Primary

Science

The Rowan Learning Trust

CONTENTS:

Trust Level

Children are matched against 'stage descriptors' (in other words what pupils are expected to know and be able to do in Science for their year group or phase) when being assessed by their teachers in their science lessons. Where appropriate, teachers will provide opportunities for children to embed essential skills acquired in English and Maths within science lessons.

School Level

Assessments will be administered in different ways depending on the school. E.g., gradings offered, end of unit mini assessments, knowledge review weeks, termly or half-termly assessment periods etc.

Schools will assess pupils informally in accordance with the school's guidelines. At school level the specification document for each subject will be supported by the school own planning documents/ portals which also include LTPs, MTPs, schemes of work and associated resources.

Long Term Plans provider leaders, teachers, students and parents with the overview of the learning journey that occurs yearly. These are available on the school website.

Medium Term Plans map the learning for each of the learning focusses of each half term in each year group. These provide detailed information into the steps to facilitate a differentiated approach. This ensures that knowledge and skills are covered. The number of activities / objectives covered may vary dependent on the length of a half term and the frequency of lessons in a given subject.

Schemes of Work may vary from subject to subject allowing the specialists in schools to develop suitable activities and topics ensuring ownership of planning for progress. Please note we do not follow external schemes of work prescriptively. When used, they are merely a starting point. This allows schools the freedom to adapt to the needs of their pupils.

SOW – Guiding Principles

- The school's curriculum is inclusive and meets the needs of all learners
- Knowledge and skills based
- Form part of the 'big picture' e.g., show progression over the 6 years in school
- Provide suggested resources
- Allow for teacher ownership and/or creativity of lessons within the framework of the agreed scheme
- Allow for appropriate differentiation

The National Curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- are equipped with the scientific knowledge required to understand the uses and implications of science today and for the future.

	Objectives
KS1	The principle 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. • be encouraged to be curious and ask questions about what they notice. • 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. • 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. • 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. • should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at KS1.
LKS2	The principle focus of science teaching in lower Key stage 2 is to enable pupils to broaden their scientific view of the world around them. • be encouraged to do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments. • begin to develop their own ideas about function, relationships and interactions. • ask their own questions about what they observe and make their own 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. • draw simple conclusions. • use scientific language, first to talk about, later to write about what they have found out. • should read and spell scientific vocabulary correctly and with confidence using their growing word reading and spelling knowledge.

Objectives	
UKS2	The principle 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. • explore and talk about their ideas. • ask their own questions about scientific phenomena. • analyse functions, relationships and interactions more systematically. • should encounter more abstract ideas and begin to recognise help them to understand and predict how the world operates. • begin to recognise that scientific ideas change and develop overtime. • 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. • draw conclusions based on their data and observations. Use evidence to justify their ideas. • use their scientific knowledge and understanding to explain their ideas. • should read, spell and pronounce scientific vocabulary correctly.

SCIENCE INTENT

The Science curriculum at Farington, aims to provide our pupils with the foundations they need to understand the world in which they live. Our lessons involve a combination of practical experiments and acquisition of key subject knowledge. We provide hands on activities encouraging curiosity, with pupils working scientifically, asking questions and considering how they might solve them through investigation. Children build up a specialist vocabulary, which they use to explain their observations and conclusions.

SCIENCE IMPLEMENTATION

Units of work begin with a starting activity to encourage initial discussions and allow for teachers to assess prior learning. Vocabulary is at the heart of our teaching of Science, with words relating to the topic displayed in the classroom and referred to throughout the unit of work. This vocabulary is on display for the school year and revisited termly. Science lessons at Farington, incorporate a mixture of knowledge acquisition and practical experiments, concluding with a short assessment of the learning which has taken place in that unit.

Each year, classes learn about the impact of a real-life scientist, in relation to a topic they are studying.

Learning is enhanced through visitors to school, including a Science Roadshow for the whole school and the Bright Sparks Electricity Programme.

KS1 take advantage of our outdoor areas to observe changes in nature over time. Pupils classify, identify and observe closely.

LKS2 record data and draw conclusions. Children set up simple practical activities and make comparative and fair tests.

In UKS2, pupils talk about their ideas and ask questions, making suitable predictions. They are encouraged to draw conclusions based on their data and observations. They are expected to take accurate measurements and to record data.

At Farington, we reinforce scientific knowledge over time, by revisiting previously taught key knowledge, on a termly basis.

SCIENCE IMPACT

Farington pupils are equipped with the scientific knowledge required to understand the uses and importance of science in their lives. They have a knowledge and understanding of the key areas of science and can express this using relevant scientific vocabulary.

Pupils use a Growth Mindset and display resilience when encountering problems. They are able to work as team to solve problems. We teach the children to ask questions and can suggest how to solve them.

They recognise some real life scientists and how their work has shaped our lives.

Our children are able to investigate, interpret results and draw conclusions based on real evidence.

Summary of Subject Content

Science –Farington Primary School broadly follows the National Curriculum Scheme of Work and **Snap Science**. Each teacher is provided with log on details for the site. Additional materials can be found in the Science Folder on the shared server. The scheme supports best practice in primary science teaching and assessment , whilst encouraging professionalism and autonomy. Therefore, teachers have the professional flexibility to choose from a variety of suggested activities, adapt and modify the scheme to suit their children's interests, current events, their own teaching style, the use of any support staff and the resources available.

However, any modification must not overlook any of the scientific skills that are in the Key Specification document. In addition, the scheme of work has clear skills and knowledge progression built in from the Early Years to Year 6. These must be taught to ensure a full and comprehensive coverage of the science curriculum is provided for our children.

Long Term Planning – overview

Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Our Changing World – The Local Environment					
EYFS	Light, Space, Electricity and Movement		Objects and Materials		Animals and Plants	
	Our Changing World – Sensing Seasons, Plants, Animal Antics					
Year 1	Using Our Senses	Everyday Materials	Everyday Materials	Looking At Animals	Looking At Animals	Plant Detectives
	Our Changing World - Plants, Habitats					
Year 2	Take Care	Materials- Good Choices	Materials – Shaping Up	Growing Up (offspring)	The Apprentice Gardener	The Apprentice Gardener/ What's in Your Habitat? (4 lessons)
	Our Changing World – Plants, Flowers, Berries					
Year 3	Can you see Me? (Light)	Amazing Bodies	Rock Detectives	The Power of Forces	How Does Your Garden Grow?	How Does Your Garden Grow?
	Our Changing World – Trees/ Flowers					
Year 4	Good Vibrations	Switched On	Where Does All That Food Go?	Who Am I?	In a State	Human Impact
	Our Changing World – Plants Without Seeds					
Year 5	Materials – • Get Sorted • Everyday Materials • Marvellous Mixtures • All Change	Feel the Force – Air Water Resistance	Circle of Life (Life Cycles)	The Earth & Beyond	Feel the Force – Levers/ Pulleys/ Gears	Reproduction in Animals and Plants
	Our Changing World – Animal Behaviours					
Year 6	The Nature Library (Classification)	Body Pump (Circulatory System)	Body Health (Healthy Food, Exercise, Drugs/ Smoking)	Everything Changes (Adaptation)	Light Up Your World	Danger! Low Voltage

Green - Our Changing World – ongoing throughout the year alongside topics, noticing changes outdoors / floor book work

STAGE DESCRIPTORS

Year 1

Working Scientifically	Animals including Humans
– ask simple scientific questions – use simple equipment to make observations – carry out simple tests – identify and classify things – suggest what I have found out using everyday scientific words (Y1) – use simple data to answer questions – measure using non - standard units of measure, rulers and meter sticks.	**I can identify and name** a variety of common animals including fish, amphibians, reptiles, birds and mammals. **I can classify** and name animals by what they eat (carnivore, herbivore and omnivore). **I can describe and compare** the structure of a variety of common sort animals (including fish, amphibians, reptiles, birds and mammals and pets). I **can identify, name, draw and label** the basic parts of the human body that I can see and say which part of the body is associated with each sense.
Seasonal Changes	**Plants**
I can observe and comment on changes across the four seasons. **I can name** the seasons and describe the weather associated with the seasons and how day length varies. **I can keep** a nature diary across the year (include all four seasons, pictures, notes, observations, examples of leaves/flowers, photos).	**I can identify and name** a variety of common wild and garden plants, including deciduous and evergreen trees. **I can identify** and describe the basic structure of a variety of common flowering plants, including trees.
Everyday Materials	
I can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. **I can distinguish** between an object and the material from which it is made. **I can describe** the simple physical properties of a variety of everyday materials. **I can compare** and group together a variety of everyday materials on the basis of their simple physical properties.	

Year 2

Working Scientifically	Animals including Humans
– ask simple scientific questions – use simple equipment to make observations – carry out simple tests – identify and classify things – record what I have found out using everyday scientific words – use simple data to answer questions – measure using non - standard units of measure, rulers and meter sticks.	**I can recognise** that animals, including humans have offspring that grow into adults. **I can describe** the basic needs of humans and animals for survival (water, food and air). **I can describe** the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
Living Things and Their Habitats	**Plants**
I can explore and compare the differences between things that are living, things that are dead and things that have never been alive. **I can 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. **I can identify** and name a variety of plants and animals in their habitats, including micro-habitats. **I can describe** how animals obtain food from plants and other animals, using the idea of simple food chain and identify and name different sources of food. **I can observe** living things in their habitats during different seasonal changes (keep a nature diary).	**I can observe** and describe how seeds and bulbs grow into mature plants. **I can find out** and describe how plants need water, light and a suitable temperature to grow and stay healthy.
Everyday Materials	
I can identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. **I can find out how** the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	

Year 3

Working Scientifically	Animals including Humans
– ask relevant scientific questions – use simple equipment, including thermometers and data loggers to make measurements – use observations and knowledge to answer scientific questions – set up a simple enquiry to explore a scientific question – set up a test to compare two things – set up a fair test and explain why it is fair – make careful and accurate observations, including the use of standard units – gather data in different ways to answer scientific questions – record data in different ways to answer scientific questions – classify data in different ways to answer scientific questions – present data in different ways to answer scientific questions – use diagrams, keys, bar charts and tables to represent scientific data – report my findings using scientific vocabulary (including oral and written explanations) – draw conclusions from my findings – suggest improvements – make a prediction with a reason – identify differences, similarities and changes in results	**I can 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. **I can explain** why an adequate and varied diet is beneficial to health (along with a good supply of air and clean water). **I can explain** why regular and varied exercise is beneficial to health. **I can identify** that humans and some other animals have skeletons and muscles for support, protection and movement.
	Plants
	I can identify, locate and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. **I can 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. **I can investigate** the way in which water is transported within plants. **I can explore** the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. **I can observe** life cycles of plants across the year/seasons. (Our Changing World Modules)
Rocks	**Forces and Magnets**
I can compare and group together different kinds of rocks based on their appearance and simple physical properties. **I recognise** that soils are made from rocks and organic matter. **I can describe** in simple terms how fossils are formed when things that have lived are trapped within rock.	**I notice** that some forces need contact between two objects, but magnetic forces can act at a distance. **I can compare** how some things move on different surfaces. **I can compare and group** together a variety of everyday materials based on whether they are attracted to a magnet and identify some magnetic materials. **I can observe** how magnets attract or repel each other and only attract some materials. **I can describe** magnets as having two poles (like and unlike poles). **I can predict** whether two magnets will attract or repel each other, depending on which poles are facing.
Light including reflection and shadows	
I recognise that we need light in order to see things and that dark is the absence of light. **I notice** that light is reflected from surfaces and explore how light behaves **I recognise** that light from the sun can be dangerous and that there are ways to protect my eyes. **I recognise** that shadows are formed when the light from a light source is blocked by a solid object. **I can find** patterns, when measuring, in the way that the size of shadows can change**.**	

Year 4

Working Scientifically	Electricity
– ask relevant scientific questions – use simple equipment, including thermometers and data loggers to make measurements – use observations and knowledge to answer scientific questions – set up a simple enquiry to explore a scientific question – set up a test to compare two things – set up a fair test and explain why it is fair – make careful and accurate observations, including the use of standard units – gather data in different ways to answer scientific questions – record data in different ways to answer scientific questions – classify data in different ways to answer scientific questions – present data in different ways to answer scientific questions – use diagrams, keys, bar charts and tables to represent scientific data – report my findings using scientific vocabulary (including oral and written explanations) – draw conclusions from my findings – suggest improvements – make a prediction with a reason – identify differences, similarities and changes in results	**I can identify** common appliances that run on electricity **I can construct** a simple series electrical circuit, identify and naming its basic parts, including cells, wires, bulbs, switches and buzzers. **I can 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. **I can recognise** that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. **I can recognise** some common conductors and insulators and associate metals with being good conductors. **Sound** **I can identify** how sounds are made, associating some of them with something vibrating. **I can recognise** that vibrations from sound travel through a medium to the ear. **I can find** patterns between the volume of a sound and the strength of the vibrations that produce it. **I can recognise** that sounds get fainter as the distance from the sound increases. **I can find** patterns between pitch of a sound and the features of the object that produces it.
States of matter	**Environment – livings things and their environment**
I can compare and group materials together, according to whether they are solids, liquids or gases. **I can 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). **I can identify** the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**I can recognise** that environments can change and this can sometimes pose dangers to living things. **I can explore** and use classification keys to help group, identify and name a variety of living things in their local and wider environment. **Animals – teeth, eating and digestion** **I can describe** the simple functions of the basic parts of the digestive system in humans. **I can identify** the different types of teeth in humans and their simple functions. **I can construct** and interpret a variety of food chains identifying producers, predators and prey. **I can recognise** that living things can be grouped in a variety of ways.

Year 5

Working Scientifically	Earth and Space
– plan different types of scientific enquiry – control variables in an enquiry – measure accurately and precisely using a range of equipment – record data and results using scientific diagrams and labels (Y5&6) – record data and results using classification keys (Y5&6) – record data and results using tables (Y5&6) – record data and results using scatter graphs (Y6) – record data and results using bar graphs (Y5) – record data and results using line graphs (Y6) – use test results to make predictions – set up further comparative fair tests – report findings – explain a conclusion – explain causal relationships – use evidence to support or refute a scientific argument or theory	**I can describe** the movement of the Earth and other planets, relative to the Sun in the Solar System. **I can describe** the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. **I can describe** the movement of the Moon relative to the Earth **I can describe** the sun, moon and Earth as approximately spherical bodies.
Forces	**Living Things and Life Cycles**
I can identify the effects if air resistance, water resistance and friction, which act between moving surfaces. **I can explain** that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. **I can** recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	**I can describe** the differences in the life cycles of a mammal, an amphibian, an insect and a bird. **I can describe** the life processes of reproduction in some plants and animals. **I can describe** the changes as humans develop to old age.
Materials and their Properties	**Materials – Changing State**
I can compare and group together everyday materials based on evidence from comparative and fair tests, including hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. **I can give reasons**, based on evidence form comparative and fair tests, for specific uses of everyday materials, including metals, wood and plastic.	**I can use knowledge** of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. **I know** that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. **I can demonstrate** that dissolving, mixing and changes of state and reversible changes. **I can 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.

Year 6

Working Scientifically	Animals – Exercise, health and the Circulatory System
– plan different types of scientific enquiry – control variables in an enquiry – measure accurately and precisely using a range of equipment – record data and results using scientific diagrams and labels (Y5&6) – record data and results using classification keys (Y5&6) – record data and results using tables (Y5&6) – record data and results using scatter graphs (Y6) – record data and results using bar graphs (Y5) – record data and results using line graphs (Y6) – use test results to make predictions – set up further comparative fair tests – report findings – explain a conclusion – explain causal relationships – use evidence to support or refute a scientific argument or theory	**I can identify and name** the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. **I can describe** the ways in which nutrients and water are transported within animals, including humans. **I recognise and can describe** the impact of diet, exercise, drugs and lifestyle on the way bodies function.
Living Things and Their Habitats – - Classification	**Living Things and Their Habitats – Evolution and Inheritance**
I can 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. **I can give reasons** for classifying plants and animals based on specific characteristics.	**I recognise** that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. **I can identify** how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. **I can recognise** that living things on earth have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
Light – How Light Travels	**Electricity**
I can explain that we see things because the light travels from light sources to our eyes or from light sources to objects and then to our eyes (and represent this in simple diagrammatic form). **I can recognise** that light appears to travel in straight lines and 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. **I can use** the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	**I can use** recognised symbols (at least: cells, wires, switches, bulbs, buzzers and motors) when representing a simple circuit in a diagram. **I can compare** the functions of different components giving reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. **I can associate and explain the** brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. **I can use/interpret** circuit diagrams to construct a variety of more complex circuits predicting whether they will 'work'.

Assessment Criteria

What we do

1. We implement an inclusive curriculum so that all children, including those with SEND, can make progress and demonstrate success in a range of ways.
2. We conduct baseline assessments, checking the pupils' existing knowledge and skill level.
3. We review and re-cap prior learning and link it to new and current study. We identify curriculum links so that learning can be applied and assessed in new contexts.
4. Teachers use a range of assessment activities in their class, including the review of knowledge organisers, mini assessments, sketch books, independent tasks, work in books, pupil chats in lessons. We incorporate longitudinal study where appropriate, including geography and history to assess long term knowledge retention.
5. To meet the expected standard, pupils should demonstrate a broad understanding of the key facts in the end points for that year (as outlined in the subject key specification document). In addition, they retain key knowledge from prior learning.
6. At the greater depth standard, pupils demonstrate knowledge and understanding of every aspect of the key specification to the highest degree.
7. We enter a mid-year and end of year attainment grade onto FFT. Subject leaders analyse the data and report to governors annually.
8. Bi-annual peer audits provide quality assurance, moderation of standards and training across trust schools.

Our logo was carefully chosen to represent the children, young people and adults in our learning community who strive for excellence through high aspiration and high expectation.