

Faldingworth Community Primary and Normanby by Spital Primary Schools

Fair Acres Federation

Science Progression Document

Intent

Across the Fair Acre Federation, it is our intent to provide a high quality Science education so that our children have a wide range of opportunities to develop their science knowledge and skills enabling them to think as scientists.

Science is taught in EYFS, Key Stage 1 and 2. In line with the 2014 National Curriculum. Our aim is to provide a high-quality science education which provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. The curriculum will teach children key knowledge about:

- plants; animals including humans;
- everyday materials;
- seasonal changes;
- living things and their habitats;
- rocks; light;
- forces and magnets;
- states of matter;
- sound;
- electricity;
- Earth and space;
- evolution and inheritance.

Learners will also have the opportunity to gain an understanding of the skills needed to work scientifically. The knowledge of these scientific skills will be delivered progressively through all science lessons and year groups.

The objectives within each strand support the development of learning across the key stages, ensuring a solid grounding for future learning and beyond. The science curriculum at the Fair Acres Federation, is driven by real life application and a curiosity about the world in which we live.

Implementation

Our children will be taught Science in a way that ensures progression of the knowledge and skills set out in the National Curriculum (2014), and follows a sequence built on previous learning. Teachers use our progression of knowledge and skills document to plan their science lessons. This ensures that the knowledge and skills taught are progressive from year group to year group.

At The Fair Acres Federation, science is carefully planned to excite and engage all learners. This ensures children are able to develop depth in their knowledge and skills over the duration of each of their science topics. Teachers then allow opportunities to revisit these areas during ‘Spaced learning’ sessions, to assess what the children retain, and also to build on prior knowledge. Teachers use the Federation planning progression documents as a starting point for their planning and science is taught as a discrete lesson weekly. Where possible it is linked to engaging contexts in other subjects and topics using cross curricular connections. Employing cross-curricular links motivates pupils and supports them to make connections and remember the steps they have been taught.

Due to the nature of our mixed age classes, children get the opportunity to ‘revisit’ knowledge, often building upon what they know, constantly making links between old and new knowledge. The long and mid-term plans are designed to ensure that they allow a consistent evolution of skills across mixed year groups. Knowledge Organisers allow the children an overview of what they will be learning, key facts and vocabulary and any useful diagrams which may aid their learning. Learning in science may be recorded in their science exercise books, photos, computer work or presentation.

Impact

Our approach to the curriculum results in a fun, engaging, and high-quality science education. The quality of children’s learning is evident in their class books (both discrete science and cross curricular) where pupils can share and evaluate their own work, as well as that of their peers. Feedback is given to the children as soon as possible, and marking work will follow the school’s marking policy. We measure the impact of our curriculum through the following methods:

- Assessing children’s understanding of topic linked vocabulary before and after the unit is taught.
- Images and videos of the children’s practical learning/learning walks and observations.
- POP tasks (proof of progression)/comparative judgement

- Interviewing the pupils about their learning (pupil voice).
- Moderation staff meetings where pupil's work is scrutinised and there is the opportunity for a dialogue between teachers to understand their class's work.
- Annual reporting of standards across the curriculum.
- Action planning for progress

Science blocking – when do we teach each aspect of science?

To allow for our mixed year classes, science has been blocked 'mapped out' in a two-year cycle to allow all children to experience the coverage of a full curriculum. We follow the progression map, which can be found at the end of this document to ensure that skills are taught in a logical order. Due to the nature of both of our federation schools having a different combination of year groups in each class, two different blocking systems have been produced. These cover a split R/1, Y2/3 and Y4/5/6 or a R/Y1/2, Y3/4 and Y5/6 combination.

Blocking for a Y1/Y2, Y3/4 and Y5/6 is found below:

Year 1/2 science blocking (Faldingworth) Cycle A

Y1/2	Week 1-6/7	Week 1 -6/7
	I know that/ I know how to:	I know that/ I know how to:
1A	<u>Animals including humans</u> -Notice that animals, including humans, have offspring which grow into adults. - Identify, name, draw and label the basic parts of the human body and say which of the body is associated with each sense -Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) <u>Working scientifically skills:</u> - Ask simple questions and recognise that they can be answered in different ways. - Observe closely, using simple equipment. - Identify and classify. - Use their observations and ideas to suggest answers to questions. - Gather and record data to help answer questions	<u>Everyday materials</u> - 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. -Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses <u>Working scientifically skills:</u> -Ask simple questions and recognise that they can be answered in different ways. -Observe closely, using simple equipment -Identify and classify. -Use their observations and ideas to suggest answers to questions.
2A	<u>Living things and their habitats</u> -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. <u>Working scientifically skills:</u> -Ask simple questions and recognise that they can be answered in different ways. -Observe closely, using simple equipment -Perform simple tests. -Identify and classify. -Use their observations and ideas to suggest answers to questions. -Gather and record data to help answer questions.	<u>Seasonal Changes – focus on temperature and rainfall</u> -Observe changes across the four seasons. - i-Observe and describe weather associated with the seasons and how day length varies. -Observe changes in temperature and rainfall. <u>Working Scientifically skills:</u> -Ask simple questions and recognise that they can be answered in different ways. -Observe closely, using simple equipment. -Perform simple tests. -Use their observations and ideas to suggest answers to questions. -Gather and record data to help answer questions.
3A	<u>Plants</u> -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. -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. <u>Working scientifically skills</u> -Ask simple questions and recognise that they can be answered in different ways. -Observe closely, using simple equipment. -Identify and classify	<u>Animals including humans</u> -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. Ask simple questions and recognise that they can be answered in different ways. Use observations and ideas to suggest answers to questions.

Year 1/2 science blocking (Faldingworth) Cycle B

Y1/2	Week 1-6/7	Week 1-6/7
	I know that/ I know how to:	I know that/ I know how to:
1B	<u>Seasonal changes – focus on light levels and wind</u> -Observe changes across the four seasons. -Observe and describe weather associated with the seasons and how day length varies. <u>Working scientifically skills:</u> -Ask simple questions and recognise that they can be answered in different ways. -Observe closely, using simple equipment. -Perform simple tasks. -Use their observations and ideas to suggest answers to questions. -Gather and record data to help in answering questions.	<u>Animals including Humans</u> -Identify, name a variety of common animals including fish, amphibians, reptiles, birds, 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. <u>Working scientifically skills:</u> - Ask simple questions and recognise that they can be answered in different ways. - Observe closely, using simple equipment. - Use their observations and ideas to suggest answers to questions. - Gather and record data to help answer questions.
2B	<u>Everyday Materials – materials for purpose</u> -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. -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. <u>Working Scientifically skills:</u> -Ask simple questions and recognise that they can be answered in different ways. -Observe closely, using simple equipment. -Perform simple tests. -Identify and classify. -Use their observations and ideas to suggest answers to questions. -Gather and record data to help answer questions.	<u>Plants</u> -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. -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. <u>Working scientifically skills:</u> -Ask simple questions and recognise that they can be answered in different ways. -Observe closely, using simple equipment. -Use their observations and ideas to suggest answers to questions. -Gather and record data to help answer questions.
3B	<u>Everyday Materials – Changes (ice, heating, melting materials)</u> -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. 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 <u>Working scientifically skills:</u> . Ask simple questions and recognise that they can be answered in different ways. -Observe closely, using simple equipment. -Perform simple tests. -Use their observations and ideas to suggest answers to questions. -Gather and record data to help in answering questions.	<u>Living things and their habitats</u> -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. <u>Working scientifically skills:</u> -Ask simple questions and recognise that they can be answered in different ways. -Use their observations and ideas to suggest answers to questions -Observe closely, using simple equipment. -Identify and classify.

Year 3/4 science blocking (Faldingworth) Cycle A

Y3/4	Week 1-6/7	Week 1 -6/7
	I know that/ I know how to:	I know that/ I know how to:
1A	<u>Forces and Magnets</u> -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 <u>Working scientifically</u> -Set up simple practical enquiries and comparative and fair tests. -Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment. -Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. -Use straightforward scientific evidence to answer questions or to support their findings.	<u>Animals including humans – diet and fitness</u> -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. <u>Working scientifically skills:</u> -Gather, record, classify and present data in a variety of ways to help answer questions. -Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. -Use straightforward scientific evidence to answer questions or to support their findings-pattern seeking enquiry. -Setup simple practical enquiries and comparative and fair tests. -Make systematic and careful observations and, where appropriate, take accurate measurements using standard units.
2A	<u>Living things and their habitats</u> -Recognise that living things can be grouped in a variety of ways (plants and animals) -Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. <u>Working scientifically skills:</u> -Ask relevant questions and use different types of scientific enquiries to answer them. -Identify differences, similarities or changes related to simple scientific ideas and processes. -Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment. -Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. -Gather, record, classify and present data in a variety of ways to help answer questions. -Identify differences, similarities or changes related to simple scientific ideas and processes. -Set up simple practical enquiries and comparative and fair tests.	<u>States of Matter</u> -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. <u>Working scientifically skills:</u> -Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. -Gather, record, classify and present data in a variety of ways to help answer questions. -Ask relevant questions and use different types of scientific enquiries to answer them. -Use straightforward scientific evidence to answer questions or to support their findings. -Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. -Identify differences, similarities or changes related to simple scientific ideas and processes.
3A	<u>Plants - reproduction</u> -Explore the part that flowers play in the life cycle of flowering plants -Discover the essential role of bees and other insects in the pollination of flowers -Use classification skills to sort fruits into different types and learn the many different ways that seeds can be dispersed <u>Working scientifically skills:</u> -Make systematic and careful observations. -Record findings using simple scientific language, drawings and labelled diagrams. -Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. -Use straightforward scientific evidence to answer questions or to support their findings.	<u>Sound</u> -Identify how sounds are made, associating some of them with something vibrating. -Find patterns between the volume of a sound and the strength of the vibrations that produced it. -Recognise that vibrations from sounds travel through a medium to the ear. -Recognise that sounds get fainter as the distance from the sound source increases. -Find patterns between the pitch of a sound and features of the object that produced it. <u>Working scientifically skills:</u> -Ask relevant questions and use different types of scientific enquiries to answer them. -Set up simple practical enquiries and comparative and fair tests. -Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Year 3/4 science blocking (Faldingworth) Cycle B

Y3/4	Week 1-6/7	Week 1-6/7
	I know that/ I know how to:	I know that/ I know how to:
1B	<u>Rocks</u> 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. <u>Working scientifically skills:</u> -Set up simple practical enquiries and comparative and fair tests. -Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. -Use straightforward scientific evidence to answer questions or to support their findings -Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	<u>Light</u> 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 an opaque object. Find patterns in the way that the size of shadows change <u>Working scientifically skills:</u> -Ask relevant questions and using different types of scientific enquiries to answer them. -Making systematic and careful observations. -Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. -Gather, record, classify and present data in a variety of ways to help answer questions. -Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
2B	<u>Living things and their habitats</u> Recognise that environments can change and that this can sometimes pose dangers to living things Recognise that animals are adapted to live in their own habitats Identify ways in which climate change is having an impact on certain environments. Discover how we can help protect the habitats of animals and our environments. <u>Working scientifically skills:</u> -Make systematic and careful observations and, where appropriate, take accurate measurements. -Gather, record, classify and present data in a variety of ways to help answer questions. -Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. -Identify differences, similarities or changes related to simple scientific ideas and processes.	<u>Plants – what they need to grow</u> - 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 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. <u>Working scientifically skills</u> Ask relevant questions and use different types of scientific enquiries to answer them. Set up simple practical enquiries and comparative and fair tests. Make systematic and careful observations and, where appropriate, take accurate measurements using standard units. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.
3B	<u>Electricity</u> -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 <u>Working scientifically</u> 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.	<u>Animals including humans</u> -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 -Identify the different types of teeth in humans and their simple functions <u>Working scientifically skills:</u> -Asking relevant questions and using different types of scientific enquiries to answer them -Identifying differences, similarities or changes related to simple scientific ideas and processes -Making systematic and careful observations (of their teeth) -Identifying differences, similarities or changes related to simple scientific ideas and processes -Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions -Identifying differences, similarities or changes related to simple scientific ideas and processes

Year 5/6 science blocking (Faldingworth) Cycle A

Y5/6	Week 1-6/7	Week 1 -6/7
	I know that/ I know how to:	I know that/ I know how to:
1A	<u>Living things and their habitats – reproductions and life cycles</u> -Describe the life process of reproduction in some plants and animals -Describe the differences in the life cycles of an amphibian and an insect -Describe the differences in the life cycles of a mammal and a bird -Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird -Learn about some significant naturalists and animal behaviourists <u>Working scientifically skills</u> - Recording data and results of increasing complexity using scientific diagrams and labels -Identifying scientific evidence that has been used to support or refute ideas or arguments -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	<u>Properties of materials</u> -Compare and group together everyday materials on the basis of their properties, including their hardness, transparency, and conductivity (electrical and thermal) -Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic -Investigate thermal insulators and conductors <u>Working scientifically skills:</u> -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
2A	<u>Animals including humans – The human body</u> - Describe the changes as humans develop to old age - Explore gestation periods, foetal development and growth patterns - Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function - Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood - Describe the ways in which nutrients and water are transported within animals, including humans <u>Working scientifically skills</u> -Taking measurements, using a range of scientific equipment, with increasing accuracy & precision -Recording data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs -Reporting and presenting findings from enquiries, including causal relationships, in written forms such as displays -Identifying scientific evidence that has been used to support or refute ideas or arguments	<u>Light</u> -Recognise that light appears to travel in straight lines -Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them -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 <u>Working scientifically skills:</u> - 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 results using scientific diagrams and labels, tables, scatter graphs, bar and line graphs - 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
3A	<u>. Animals including humans – micro-organisms and medicine</u> -Explore how understanding the life cycle of insects can help science treat, cure and even eradicate diseases -Describe the differences in the life cycles of insects - Describe the life process of reproduction in insects -Understand the basic differences between bacteria and viruses, how they might be contracts and how to prevent them. - Understand about vaccinations and their use <u>Working scientifically skills</u> -Recording data using scientific diagrams and labels -Reporting and presenting findings from enquiries in written forms -Identifying scientific evidence that has been used to support or refute ideas or arguments	<u>Electricity</u> -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 -Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit -Investigate the use motors, switches, bulbs and buzzers. <u>Working scientifically skills:</u> -Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary -Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms -Identifying scientific evidence that has been used to support or refute ideas or arguments

Year 5/6 science blocking (Faldingworth) Cycle B

Y5/6	Week 1-6/7	Week 1-6/7
	I know that/ I know how to:	I know that/ I know how to:
1B	<u>Properties of materials – mixtures</u> -Compare and group together everyday materials on the basis of their solubility properties -Know that some materials will dissolve in liquid to form a solution -Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating -Demonstrate that dissolving, mixing and changes of state are reversible -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 the action of acid on bicarbonate of soda. 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 <u>Working scientifically skills</u> -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, tables and graphs	<u>Living things and their habitats – classification</u> -Know who Linnaeus was and learn about his classification system -Describe how living things are classified into broad groups according to common observable characteristics & based on similarities & differences, including microorganisms, plants & animals -Give reasons for classifying plants and animals based on specific characteristics - To develop classification keys -To test out classification key, noting different approaches and identifying potential flaws -To describe the key characteristics of unusual living things from around the world <u>Working scientifically skills</u> -planning different types of scientific enquiries to answer questions -Recording results of increasing complexity using scientific diagrams & labels, & classification keys -Reporting & presenting findings from enquiries, including conclusions, in oral and written forms -Identifying scientific evidence that has been used to support or refute ideas or arguments
2B	<u>Earth and space</u> -Describe the movement of Earth, & 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. -Track the Earth’s movement by observing and measuring shadows -Use photos as a scientific source to identify features on the moon -Research the effect the moon has on the Earth’s tides <u>Working scientifically skills:</u> 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 tables and bar graphs Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms Identifying scientific evidence that has been used to support or refute ideas or arguments	<u>Evolution and inheritance</u> -Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents -Recognise that living things have changed over time -Identify how animals & plants are adapted to suit their environment in different ways & that adaptation may lead to evolution -Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. <u>Working scientifically skills</u> -Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms -Identifying scientific evidence that has been used to support or refute ideas or arguments -Identifying scientific evidence that has been used to support or refute ideas or arguments
3B	<u>Forces</u> -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 friction, that acts between moving surfaces -Identify the effects of water resistance, that acts between moving surfaces -Recognise that some mechanisms, including levers and pulleys, allow a smaller force to have a greater effect -Recognise that gear mechanisms allow a smaller force to have a greater effect -Identify the effects of friction, that acts between moving surfaces <u>Working scientifically skills</u> -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, 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	<u>Real life science</u> Discover famous scientists living today Learn about jobs that involve science Case study on David Attenborough or Mae Jemison (first black woman in space)

Science knowledge and vocabulary progression at The Fair Acres Federation

	Nursery	Reception	KS1		KS2			
P L A N T S	Know some names of plants. Begin to say how they are different from each other. Start to describe the features of plants.	Identify and name a variety of common wild and garden plants. Identify and describe the basic structure of plant.	Identify and name a variety of common plants (including garden plants, wild plants and trees and those that are classified as deciduous and evergreen). Describe basic structure of common plants (including root, stem, leaves and flowers).	Observe and describe how seeds and bulbs grow into mature plants. Describe how plants need water, light, and suitable temp to grow and stay healthy.	Identify/describe the functions of different parts of flowering plants (inc. roots, stem/trunk, leaves and flower). Identify requirements of plants for life and growth and how they vary from plant to plant (air, light, water, nutrients from soil and room to grow). Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants (inc. pollination, seed formation and seed dispersal).	N/A	N/A	N/A (reproduction of plants see living things and their habitats)
Plants Vocabulary			Common tree - deciduous blossom, petals, root, wild plants evergreen, trunk stem garden plants branches, leaf, root fruit deciduous vegetables evergreen plant - leaf, root, bulb leaves, bud, flowers seed	water grow reproduction light healthy suitable temperature germination	structure - flowering plants roots, stem/trunk, leaves, flowers requirements for life and growth - air, light, water, nutrients from soil, room to grow function - nutrients, support, reproduction makes its own food needs vary, fertiliser life cycle - flowers pollination, seed formation, seed dispersal			
A N I M A L S I N C H U	Observe and describe features of animals and plants. Know that animals and plants are living Say how animals and plants are different.	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	Identify/name a variety of animals that are birds, fish, amphibians, reptiles, mammals and invertebrates. Identify and name a variety of carnivores, herbivores & omnivores. Describe/compare the body parts of common animals (inc. fish, reptiles, amphibians, birds, mammals and pets). Identify, name and draw basic parts of human body and relate to senses.	Understand that animals, including humans, have offspring that grow into adults. Find out and describe the basic needs of animals for survival (water, food, air). Describe the importance of exercise, eating the right amounts of food and hygiene for humans.	Identify and describe how animals, including humans, need the right types and amounts of nutrients, that they cannot make their own food but that they get nutrients from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Describe the simple functions of the basic parts of the digestive system in humans. Identify different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators, prey, herbivores, carnivores and omnivores. Explain how a feeding relationship occurs in a variety of habitats. Recognise the impact of diet, drugs and lifestyle on the way bodies function. Ongoing through PHSE and science	Describe the changes as humans develop to old age. 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, drugs and lifestyle on the way bodies function. Ongoing through PHSE and science Describe the way in which nutrients and water are transported within animals including humans.	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 adopted to suit their environment in different ways and that adaptation may lead to evolution. Recognise the impact of diet, drugs and lifestyle on the way bodies function. Ongoing through PHSE and science

M A N S		with each sense						
			Common animals Fish Amphibians Reptiles Birds Mammals Pets CARNIVOURES – Meat, cat, dog, lion, tiger, fox, shark, killer whale, eagle, hawk, snake T-rex HERBIVOURES – Plants, cow, hamster, guinea pig tortoise, triceratops OMNIVOURES – Meat and plant, badger, human, bear, chicken, PARTS OF BODY – Head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth	Offspring, grow, adult, nutrition, reproduction SURVIVAL – Water, food, air, exercise, hygiene, egg-chick-chicken, Egg-caterpillar-pupa-butterfly Spawn-tadpole-frog Lamb-sheep Baby-toddler-child-teenager- adult	Nutrition, vitamins, minerals, fat, protein, carbohydrates, fibre, water, SKELETONS – Support, protection, skull – brain Ribs – heart lungs, movement, joint MUSCLES – Movement, pull, contract, relax, diet	HUMAN DIGESTIVE SYSTEM – Mouth, tongue – mixes, moistens, saliva Teeth – incisors – cutting, slicing Canines – ripping, tearing Molars – chewing, grinding Oesophagus, transports, stomach, acids, enzymes, small intestine – absorbs Large intestine – compacts Brush, floss, food chain, sun, predator, prey, producers	Human development Puberty, gestation, length, mass, grows, growing	HUMAN INTERNAL ORGANS – heart, lungs, liver, kidney, brain, skeletal, skeleton, muscle, muscular, digest, digestion, digestive, HUMAN CIRCULATORY SYSTEM – heart, blood vessels, veins, arteries, capillaries Diet, exercise, drugs, lifestyle, nutrients, alcohol, substance
L I V I N G T H I N G S	Talk about the features of their immediate environment Say how environments vary from one to another	Observe changes across the four seasons. observe and describe weather associated with the seasons and how day length varies.	N/A	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 that they are suited to. 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 (inc. micro-habitats). Describe how animals get their food from plants and other animals (simple food chain). Identify and name different sources of food.	N/A	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 the local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things.	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life processes of reproduction in some plants and animals.	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences (inc. micro- organisms, plants and animals).

Living things and their habitats vocabulary				Living, dead, never alive, habitats, micro-habitats, food, food chain, alive, healthy, shelter, seashore, woodland, ocean, rainforest, conditions, hot/warm/cold Dry/damp/wet Bright/shade/dark		Environment, reptiles, birds, mammals, amphibians INVERTABRATES – snails, slugs, worms, spiders, insects PLANTS – flowering including grasses, non-flowering including moss HUMAN IMPACT Nature reserves, ecologically planned parks, garden ponds, population increase, litter, deforestation	LIFE CYCLES – mamals, amphibian, insect, birds Life processes of reproduction – plants and animals Vegetable garden, flower boarders, animal naturalists – David Attenborough Animal behaviousists – Jane Goodhall Reproduction – plants Sexual and A-sexual LIFECYCLES AROUND THE WORLD Rainforests, oceans, deserts, prehistoric, similarities, differences	Micro organisms, plants, animals, classification, Scientists – Carl Linnaeus
M A T E R I A L S	Begin to say similarities and differences between materials.	D	N/A 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.	Identify and compare the suitability of a variety of everyday materials (inc. wood, metal, plastic, glass, brick, rock, paper, cardboard) for certain uses.	Rocks Compare/group rocks on their physical properties. Relate simple physical properties of some rocks to their formation (igneous/sedimentary) Describe how fossils are formed. Recognise that soils are made from rocks and organic matter to form igneous, sedimentary and metamorphic rock.	States of matter Compare and group materials into solids, liquids and gases. Observe and explain that some materials change state when heated/cooled and measure temp in degrees Celsius. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Explain how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.	Properties and changes of materials Compare/group material based on comparative tests and fair tests (incl. hardness, solubility, conductivity and insulation, behavior with magnets). Give reasons, based on evidence from comparative and fair tests, for the particular use of everyday materials (inc. wood, metal and plastic) Explain how 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 describe how mixtures might be separated (inc. through filtering, sieving and evaporating). 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 (inc. changes associated with burning and action of acid on bicarbornate of soda).	Find own ways of classifying materials according to their properties. Explain reasons and design products suitable for use which demonstrate these features Plan, test, evaluate and conclude using research to back up ideas involving tests looking at changes of state.
Materials vocabulary			MATERIAL – wood, plastic, glass, metal, water, rock PROPERTIES – hard, soft, stretchy, stiff, shiny, dull,	wood, metal, plastic, glass, brick, rock, paper, cardboard, squashing, bending, twisting, stretching	Appearance, physical properties PROPERTIES – hard/ soft Stretchy/ dull/shiny/rough/smooth/absorbent /not absorbent	Soild, melt, freeze, liquid, freeze, evaporate, condense, gas, container CHANGING STATE	PROPERTIES – hardness, solubility, transparency, conductive (electrical and thermal) response to magnets	

			rough, smooth, bendy, not bendy, waterproof, non waterproof, absorbent, not absorbent Brick, paperm fabrics, elastics, foil	METAL – coins, cans, cars, table, legs WOOD – matches, floors, telegraph SPOON – plastic, wood, metal JOHN DUNLOP- rubber CHARLES MACINTOSH – waterproof	FOSSILS – sedimentary rock Soils – rock, organic matter, Uses – buildings, grave stones, grains, crystals	Chocolate, butter, cream, heat, heat, cooled, cool, degrees Celcius, thermometer WATER CYCLE – Evaporate, evaporation, condense, condensation, temperature, water vapour	DISSOLVE – liquid, solution, separate, separating SOLIDS< LIQUIDS< GASES – filetering, sieving, evaporating REVERSIBLE CHAGES – dissolving, mixing, evaporation, filerting, sieving, melting IRREVERSIBLE – new material, burning, rusting Magnetism Chemists – Spencer Silver, Ruth Benerito QUANTITIVE Measurements – conductivity, insulation chemical	
L I G H T S O U N D	N/A	N/A	N/A	Light Identify/name sources of light Explain what darkness is. Compare a variety of sources of light. Describe the features of day and night. Describe the movement of the sun across the sky.	Light Understand that light is reflected from surfaces. Recognise that shadows are formed when the light from a light source is blocked by a solid object. Investigate and find patterns in the way the size of a shadow changes.	Sound Identify and name 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.	N/A	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 of from light sources to objects and then our eyes. Using the idea that light travels in straight lines, explain why shadows have the same shape as the object that cast them. Explain that light can be broken into colours and different colours can be combined to appear as a new colour.
			Light, see, dark, reflect, natural, star, sun, moon, artificial, tource, candle, lamp Shadow, blocked, solid, sunlight, dangerous, protect eyes		Light, see, dark, reflect, natural, star, sun, moon, artificial, tource, candle, lamp Shadow, blocked, solid, sunlight, dangerous, protect eyes	Ear drum, vibrating, pitch, volume, straight lines, travel through air and other materials, sound source, fainter, louder, object		travels in straight lines, light source, object, shadow, rainbow, filter, reflect, reflection, mirrors, periscope
S P A C E	N/A	N/A	N/A	N/A	N/A	Explain that the sun is the centre of our solar system. Discuss and understand the terms star, galaxy, milky way and universe. Identify the four seasons and link this to changes in sunlight and weather. Beg Begin to understand the movement of the earth around	Describe the movement of 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	Revisit the previous years objectives and extend to knowledge of the planets of our solar system and their features.

						the sun and the moons movement around the earth.	night and the apparent movement of the sun across the sky.	
						Earth, Sun, Moon, planets, star, solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, dwarf planet, movement, rotate, orbit, axis, sphere, day, night, light, heat, universe, solar	Celestial body, spherical, sphere, eclipse, satellite, astronomer - Ptolemy, Copernicus Sundial, shadow clock	
F O R C E S M A G N E T S	N/A	N/A	N/A	Describe how things move at different speeds, speed up and slow down.	Compare how things move on different surfaces (friction). Understand that some forces need contact between two objects and that magnetic forces can act at a distance. Explain the force of gravity. Explore push and pulls as a force. Magnets Describe how magnets have two poles - one that attracts and one that repels. Predict and observe how magnets attract or repel each other and attract some materials and not others, depending on which poles are facing. Investigate the magnetic materials and know that magnets can work through materials.	Explain that unsupported objects fall towards the Earth because of the force of gravity (drag force). Identify mechanisms which use forces Design and make a game that uses magnets.	Explain that unsupported objects fall towards the Earth because of the force of gravity (drag force). Identify the effect of gravity, air resistance, water resistance and friction that act between moving surfaces. Know how to measure the size of a force using newtons. Recognise that some mechanisms (inc. levers, pulleys and gears) allow a smaller force to have a greater effect.	Plan fair experiments which rpve the existence of gravity and air resistance and ho they effect each other. Design and make a lever which allows a small force to have a bigger effect.
				Forces, push, pull, fast, slow, speed up, twist, bend, squeeze, strech	Direction, friction, ramp, rough, distance, slope, friction, gravity, twist, vehicle, fast, faster, fastest, slow, slower, slowest, magnet, magnetic, magnetism, attract, repel, stick, materials	Mechanisms drag force	Gravity, air resistance, water resistance, friction, surface, force, effect, move, accelerate, decelerate, stop, change direction, brake, mechanism, pulley, gear, spring, theory of gravity, Galileo Galilei Isaac Newton	
E L E C T R	N/A	N/A	N/A	N/A		Identify common appliances that run on electricity. Understand how electricity is generated and how it gets to our homes Construct a simple series circuit, identifying and naming its basic parts (inc. batteries, wires, bulbs, switches and buzzers). Recognise that a switch opens and closes a circuit and associate this with whether or	Understand the different ways that electricity is generated. What is a generator? Construct a simple parallel circuit, identifying and naming its basic parts (inc. batteries, wires, bulbs, switches and buzzers). Design an experiment which tests the conductivity of materials	Compare methods of electricity production using secondary sources and own knowledge. Associate the brightness of a lamp or the volume of a buxxer and the voltage of batteries (cells) used in the circuit.

I C I T Y						not a lamp lights in a simple circuit. Recognise that some common conductors and insulators and associate metals with being good conductors.		Compare and give reasons for variations in how components function (inc. the brightness of a bulb, loudness of buzzers and position of on/off switches). Use recognised symbols when representing a simple circuit diagram knowing the names of all components. Identify what causes a short circuit or a circuit to fuse.
						Appliances, electricity, electrical circuit, cell. Wire, danger, bulb, buzzer, electrical safety, sign, insulators, wood, rubber, plastic, glass, conductors, metal, water, switch, opem, closede	Generator, simple circuit, parallel circuit, Conductivity, solar, nuclear, hydro, coal, renewable, fossil fuels	Voltage Brightness, volume, switches, circuit diagram, symbols
Working Scientifically (to be delivered through teaching of subject content and not to be taught separately)	N/A	Ask simple questions and recognising that they can be answered in different ways. Observe closely, using simple equipment. Perform simple tests. Identifying and classifying. Use observations and ideas to suggest answers to questions. Gather and record data to help in answering questions.	Ask simple questions and recognising that they can be answered in different ways. Observe closely using simple equipment. Perform simple tests and evaluate the findings. Identify and classify. Record findings: drawings, diagrams, photographs, simple prepared formats, such as tables and charts, tally charts and displays.	Observe closely using simple equipment. Perform simple tests, make predictions, measure and evaluate findings. Identify and classify. Record findings: drawings, diagrams, photographs, simple prepared formats, such as tables and charts, tally charts and displays.	Ask relevant questions using different types of scientific enquiries to answer. Set up simple practical enquiries, comparative and fair tests. Begin to make accurate measurements using standard units (inc. data loggers). Record findings using simple scientific language, drawings, labeled diagrams, bar charts and tables. Report findings from investigations including written explanations of results and conclusions, displays or presentations. Use results to draw simple conclusions and suggest improvements and predictions for setting up further tests. Look for similarities and differences or changes in data in order to draw conclusions. Use straightforward scientific language to answer questions or to support findings.	Ask relevant questions using different types of scientific enquiries to answer. Set up simple practical enquiries, comparative and fair tests using a range of equipment. Begin to make accurate measurements using standard units (inc. data loggers and thermometers). Record findings using simple scientific language, drawings, labeled diagrams, bar charts and tables. Report findings from investigations including oral and written explanations of results and conclusions, displays or presentations. Use results to draw simple conclusions, make predictions for new values and suggest improvements. Use straightforward scientific evidence to answer questions or to support findings (using secondary sources).	Plan different types of scientific enquiries to answer questions, including recognizing and controlling variables where necessary. Take measurements, using a range of equipment, with increasing accuracy, taking repeat readings when appropriate. Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative tests. Report and present findings from enquiries, including conclusions, causal relationships and explanations of degrees of trust in tests, in oral and written forms.	Plan different types of scientific enquiries to answer questions, including recognizing and controlling variables where necessary. Take measurements, using a range of equipment, with complete accuracy, taking repeat readings when appropriate. Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Continue to use test results to make predictions to set up further comparative tests. Report and present findings from enquiries, including conclusions, causal relationships and explanations of degrees of trust in tests, in oral and written forms. Identify scientific evidence that has been used to support or refute ideas or arguments.

		Research -question answer observe observing equipment identify classify sort group record - diagram, chart, map data compare, contrast describe biology chemistry physics	research - relevant questions scientific enquiry comparative and fair test systematic, careful observation accurate measurements equipment - thermometer, data logger data - gather, record, classify, present record - drawings, labelled diagrams, keys, bar charts, tables oral and written explanations conclusion predictions differences, similarities, changes evidence improve secondary sources guides, keys construct interpret	plan variables measurements accuracy precision repeat readings report data - scientific diagrams, labels, classification keys, tables, scatter graphs, bar graph and line graphs predictions further comparative and fair test report and present - conclusions, causal relationship, explanations, degree of trust, oral and written display and presentation. evidence - support, refute ideas or arguments identify, classify and describe patterns systematic quantitative measurements
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