*Science has changed our lives and is vital to the world’s future prosperity. Our Science Curriculum endeavours to teach the essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. They will be given the opportunity to carry out investigations promoting explorative learning where they will learn through scientific enquiry.*

**Early Years Foundation Stage**

**Understanding the world:** Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.

**Key Stage One**

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.

**Key Stage Two**

**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.

**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.

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|  | **Working scientifically** | **Biology** | **Physics** **Chemistry** |
| **Reception** | **Communication & Language**Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contextsMake comments about what they have heard and ask questions to clarify their understanding. | **Managing Self**Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.**PSHE**Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of ‘screen time’ - having a good sleep routine - being a safe pedestrian | **UTW**Explore the natural world around them. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.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. |
| **Year 1** | .* Ask simple questions
* Observe closely and use simple equipment Use their observations and ideas to suggest answers to questions
* Identify and classify
* Compare and contrast familiar plants
* Draw diagrams showing the parts of different plants, including trees
* Gather and record data to help in answering questions
* Describe how they are able to identify and group different plants
* Perform simple tests
* Use observations and ideas to suggest answers to questions
* Group and sort
 | **Animals including humans:** * Identify, name draw and label basic parts of the human body and say which part of the body is associated with each sense
* Identify and name a

variety of common animals including fish, amphibians, reptiles, birds and mammals.* Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).
* Identify and name a variety of common animals that are carnivores, herbivores and omnivores

**Plants:*** Become familiar with common names of flowers and plant structures including seeds
* Identify and describe the basic structure of a variety of common flowering plants, including trees
* Identify and name a variety of common wild and garden plants
* Identify and name a variety of deciduous and evergreen trees.
* Understand how plants change overtime
* Observe the growth planted flowers
* Keep records of how plants change over time

**Seasonal Changes:*** Observe changes across the four seasons
* Observe and describe weather associated with the seasons and how day length varies
 | **Everyday Materials:*** Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.
* Distinguish between an object and the material from which it is made.
* Describe the simple physical properties of everyday materials.
* Compare and group together a variety of everyday materials on the basis of their simple physical properties.
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| **Year 2** | * Using their observations and ideas to suggest answers to questions
* Performing simple tests
* Gathering and recording data to help in answering questions
* Using their observations and ideas to suggest answers to questions
* Identifying and classifying
* Observing closely, using simple equipment
* Using their observations and ideas to suggest answers to questions
* Asking simple questions and recognising that they can be answered in different ways
* Gathering and recording data to help in answering questions
* Identifying differences, similarities or changes related to simple scientific ideas and processes
* Observing and recording, with some accuracy
* Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
 | **Living things and their habitats:*** Explore and compare the differences between things that are living, dead, and things that have never been alive
* identify and name a variety of plants
* and animals in their habitats,
* including microhabitats
* Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain
* Identify and name different sources of food

**Habitats around the world:*** Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
* Identify and name a variety of plants and animals in their habitats, including microhabitats

**Animals including Humans:*** Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
* Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene
* Notice that animals, including
* humans, have offspring
* which grow into adults

**Plants:*** Observe and describe how seeds and bulbs grow into mature plants
* Find out and describe how
* plants need water, light and a suitable temperature to grow and stay healthy
* Understand the requirements of plants for germination, growth and survival, as well as, the processes of reproduction and growth in plants
 | **Materials:*** Identify and compare the suitability of variety of everyday materials
* Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
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| **Year 3** | * Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
* Using straightforward scientific evidence to answer questions or to support their findings
* Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
* Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
* Identifying differences, similarities or changes related to simple scientific ideas and processes
* Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
* Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
* Setting up simple practical enquiries, comparative and fair tests
* 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
 | **Animals including Humans:*** 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
* Identify that humans and some other animals have skeletons and muscles for support, protection and movement

**Plants:*** 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#
* Identify and describe the functions of different parts of a flowering plant
* Investigate the way in which water is transported within plants
* Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

**Rocks:*** Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
* Explore how and why [rocks] might have changed over time (non-statutory)
* Describe in simple terms how fossils are formed when things that have lived are trapped within rock
* Recognise that soils are made from rocks and organic matter
 | **Light:** * Recognise that they need light in order to see things and that dark is the absence of light
* Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
* Notice that light is reflected from surfaces
* Recognise that shadows are formed when the light from a light source is blocked by an opaque object
* Find patterns in the way that the size of shadows change**Forces and Magnets:**.
* Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance
* Compare how things move on different surfaces
* Describe magnets as having 2 poles Predict whether 2 magnets will attract or repel each other, depending on which poles are facing
* 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
* Describe magnets as having two poles
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| **Year 4** | * Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
* Making systematic and careful observations
* Reporting on findings from enquiries, including oral and written explanations
* Setting up simple practical enquiries, comparative and fair tests
* 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
* Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
* Using straightforward scientific evidence to answer questions or to support their findings
* Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
* Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
* Investigate, record data, analysing data, presenting findings
 | **Living things and their habitats:*** Recognise that living things can be grouped in a variety of ways
* Making a guide to local living things (nonstatutory)
* Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
* Recognise that environments can change and that this can sometimes pose dangers to living things

**Animals including Humans:*** Describe the simple functions of the basic parts of the digestive system in humans
* Identify the different types of teeth in humans and their simple functions
* Construct and interpret a variety of food chains, identifying producers, predators and prey
 | **Sound:*** Identify how sounds are made, associating some of them with something vibrating
* Recognise that vibrations from sounds travel through a medium to the ear
* Find patterns between the pitch of a sound and features of the object that produced it
* Recognise that sounds get fainter as the distance from the sound source increases

**Electricity:*** Identify common appliances that run on electricity
* Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
* 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
* Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit

**States of matter:*** Compare and group materials together, according to whether they are solids, liquids or gases
* 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)
* Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature
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| **Year 5** | * Identifying scientific evidence that has been used to support or refute ideas or arguments
* Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
* 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
* Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
* 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
* Plan different types of scientific enquiries to answer questions, including controlling variables where necessary
 | **Living things and their habitats:*** Describe the life process of reproduction in some plants and animals

**Animals including Humans:*** Describe the changes as humans develop to old age
* Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
* They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall. [Non-statuary]
 | **Earth and Space:*** Describe the movement of the Earth and other planets relative to the sun in the solar system Describe the sun, Earth and moon as approximately spherical bodies
* Describe the movement of the moon relative to the Earth
* Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky

**Forces:*** Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
* Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
* Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

**Properties of materials:*** 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
* Compare and group together everyday materials based on evidence from comparative and fair tests, including their conductivity of heat
* Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
* 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
* Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
* Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating

**Changes of materials:*** Describe how to recover a substance from a solution
* Demonstrate that dissolving, mixing and changes of state are reversible changes
* 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.
* Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated the action of acid on bicarbonate of soda
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**Science Enrichment Opportunities include:**

* Inviting a STEM ambassador to the classroom.
* Researching a subject of interest for a presentation to class.
* Enrichment clusters for the deeper exploration of a subject, for example where do we go when the sun destroys the earth?
* The inclusion of ethical issues, for example should we take plants and animals from the wild to study them?
* Extending learning into other subjects such as PSHE (puberty, balanced diet), finance (bubble wand mixture sales), and DT (cooking causing chance in materials).
* Class educational outings to local sites like BASF Bradford (early signposting to STEM careers).
* Science week including Highburton First School’s Science Fair
* Science afterschool club.
* Use of forest school.
* Kirkburton Middle School science transition sessions.
* Local education site visits for example pond dipping at Cliffe House.

**How Science relates to our Vision and Values**

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| **Creativity** | **Resilience** | **Friendship** | **Aspiration** | **Respect** |
| **Questioning:** Asking and answering questions. Understanding that questioning never ends. | **Testing and Trialling:** Setting up their own tests and recording results. | **Teamwork:** Workingtogether and collaboratingon experiments. Sharingequipment and tasks. | **Making links:** Using theirknowledge to find patterns andsimilarities. Linking knowledgefrom previous learning. | **Being Safe:** Using equipmentsafely and recognising andminimising risk. |
| **Observing:** Looking deeply,noticing changes andpatterns. | **Recognising errors:** Recognising where mistakes have been made or data is insufficient to answer the question. | **Reporting:** Sharing theirfindings with others andlistening to others. | **Generalisation:** Turningspecific findings into patternsand conclusions. | **Looking after the World:**Taking care of the world nowand for the future. |
| **Problem solving:** Designing investigations to answer self-generated questions. | **Progression:** having the toolkit to progress without being intimidated by increasingly challenging concepts. | **Support:** Understanding science and taking time to help fellow pupils by sharing that understanding of science. | **Work with independence:** Considering what’s next? Thinking about how to extend investigations to answer questions generated by results and conclusions. | **Courtesy:** Appreciation that cultures have beliefs that may differ from the scientific evidence. |