark?  Why is it important to water both plants?  How often will you water both plants?  How much water will you give to both plants?  What will you change?  What will you keep the same? | Key Questions:  How can we sort and group animals based on their skeletons?  How many bones are there in the human skeleton?  Where is the skull found in the skeleton?  Where is the femur found?  Where is the pelvis found in the skeleton?  Where is the ribcage found?  Where is the spine found in the skeleton? |
| Key Vocabulary:  Plant  Flower  Fruit  Vegetable  herb | Key Vocabulary:  Blossom  Stem  Leaf  Trunk  branch | Key Vocabulary:  Seed  Plant  Sunlight | Key Vocabulary:  Independent variable  Dependent variable  Controlled carriable | Key Vocabulary:  Skeleton  Skull  Ribcage  Spine  Pelvis  Femur |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 -**  Properties of materials | | **Lesson 2-**  Properties of materials | | **Lesson 3-**  Properties of materials | **Lesson 4-**  Properties of materials / Sound | | **Lesson 5-**  Sound | |
| Properties of materials  Sound | Flash back:  See Power point | | Flash back:  See Power point | | Flash back:  See Power point | Flash back:  See Power point | | Flash back:  See Power point | |
| Test materials - magnetism, transparency and hardness  I will be able to test everyday materials and group them based on their transparency, hardness and magnetism.  I will be able link the properties of materials to their uses | Test materials – electrical  I will be able to test some everyday materials and group them based on their electrical conductivity  I will be able to classify as conductors or insulators | Plan - Insulating heat experiment  I will be able to plan a comparative test to investigate which material is the best thermal insulator  I will be able to explore which material is the best at keeping hot water warm. | Investigate - Insulating heat experiment  I will be able to carry out a comparative test to explore which materials are the best insulators of heat. | Evaluate – insulating heat experiment  I will be able to work scientifically to analyse data, make conclusions and evaluate the insulation experiment | Use of everyday materials – plastic, wood and metal  I will be able to look at three common materials, plastic, wood and metal, and link the uses of these materials to their properties | Vibrations:  I Will know that sounds are made when objects vibrate. | The ear  I will know that sound reaches the ear and how the different parts of the ear allow us to hear sounds | Investigate sounds  I will understand how the intensity of sound is measured  I will know that the intensity, or loudness, of sound is measured in decibels (dB |
| Key Questions:  What does “magnetic” mean? Is a magnetic material?  Are all metals magnetic?  What do the terms “translucent”, ”transparent” and “opaque” mean?  How could two materials be tested to see which one is the hardest?  Which material do you think is the hardest? | Key Questions:  What does “electrical conductor” mean?  What does “electrical insulator” mean?  What components are needed in a complete circuit?  Is a conductor of electricity?  How would you know that is a conductor of electricity?  Electrical wires are covered with a plastic casing.  Why is plastic used? | Key Questions:  What is a thermal insulator?  When would you need to keep something hot?  When would you need to keep something cold?  What are the independent, dependent and controlled variables in this experiment? What equipment will you use and why?  How will you record your results? | Key Questions:  What is a thermal insulator?  What is your experiment plan?  What is your prediction for the experiment? Why was one of the beakers not covered in insulation? What did you notice about the temperature of all four beakers at the end of the experiment? | Key Questions  What do the results tell you about which material is the best insulating material?  If you were to repeat this experiment, how could you improve your results?  How could you make your results more reliable?  What questions do you have for further investigation? | Key Questions  What is an electrical conductor?  What is an electrical insulator?  What is a thermal insulator?  What object is this? What material is it made from? What other materials could this object be made from?  Why is a suitable material for a ?  Why would be unsuitable for a ? | Key Questions  Which organ in our bodies detects sound?  What does “vibration” mean?  How do we hear sounds? If you hit a drum harder, what does it do to the sound produced?  How does a guitar produce sound when played?  How does a drum produce sound when it is hit?  Does sound only travel through air? Explain your thinking. | Key Questions:  What is the outer ear?  How does the outer ear help us to hear?  What is the inner ear?  How does the inner ear help us to hear?  How does sound travel to the ear?  What else does the inner ear help us with?  What is the function of the ear drum? | Key Questions:  How is sound measured?  What equipment is used to measure sound?  How many decibels is a human talking?  How many decibels is a human shouting?  How many decibels is the quietest sound a human can hear?  What is the level of sound in the classroom? How is that different from the level of sound in the lunch hall/playground?  How does the loudness of sound in the classroom change over the day? |
| Key Vocabulary:  Transparent  Translucent  Opaque  Magnetism  Hardness | Key Vocabulary:  Electrical conductor  Electrical insulator  Circuit  Cel  bulbl | Key Vocabulary:  Independent variables  Dependent variables  Controlled variables | Key Vocabulary:  Thermal insulator  Thermometer  Control beaker  Temperature | Key Vocabulary:  Thermal insulator  Data  Temperature  Conclusion  Anomalous result  : | Key Vocabulary:  Properties  Wood  Matal  Plastic  Lifespan | Key Vocabulary:  Vibration  Ear  Sound  Volume  Pitch | Key Vocabulary:  Outer ear  Ear bones  Cochlea  Ear canal  Ear drum | Key Vocabulary:  Sound  Volume  Decibel (dB)  Decibel meter  Vibration |