Sheep Dip Lane Primary School

Scheme of Learning for Science

# Sheep Dip essentials for this subject:

* To know and apply qualities of a good Scientist especially with regards to teamwork and perseverance.
* To be able to ask questions, plan, record, take accurate measurements and draw conclusions, using appropriate Scientific knowledge.
* To gain a vast amount of knowledge and skills about all different aspects of science.
* To learn how we have acquired our current knowledge from great scientists of the past and today.
* To understand that Science involves research and drawing conclusions from this.
* To develop an awareness through the curriculum of how science can impacts on all aspects of our lives and that it can save lives.
* To explore and investigate how inspirational Science is and how it has and is being used in real life situations and to be able to give examples of this.

**Coverage within the science National Curriculum**

|  |  |  |  |
| --- | --- | --- | --- |
|                     | Biology | Chemistry | Physics |
| **Plants** | **Animals, including humans** | **Living things & habitats** | **Evolution & inheritance** | **Rocks** | **Everyday materials** | **Properties & changes of materials** | **States of matter** | **Light** | **Sound** | **Forces & magnets** | **Seasonal changes** | **Earth & space** | **Electricity** |
| **Yr 1** | **X** | **X** |  |  |  | **X** |  |  |  |  |  | **X** |  |  |
| **Yr 2** | **X** | **X** | **X** |  |  | **X** |  |  |  |  |  |  |  |  |
| **Yr 3** | **X** | **X** |  |  | **X** |  |  |  | **X** |  | **X** |  |  |  |
| **Yr 4** |  | **X** | **X** |  |  |  |  | **X** |  | **X** |  |  |  | **X** |
| **Yr 5** |  | **X** | **X** |  |  |  | **X** |  |  |  | **X**  |  | **X** |  |
| **Yr 6** |  | **X** | **X** | **X** |  |  |  |  | **X** |  |  |  |  | **X** |

Science in 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.

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.

Year 1

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| --- | --- | --- |
| Statutory requirements ( National curriculum) | Key Assessment Criteria | Identified topic for Coverage of Content and Skills (Suggested Ideas included) |
| **WORKING SCIENTIFICALLY*** asking simple questions and recognising that they can be answered in different ways
* observing closely, using simple equipment
* performing simple tests
* identifying and classifying (with guidance)
* using their observations and ideas to suggest answers to questions
* gathering and recording data to help in answering questions. (Tally given and simple chart completed)
* Orally use Scientific language with HA children using it in written methods.
 | * Pupils in years 1 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.

 **Key Assessment:*** **I can ask simple scientific questions.**
* **I can use simple equipment to make observations.**
* **I can carry out simple tests.**
* **I can identify and classify things.**
* **I can suggest what I have found out.**
* **I can use simple data to answer questions**
 | * Use scaffold grids for investigational work across all areas of learning.
* Use photos of evidence in Science books and allow pupils to record their learning.
* All pupils to experience practical hands on learning independently.

 Topics: |

|  |  |  |
| --- | --- | --- |
| **PLANTS*** identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
* identify and describe the basic structure of a variety of common flowering plants, including trees.
 | * Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat.
* Where possible, they should observe the growth of flowers and vegetables that they have planted.
* They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).
* Pupils might work scientifically by: observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees.
* Pupils might keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.

**Key Assessment:*** **I can name a variety of common wild and garden plants.**
* **I can name the petals, stem, leaf and root of a plant.**
* **I can name the roots, trunk, branches and leaves of a tree.**
 | * Link with Geography on our local area topic.
* Trips to Martinwells lake and our own Wildlife area.
* Gardening with Staff.

 Topic: |
| **ANIMALS INCLUDING HUMANS.*** identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
* identify and name a variety of common animals that are carnivores, herbivores and omnivores
* describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)
* identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
 | * Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat.
* They should understand how to take care of animals taken from their local environment and the need to return them safely after study.
* Pupils should become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.
* Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.
* Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells.

**Key Assessment:*** **I can name a variety of animals including fish, amphibians, reptiles birds and mammals.**
* **I can classify and name animals by what they eat (carnivore, herbivore and omnivore).**
* **I can sort animals into categories (including fish, amphibians, reptiles, birds and mammals).**
* **I can sort living and non-living things.**
* **I can name the parts of the human body that I can see.**
* **I can link the correct part of the human body to each sense.**
 | * visit from local vet?
* Farmer?
* Trip to Butterfly World in Leeds.
* Visit to farm in sheffield
* Blindfold activities – use senses for smells, tastes, touch.
* Link to Geography on hot & cold places.

 Topic: |

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| --- | --- | --- |
| **EVERYDAY MATERIALS.*** distinguish between an object and the material from which it is made
* identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
* describe the simple physical properties of a variety of everyday materials
* compare and group together a variety of everyday materials on the basis of their simple physical properties.
 | * Pupils should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil.
* Pupils might work scientifically by: performing simple tests to explore questions, for example: ‘What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast’s leotard?’

**Key Assessment:*** **I can distinguish between an object and the material it is made from.**
* **I can explain the materials that an object is made from.**
* **I can name wood, plastic, glass, metal, water and rock.**
* **I can describe the properties of everyday materials.**
* **I can group objects based on the materials they are made from.**
 | * Presented with different materials in a feely bag / cover and the children have to describe it to the class / partner using scientific language.
* Ask the children to find the best material for a given object – link to Science investigation.
* Links to maths on sorting objects / venn diagrams.
* Link to our local area with Geography.
* Could link to litter / recycling materials / caring for the environment project.

 Topic:  |
| **SEASONAL CHANGES.*** observe changes across the four seasons
* observe and describe weather associated with the seasons and how day length varies.
 | Pupils should observe and talk about changes in the weather and the seasons.**Note:** Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.Pupils might work scientifically by: making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change.**Key Assessment:*** **I can observe and comment on changes in the seasons.**
* **I can name the seasons and suggest the type of weather in each season.**
 | * Present pictures from school during the seasons and ask the children to name them.
* Take temperatures outside in the morning, lunch and before school ends to see difference in temp.
* Look at different places in the world and how their seasons are different.
* Simple charts about the weather.
* Simple graph / chart detailing given day length from four seasons.
* Link to Geography Human and Physical Geography covers both assessment criteria.
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Year 2

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| --- | --- | --- |
| Statutory requirements ( National curriculum) | Key Assessment Criteria | Identified topic for Coverage of Content and Skills (Suggested Ideas included) |
| **WORKING SCIENTIFICALLY*** asking simple questions and recognising that they can be answered in different ways
* observing closely, using simple equipment
* performing simple tests
* identifying and classifying (with guidance)
* using their observations and ideas to suggest answers to questions
* gathering and recording data to help in answering questions. (Tally given and simple chart completed)

Use Scientific language when conducting experiments and in written methods. | * Pupils in years 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, 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.

**Key Assessment:*** **I can ask simple scientific questions.**
* **I can use simple equipment to make observations.**
* **I can carry out simple tests.**
* **I can identify and classify things.**
* **I can suggest what I have found out.**
* **I can use simple data to answer questions**
 | * Use scaffold grids for investigational work across all areas of learning.
* Use photos of evidence in Science books and allow pupils to record their learning.
* All pupils to experience practical hands on learning independently.

 Topics: |
| **LIVING THINGS AND THEIR HABITAT*** explore and compare the differences between things that are living, dead, and things that have never been alive
* 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 micro-habitats
* describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.

**Key Assessment:*** **I can identify things that are living, dead and never lived.**
* **I can describe how a specific habitat provides for the basic needs of things living there (plants and animals).**
* **I can identify and name plants and animals in a range of habitats.**
* **I can match living things to their habitat.**
* **I can describe how animals find their food.**
* **I can name some different sources of food for animals.**
* **I can explain a simple food chain.**
 | * Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy.
* They should raise and answer questions that help them to become familiar with the life processes that are common to all living things.
* Pupils should be introduced to the terms ‘habitat’ (a natural environment or home of a variety of plants and animals) and ‘micro- habitat’ (a very small habitat, for example for woodlice under stones, logs or leaf litter).
* They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest.
* Pupils might work scientifically by: sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts.
* They should describe how they decided where to place things, exploring questions for example: ‘Is a flame alive? Is a deciduous tree dead in winter?’ and talk about ways of answering their questions.
* They could construct a simple food chain that includes humans (e.g. grass, cow, human).
* They could describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there.
 | * This could lead on a topic on mini-beast or you could link to historical animals such as dinosaur topic.
* Overall topic on environment, caring for plants and animals. Integrate plants learning within this.
* Link with geography on a non European locality.

Topic: |
| **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.
 | * Pupils should use the local environment throughout the year to observe how different plants grow.
* Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants.
* **Note:** Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.
* Pupils might work scientifically by: observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy.

**Key Assessment:*** **I can describe how seeds and bulbs grow into plants.**
* **I can describe what plants need in order to grow and stay healthy (water, light & suitable temperature).**
 | * Link with a topic on environment.
* Visits to garden centre.
* Set up a school garden
* Invite parents to support this.
* Link with Geography.

 Topic: |
| **ANIMALS INCLUDING HUMANS.*** notice that animals, including humans, have offspring which grow into adults
* 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.
 | * Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans.
* They should also be introduced to the processes of reproduction and growth in animals.
* The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs.
* The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep.
* Growing into adults can include reference to baby, toddler, child, teenager, adult.
* Pupils might work scientifically by: observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.

**Key Assessment:*** **I can explain the basic stages in a life cycle for animals, including humans.**
* **I can describe what animals and humans need to survive.**
* **I can describe why exercise, a balanced diet and good hygiene are important for humans.**
 | * Could link to ‘Staying healthy topic’ setting up a role play health club. Food and eating. Discuss stages of growth through animals growing within the classroom and lifecycles. This could also link to living things and their habitats.

 Topic: |
| **USE OF EVERYDAY MATERIALS*** identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
* Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
 | * Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass).
* They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials.
* Pupils might find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam.
* Pupils might work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.

 **Key Assessment:*** **I can identify and name a range of materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard.**
* **I can suggest why a material might or might not be used for a specific job.**
* **I can explore how shapes can be changed by squashing, bending, twisting and stretching.**
 | * Links could be made with other curriculum areas by focusing on people who have developed useful materials.
* This could link with a project on the environment and caring for the environment. This would incorporate recycling and energy.
* You could develop a project on Design and link to enterprise with pupils creating their own little companies to design objects which they can then sell such as fashion design or bookmarks. This could incorporate many famous designers.

 Topic: |

Science in 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.

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.**

**Year 3**

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| Statutory requirements ( National curriculum) | Key Assessment Criteria | Identified topic for Coverage of Content and Skills (Suggested Ideas included) |
| **WORKING SCIENTIFICALLY*** With support, asking relevant questions and using different types of scientific enquiries to answer them
* With support, setting up simple practical enquiries, comparative and fair tests
* With support, making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers
* gathering, recording, classifying and presenting data using bar charts, tables and tally charts 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 and suggest improvements* identifying differences and similarities related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings. | * Pupils in years 3 should be given a range of scientific experiences to enable them to raise their own questions about the world around them.
* They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys.
* They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.
* **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 so that the expectations in the programme of study can be met by the end of year 3.
 | * Use whole school agreed format for recording investigations.
* Use photos within books to collect evidence of investigation work.
* Ensure all pupils have access to data loggers.
* Integrate across all topics and make links with mathematics where possible.

**Key Assessment:*** **I can ask relevant scientific questions.**
* **I can use observations and knowledge to answer scientific questions.**
* **I can set up a simple enquiry to explore a scientific question.**
* **I can set up a test to compare two things.**
* **I can set up a fair test and explain why it is fair.**
* **I can make careful and accurate observations, including the use of standard units.**
* **I can use equipment, including thermometers and data loggers to make measurements.**
* **I can gather, record, classify and present data in different ways to answer scientific questions.**
* **I can use diagrams, keys, bar charts and tables; using scientific language.**
* **I can use findings to report in different ways, including oral and written explanations, presentation.**
* **I can draw conclusions and suggest improvements.**
* **I can make a prediction with a reason.**
* **I can identify differences, similarities and changes related to an enquiry.**
 |
| **PLANTS.*** identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
* 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
* 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.
 | * Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do.
* They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.
* **Note:** Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.
* Pupils might work scientifically by: comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed.
* They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.

**Key Assessment:*** **I can describe the function of different parts of flowing plants and trees.**
* **I can explore and describe the needs of different plants for survival.**
* **I can explore and describe how water is transported within plants.**
* **I can describe the plant life cycle, especially the importance of flowers.**
 |  Use the local environment to investigate these areas. Dye in water to see how the colour of leaves / flowers can change.Experiment for growing plants in different places to see effect – cold, war, light, dark, water.Visit to Nature Reserve to look at seed dispersal. Topic: |
| ANIMALS INCLUDING HUMANS (INCLUDE TEETH)* 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.
* Link to healthy lifestyles, health and hygiene, body clothes and teeth.

identify the different types of teeth in humans and their simple functions | * Pupils should continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions.
* Pupils might work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons.
* They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat.
* They might research different food groups and how they keep us healthy and design meals based on what they find out.
* Discuss healthy lifestyle. How do we need to keep healthy as well as eating well. Discuss hygiene, changing clothes and brushing teeth.
* Pupils might work scientifically by: comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them.
* Link to fitness and athletes. Research famous athletes and their training programme.

**Key Assessment:*** **I can explain the importance of a nutritious, balanced diet.**
* **I can explain how nutrients, water and oxygen are transported within animals and humans.**
* **I can describe and explain the skeletal system of a human.**
* **I can describe and explain the muscular system of a human.**
* **I can describe the purpose of the skeleton in humans and animals.**
 | Talk from local nurse / dentist.Exercise and how it makes our bodies work differently.Visit a local Gym or invite fitness instructors into school.Invite local famous athletes / footballers to discuss their training programme and diet. Historical links – first black footballer came form Edlington in 1915 Arthur Wharton Invite Ron Flowers (Jean Hayes brother) (1966 world cup) came from Edlington. Hold a mini-olympics etc.Improve on personal times etc.Topic:  |
| **ROCKS*** compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
* 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.
 | * Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment. Link with Volcanoes and earthquakes.
* Pupils might work scientifically by: observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.
* Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed.
* Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water.
* They can raise and answer questions about the way soils are formed.

**Key Assessment:*** **I can compare and group rocks based on their appearance and physical properties, giving a reason.**
* **I can describe how fossils are formed.**
* **I can describe how soil is made.**
* **I can describe and explain the difference between sedimentary and igneous rock.**
 | **Landslides, erosion of walls and gravestones. Look at local area, what rocks do we have here.****Trip to Coal Mining Museum.****Trip caving to explore inside of the rocks and underground.****Organise a visit from the fossil man to bring in lots of different types of fossils.****Link to art and design and making fossil.****Topic:** |
| **LIGHT*** recognise that they need light in order to see things and that dark is the absence of light
* notice that light is reflected from surfaces
* recognise that light from the sun can be dangerous and that there are ways to protect their eyes
* recognise that shadows are formed when the light from a light source is blocked by a solid object
* find patterns in the way that the size of shadows change.
 | * Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves.
* They should think about why it is important to protect their eyes from bright lights.
* They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.
* **Note:** Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.
* Pupils might work scientifically by: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

**Key Assessment:*** **I can describe what dark is (the absence of light).**
* **I can explain that light is needed in order to see.**
* **I can explain that light is reflected from a surface.**
* **I can explain and demonstrate how a shadow is formed.**
* **I can explore shadow size and explain.**
* **I can explain the danger of direct sunlight and describe how to keep protected.**
 | Shadow patterns on the floor at different times of the day. Mirror games to see how light beams can bend.Link with History and research Thomas Eddison (First Light Bulb)Topic: |
| **FORCES AND MAGNETS*** compare how things move on different surfaces
* notice that some forces need contact between two objects, but magnetic forces can act at a distance
* observe how magnets attract or repel each other and attract some materials and not others
* compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
* describe magnets as having two poles
* predict whether two magnets will attract or repel each other, depending on which poles are facing
 | * Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing).
* They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).
* Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

**Key Assessment:*** **I can explore and describe how objects move on different surfaces.**
* **I can explain how some forces require contact and some do not, giving examples.**
* **I can explore and explain how objects attract and repel in relation to objects and other magnets.**
* **I can predict whether objects will be magnetic and carry out an enquiry to test this out.**
* **I can describe how magnets work.**
* **I can predict whether magnets will attract or repel and give a reason.**
 | Which materials are magneticPut an object on the table and move it along with a magnet underneath.How like pole repel each other and opposites attract.Topic: |

**Year 4**

|  |  |  |
| --- | --- | --- |
| Statutory requirements ( National curriculum) | Key Assessment Criteria | Identified topic for Coverage of Content and Skills (Suggested Ideas included) |
| **WORKING SCIENTIFICALLY*** Independently, asking relevant questions and using different types of scientific enquiries to answer them
* Independently, setting up simple practical enquiries, comparative and fair tests
* Independently, making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data logging
* gathering, recording, classifying and presenting data in a variety of ways including scatter graphs and line graphs 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 and suggest improvements and raise further questions
* identifying differences and similarities or changes related to simple scientific ideas and processes
* using straightforward scientific evidence to answer questions or to support their findings.
 | * Pupils in years 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys.
* They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.
* They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.
* 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 4 so that the expectations in the programme of study can be met by the end of year 4.
 |  **Key Assessment:****Working scientifically****(Y3 and Y4)*** **I can ask relevant scientific questions.**
* **I can use observations and knowledge to answer scientific questions.**
* **I can set up a simple enquiry to explore a scientific question.**
* **I can set up a test to compare two things.**
* **I can set up a fair test and explain why it is fair.**
* **I can make careful and accurate observations, including the use of standard units.**
* **I can use equipment, including thermometers and data loggers to make measurements.**
* **I can gather, record, classify and present data in different ways to answer scientific questions.**
* **I can use diagrams, keys, bar charts and tables; using scientific language.**
* **I can use findings to report in different ways, including oral and written explanations, presentation.**
* **I can draw conclusions and suggest improvements.**
* **I an make a prediction with a reason.**
* **I can identify differences, similarities and changes related to an enquiry.**
 |
| **Living Things and Their Habitats*** recognise that living things can be grouped in a variety of ways
* 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.
 | * Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat.
* They should identify how the habitat changes throughout the year.
* Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants.
* Pupils could begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.
* **Note:** Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses.
* Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.
* Pupils might work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.
 | * Link to Geography on location study. Visit a coastal location such as Scarborough and explore the habitats or whitby.
* Look at the impact of tourism on the local environment.

Topic:  |
| **ANIMALS INCLUDING HUMANS*** describe the simple functions of the basic parts of the digestive system in humans

construct and interpret a variety of food chains, identifying producers, predators and prey. | * Pupils should be introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions.
* They might draw and discuss their ideas about the digestive system and compare them with models or images.

**Key Assessment:*** **I can identify and name the parts of the human digestive system.**
* **I can describe the functions of the organs in the human digestive system.**
* **I can identify and describe the different types of teeth in humans.**
* **I can describe the functions of different human teeth.**
* **I can use food chains to identify producers, predators and prey.**
* **I can construct food chains to identify producers, predators and prey.**
 | * Famous Scientist - Alexander Fleming Penicillin
* Link to local visits to health centre
* Have talks from nurse / doctors etc.

 Topic: |
| **STATES OF MATTER INCLUDING MATERIAL CHANGES.*** 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.

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 | Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled.**Note:** Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning.Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.**Key Assessment:*** **I can group materials based on their state of matter (solid, liquid, gas).**
* **I can describe how some materials can change state.**
* **I can explore how materials change state.**
* **I can measure the temperature at which materials change state.**
* **I can describe the water cycle.**
* **I can explain the part played by evaporation and condensation in the water cycle.**
 | * Make Geographical links with water cycle by exploring coastal locality.

 Topic: |
| **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
* find patterns between the volume of a sound and the strength of the vibrations that produced it
* recognise that sounds get fainter as the distance from the sound source increases.
 | * Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways.
* Pupils might work scientifically by: finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.
* They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound.
* They could make and play their own instruments by using what they have found out about pitch and volume.

**Key Assessment:*** **I can describe how sound is made.**
* **I can explain how sound travels from a source to our ears.**
* **I can explain the place of vibration in hearing.**
* **I can explore the correlation between pitch and the object producing a sound.**
* **I can explore the correlation between the volume of a sound and the strength of the vibrations that produced it.**
* **I can describe what happens to a sound as it travels away from its source.**
 | Link to music.* Give the children a problem – create insulation material for a new music classroom.
* Bring in musicians and explore these.
* Try and make lessons practical using instruments.
* Make simple devices to transport sound.
* Alexander Graham Bell – invented the first telephone.
* Topics could link to modern sound devices.
* Make different compositions using keyboards.

 Topic:  |
| 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
* recognise some common conductors and insulators, and associate metals with being good conductors.
 | * Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices.
* Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; but useful for them to see and learn these.
* **Note:** Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage.
* Pupils should be taught about precautions for working safely with electricity.
* Pupils might work scientifically by: observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

**Key Assessment:*** **I can identify and name appliances that require electricity to function.**
* **I can construct a series circuit.**
* **I can identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers).**
* **I can draw a circuit diagram.**
* **I can predict and test whether a lamp will light within a circuit.**
* **I can describe the function of a switch in a circuit.**
* **I can describe the difference between a conductor and insulators; giving examples of each.**
 | * Link to design and using electric circuits in these.
* Electricity could lead the topic – modern and historical appliances – lights, camera action project.
* Explore materials within the project.
* Extend to Geography – weather forms such as lightning.

 Topic: |

**Science in 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 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.

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.

**Year 5**

|  |  |  |
| --- | --- | --- |
| Statutory requirements ( National curriculum) | Key Assessment Criteria | Identified topic for Coverage of Content and Skills (Suggested Ideas included) |
| **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, bar 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, 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. | * Pupils in years 5 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.
* These opportunities for working scientifically should be provided across years 5 so that the expectations in the programme of study can be met by the end of year 5.
* Pupils are not expected to cover each aspect for every area of study.
 | * School agreed format for investigation work.
* Ensure that pupils apply this in order to become independent when writing up investigations.
* Link with work with Literacy and Numeracy.

 **Key Assessment:*** **I can plan different types of scientific enquiry.**
* **I can control variables in an enquiry.**
* **I can measure accurate and precisely using a range of equipment.**
* **I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**
* **I can use the outcome of test results to make predictions and set up a further comparative fair test.**
* **I can report findings from enquiries in a range of ways.**
* **I can explain a conclusion from an enquiry.**
* **I can explain causal relationships in an enquiry.**
* **I can relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.**
* **Read, spell and pronounce scientific vocabulary accurately.**
 |
| **LIVING THINGS AND THEIR HABITATS. ANIMALS INCLUDING HUMANS*** describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
* describe the life process of reproduction in some plants and animals.

describe the changes as humans develop to old age.**Key Assessment:****Living things and their habitats*** **I can describe the life cycle of different living things, e.g. mammal, amphibian, insect bird.**
* **I can describe the differences between different life cycles.**
* **I can describe the process of reproduction in plants.**
* **I can describe the process of reproduction in animals.**

**Animals, including humans*** **I can create a timeline to indicate stages of growth in humans.**
 | * Pupils should study and raise questions about their local environment throughout the year.
* They should observe life- cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment.
* They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.
* Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.
* Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences.
* They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs.
* They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.
* Pupils should draw a timeline to indicate stages in the growth and development of humans.
* They should learn about the changes experienced in puberty.
* Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.
 | Talk by local farmer? Vet? Animal breeder? Link to Geography Topic?* Link to Geography - region in North or south America.
* Contrast with environment in Edlington.

 Topic: |
| **PROPERTIES AND CHNAGES OF MATERIALS.*** 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
* give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
* 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 and the action of acid on bicarbonate of soda. | * Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4.
* They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.
* Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda.
* They should find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.
* **Note:** Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials.
* Pupils might work scientifically by: carrying out tests to answer questions, for example, ‘Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?’
* They might compare materials in order to make a switch in a circuit.
* They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes.
* They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.
 | Independent research projects? **Topic:****Key Assessment:*** **I can compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets).**
* **I can describe how a material dissolves to form a solution; explaining the process of dissolving.**
* **I can describe and show how to recover a substance from a solution.**
* **I can describe how some materials can be separated.**
* **I can demonstrate how materials can be separated (e.g. through filtering, sieving and evaporating).**
* **I know and can demonstrate that some changes are reversible and some are not.**
* **I can explain how some changes result in the formation of a new material and that this is usually irreversible.**
* **I can discuss reversible and irreversible changes.**
* **I can give evidenced reasons why materials should be used for specific purposes.**
 |
| **EARTH AND SPACE.*** describe the movement of the Earth, and other planets, relative to the Sun in the solar system
* describe the movement of the Moon relative to the Earth
* describe the Sun, Earth and Moon as approximately spherical bodies
* use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.
 | * Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night.
* Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a ‘dwarf planet’ in 2006).
* They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).
* **Note:** Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.
* Pupils should find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.
* Pupils might work scientifically by: comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.

**Key Assessment:*** **I can describe and explain the movement of the Earth and other planets relative to the Sun.**
* **I can describe and explain the movement of the Moon relative to the Earth.**
* **I can explain and demonstrate how night and day are created.**
* **I can describe the Sun, Earth and Moon (using the term spherical).**
 | Use large ball and the children to demonstrate movement of Earth in solar system. 1 in middle with large ball and others at distance away showing how they orbit.Sun large football, Earth small ball, moon a marble.* Link with history – first man on the moon
* European Space Station project.
* First Britain in the space station.

 Topic: |
| **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.
 | * Pupils should explore falling objects and raise questions about the effects of air resistance.
* They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.
* They should experience forces that make things begin to move, get faster or slow down.
* Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel.
* Pupils should explore the effects of levers, pulleys and simple machines on movement.
* Pupils might find out how scientists, for example, Galileo **Galilei and Isaac Newton helped to develop the theory of gravitation.**
* Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective.
* They might explore resistance in water by making and testing boats of different shapes.
* They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.

**Key Assessment:*** **I can explain what gravity is and its impact on our lives.**
* **I can identify and explain the effect of air resistance.**
* **I can identify and explain the effect of water resistance.**
* **I can identify and explain the effect of friction.**
* **I can explain how levers, pulleys and gears allow a smaller force to have a greater effect.**
 | possible link to DTmake aeroplanes, parachutes, paper boats – possible use of FU water tanks.* Link to vehicles modern and historical. Why can cars travel faster today?
* How did the British cycling team ride much faster than all other countries in the Olympics?

 Topic:  |

**Year 6**

|  |  |  |
| --- | --- | --- |
| Statutory requirements ( National curriculum) | Key Assessment Criteria | Identified topic for Coverage of Content and Skills (Suggested Ideas included) |
| **WORKING SCIENTIFICALLY*** planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
* taking measurements, choose their own 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 and line bar and graphs
* using test results to make predictions to set up further comparative and fair tests. Year 6 to be able to decide for themselves.
* 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 or arguments.
 | * Pupils in years 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.
* These opportunities for working scientifically should be provided across years 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.
 | **Key Assessment:*** **I can plan different types of scientific enquiry.**
* **I can control variables in an enquiry.**
* **I can measure accurate and precisely using a range of equipment.**
* **I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**
* **I can use the outcome of test results to make predictions and set up a further comparative fair test.**
* **I can report findings from enquiries in a range of ways.**
* **I can explain a conclusion from an enquiry.**
* **I can explain causal relationships in an enquiry.**
* **I can relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory.**
* **Read, spell and pronounce scientific vocabulary accurately.**
 |
| **LIVING THINGS AND THEIR HABITATS.*** describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
* give reasons for classifying plants and animals based on specific characteristics.
 | * Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail.
* They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided.
* Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals).
* They should discuss reasons why living things are placed in one group and not another.
* Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment.
* They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

**Key Assessment:*** **I can classify living things into broad groups according to observable characteristics and based on similarities & differences.**
* **I can describe how living things have been classified.**
* **I can give reasons for classifying plants and animals in a specific way.**
 | Charles Waterton – Wakefield Museum* **Link with Ict inorder to classify living things.**
* **Provide a range of examples to show different ways of classification.**
* **link to Geography study of place.**

 **Topic:** |
| **ANIMALS INCLUDING HUMANS.*** identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
* recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function describe the ways in which nutrients and water are transported within animals, including humans.
 | * Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function.
* Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.
* Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.
* Link to famous Scientists / current research on cancer etc.

**Key Assessment:*** **I can identify and name the main parts of the human circulatory system.**
* **I can describe the function of the heart, blood vessels and blood.**
* **I can discuss the impact of diet, exercise, drugs and life style on health.**
* **I can describe the ways in which nutrients and water are transported in animals, including humans.**
 | School Nurse / Police visit to discuss use of drugs both ones used to help us and those that are illegal. Topic: |
| **Evolution and Inheritance:*** recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
* recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
* identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

**Key Assessment:*** **I can describe how the earth and living things have changed over time.**
* **I can explain how fossils can be used to find out about the past.**
* **I can explain about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents).**
* **I can explain how animals and plants are adapted to suit their environment.**
* **I can link adaptation over time to evolution.**
* **I can explain evolution.**
 | * Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time.
* They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles.
* They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes’ necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.
* **Note:** At this stage, pupils are not expected to understand how genes and chromosomes work.
* Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels.
* They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.
 |  Link could be made to habitats and how living things have changed.Linsk to environment and study of different locality in Geography.Link to RE – from the perspective of different religions. Topic: |
| **LIGHT*** recognise that light appears to travel in straight lines
* use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
* explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
* use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
 | * Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows.
* They should talk about what happens and make predictions and create their own investigations.
* Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works.
* They might investigate the relationship between light sources, objects and shadows by using shadow puppets.
* They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).
* They may explore the work of Isaac Newton linked to colour in light – prism
 | **Key Assessment:*** **I can explain how light travels.**
* **I can explain and demonstrate how we see objects.**
* **I can explain why shadows have the same shape as the object that casts them.**
* **I can explain how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.**
 |
| **ELECTRICITY.*** associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
* 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
* use recognised symbols when representing a simple circuit in a diagram.
 | * Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols.
* **Note:** Pupils are expected to learn only about series circuits, not parallel circuits.
* Pupils should be taught to take the necessary precautions for working safely with electricity.
* Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.
* Ensure that all scientific ways of representing electric circuits are covered.

**Key Assessment:*** **I can explain how the number & voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer.**
* **I can compare and give reasons for why components work and do not work in a circuit.**
* **I can draw circuit diagrams using correct symbols.**
 | **Link to D&T / ICT.** **Independently research incorporated into the project.** **Topic:** |