2019

Curriculum Skills and Progression Map
Science

The Nebula Federation

Hainford Primary School

Nebula
where stars are born

Hainford Curriculum Skills and Progression Map: Science

Key vocabulary in red: Pupils should read, spell and pronounce scientific vocabulary correctly.

Science at Hainford:

Practical science is: At Hainford, given our mixed-age classes and Inquiry-based approach children will be taught scientific content at times both out of Key-Stage and out NC specified year. In order to meet the needs of all pupils and ensure progression in skills and knowledge we use '*Working Scientifically*' to provide considerable differentiation in class. When teaching a topic such as sound which is a Yr4 topic to the yr5s and yr6s we provide clear links with other curriculum areas such as maths, computing and D&T in order to provide suitable challenge. e.g. pie charts for results. Deeper questioning is also used to ensure continued progress. For yr5/6 topics, other than 'Evolution….'which will be taught separately to the yr6s, additional support and differentiated resources will be used to deliver content.

Key language will be revisited throughout the year.

SCIENCE - WORKING SCIENTIFICALLY: STATUTORY REQUIREMENTS			
	KEY STAGE ONE	**LOWER KEY STAGE TWO**	**UPPER KEY STAGE TWO**
QUESTIONING	Asking simple questions, recognising they can be answered in different ways	Asking relevant questions, using range of scientific enquiries to answer them. Using straightforward scientific evidence to answer questions or support findings.	Planning range of scientific enquiries to answer questions, recognising and controlling variables where necessary.
OBSERVING	Observing closely using simple equipment	Making systematic, careful observations, taking accurate measurements. Using a range of equipment, including thermometers and data loggers	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
EXPERIMENTING	Performing simple tests	Setting up simple practical enquiries, comparative and fair tests	Using test results to make predictions to set up further comparative and fair tests.
CLASSIFYING	Identifying and classifying	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
APPLYING	Using observations and ideas to suggest answers to questions	Using results to draw simple conclusions, make prediction, suggest improvements raise further questions. Identifying differences, similarities or changes related to scientific ideas	Identifying scientific evidence that has been used to support or refute ideas or arguments.

		processes	
RECORDING	Gathering and recording data to help in answering questions	Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Reporting on findings from enquiries, oral and written explanations, displays or presentations of results and conclusions	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.

Skills Map - Science			
Early Years – Working Scientifically			
Observing closely	**Performing Tests**	**Identifying and Classifying**	**Recording findings**
Through provision, focus groups and with adult support, can children… • Can they discuss what they can see, touch, smell, hear or taste? • Can they use simple equipment to help them make observations?	Through provision, focus groups and with adult support, can children… • Can they perform a simple test? • Can they describe/ explain what they have done?	Through provision, focus groups and with adult support, can children… • Can they identify and classify things they observe? • Can they think of some questions to ask? • Can they answer some scientific questions? • Can they give a simple reason for their answer? • Can they explain what they have found out?	Through provision, focus groups and with adult support, can children… • Can they show their work using pictures, labels and captions? • Can they record their findings • Can they record some information in a chart or table, or using ICT
Early Years Exceeding			
• Can they find out by watching, listening, tasting, smelling and touching? • Can they give reasons for their answers?	• Can they give reasons for their answers?	• Can they discuss similarities and differences? • Can they explain what they have found out using scientific vocabulary? • Can they give reasons for their answers?	• Can they compare measurements? • Can they give reasons for their answers?

Skills Map - Science		
Year 1 – Plants	**Animals, including Humans**	
• Can they describe and name the **petals, stem, leaf, bulb, flower, seed, stem** and root of a plant? • Can they identify and name a range of common plants and trees? • Can they name the **trunk**, **branches** and **root** of a tree? • Can they discuss what they can see, **touch, smell, hear** or **taste**?	• Can they identify some of the differences between different animals? • Can they identify **living** and **non-living** things? • Can they identify and name a variety of common animals? • Can they describe how an animal is suited to its **environment**? • Can they explain what they have found out? • Can they identify and name a variety of common animals that are **carnivores (meat-eater)**, **herbivores (plant-eater)** and **omnivores?** • Can they identify and classify things they observe? • Can they give a simple reason for their answers? • Can they discuss what they can see, touch, smell, hear or taste?	• Can they name the parts of the human body and link them to their senses? • Can they name the parts of an animal's body? • Can they name a range of domestic animals? • Can they compare the bodies of different animals? • Can they identify and classify things they observe? • Can they give a simple reason for their answers? • Can they talk about what they see, touch, smell, hear or taste? `
Year 1 Greater Depth		
• Can they begin to describe what each part of a plant does? (e.g. roots, stem, leaves, petals, pollen) on a range of plants.	• Can they begin to classify animals according to a number of given criteria? • Can they point out differences between living and non-living things?	Can they name some parts of the human body that cannot be seen? • Can they say why certain animals have certain characteristics? • Can they name a range of wild animals?

Skills Map - Science	
Year 1 – Everyday Materials and Seasonal Changes	
Every day materials (classifying and grouping)	**Seasonal Changes**
• Can they distinguish between an object and the **material** from which it is made? • Can they describe materials using their senses, using specific scientific words? • Can they explain what material objects are made from? • Can they explain why a material might be useful for a specific job? • Can they name some different everyday materials? e.g. **wood, plastic, metal, water and rock** • Can they **sort** materials into groups by a given criteria? • Can they explain how solid shapes can be changed by **squashing, bending, twisting and stretching?** • Can they perform a simple test? • Can they tell other people about what they have done? • Can they talk about what they <see, touch, smell, hear or taste>? • Can they use simple equipment to help them make observations? • Can they identify and classify things they observe?	• Can they observe changes across the **four seasons**? • Can they name the four seasons in order? • Can they observe and describe **weather** associated with the seasons? • Can they observe and describe how **day length** varies? • Can they talk about what they: see, touch, smell, hear or taste? • Can they use simple equipment to help them make observations?
Year 1 Greater Depth	
• Can they describe things that are similar and different between materials? • Can they explain what happens to certain materials when they are heated, e.g. bread, ice, chocolate? • Can they explain what happens to certain materials when they are cooled, e.g. jelly, heated chocolate?	• Can they observe features in the environment and explain that these are related to a specific season? • Can they observe and talk about changes in the weather? • Can they talk about weather variation in different parts of the world?

Skills Map - Science			
Year 1 – Working Scientifically			
Observing closely	**Performing Tests**	**Identifying and Classifying**	**Recording findings**
• Can they discuss what they can see, touch, smell, hear or taste? • Can they use simple equipment to help them make observations?	• Can they perform a simple test? • Can they describe/ explain what they have done?	• Can they identify and classify things they observe? • Can they think of some questions to ask? • Can they answer some scientific questions? • Can they give a simple reason for their answer? • Can they explain what they have found out?	• Can they show their work using pictures, labels and captions? • Can they record their findings using standard units? • Can they record some information in a chart or table, or using ICT?
Year 1 Greater Depth			
• Can they find out by watching, listening, tasting, smelling and touching?	• Can they give reasons for their answers?	• Can they discuss similarities and differences? • Can they explain what they have found out using scientific vocabulary?	• Can they make accurate measurements using non-standard measurements i.e. unifix

Skills Map - Science		
(Class 2)Year 2 – Living things and their Habitats, Animals including Humans and Plants		
Living things and their Habitats	**Animals, including Humans**	**Plants**
• Can they match certain living things to the **habitats** they are found in? • Can they explain the differences between living and non-living things? • Can they describe some of the life processes common to plants and animals, including humans? • Can they describe how a habitat provides for the basic needs of things living there? • Can they describe how some animals get their food using basic **food chains**? • Can they describe how plants and animals are suited to their habitat? • Finding things out using secondary sources of information. • Can they use - see, touch, smell, hear or taste - to help them answer questions? • Can they organise things into groups?	• Can they describe what animals need to survive? Can they explain that animals **grow** and reproduce? • Can they explain why animals have **offspring** which grow into adults? • Can they describe the **life cycle** of some living things? (e.g. egg, chick, chicken) • Can they explain the basic needs of animals, including humans for **survival**? (water, food, air) • Can they describe why exercise, balanced **diet** and **hygiene** are important for humans? Can they suggest how to find things out? • Can they use prompts to find things out? • Finding things out using secondary sources of information	• Can they describe what plants need to survive? • Can they observe and describe how seeds and bulbs grow into mature plants? • Can they investigate and describe the impact of removing light, soil or water from a growing or germinating plant. • Observing changes over time. • Can they suggest how to find things out? • Can they use prompts to find things out?
Year 2 Greater Depth		
• Can they name some characteristics of an animal that help it to live in a particular habitat? • Can they describe what animals need to survive and link this to their habitats?	• Can they explain that animals reproduce in different ways?	• Can they describe what plants need to survive and link it to where they are found? • Can they explain that plants grow and reproduce in different ways?

Skills Map - Science	
Class 2 Year 2 – Materials	
Classifying and grouping materials	**Changing materials**
• Can they describe the simple physical properties of a variety of everyday materials? • Can they compare and group together a variety of materials based on their simple physical properties? • Can they use - see, touch, smell, hear or taste - to help them answer questions? • Can they use some scientific words to describe what they have seen and measured?	• Can they explore how the shapes of solid objects can be changed? (squashing, bending, twisting, stretching) • Can they find out about people who developed useful new materials? (John Dunlop, Charles Macintosh, John McAdam) • Can they identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper, cardboard for particular uses? • Can they organise things into groups? • Can they find simple patterns (or associations)? • Can they say whether things happened as they expected?
Year 2 Greater Depth	
• Can they describe the properties of different materials using words like, **transparent** or **opaque**, flexible, etc.? • Can they sort materials into groups and say why they have sorted them in that way? • Can they say which materials are natural and which are man-made?	• Can they explain how materials are changed by **heating** and **cooling**? • Can they explain how materials are changed by bending, twisting and stretching? • Can they tell which materials cannot be changed back after being heated, cooled, bent, stretched or twisted?

Skills Map - Science Year 2 – Working Scientifically				
Observing closely	**Performing Tests**	**Identifying and Classifying**	**Recording findings**	**Types of investigations**
• Can they use - see, touch, smell, hear or taste to help them answer questions? • Can they use some scientific words to describe what they have seen and measured? • Can they compare several things?	• Can they carry out a simple fair test? • Can they explain why it might not be fair to compare two things? • Can they say whether things happened as they expected? • Can they suggest how to find things out? • Can they use prompts to find things out?	• Can they organise things into groups? • Can they find simple patterns (or associations)? • Can they identify animals and plants by a specific criteria, e.g. lay eggs or not; have feathers or not?	• Can they use text, diagrams, pictures, charts, tables to record their observations? • Can they measure using simple equipment?	• Children should have the opportunity to investigate: • Observing changes over time • Noticing similarities, differences and patterns. • Grouping and classifying. • Carrying our comparative tests. • Finding things out using secondary sources of information.
Year 2 Greater Depth				
• Can they suggest ways of finding out through listening, hearing, smelling, touching and tasting?	• Can they say whether things happened as they expected and if not why not?	• Can they suggest more than one way of grouping animals and plants and explain their reasons?	• Can they use information from books and online information to find things out?	• Can they begin to independently consider controlling variables to create a **fair test**?

	Skills Map - Science	
	Year 3 – Plants and Animals, including Humans	
	Animals, including Humans	**Plants**
Yr2 specific	• Can they explain the importance of a healthy diet? • Can they describe some of the important parts of the skeletal system of a human? With support can they:	• Can they explore some of the parts of flowers that play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal? With adult support: • Can they plan and set up a fair test and explain why it was fair? • Can they explain what they have found out and use their measurements to say whether it helps to answer their question? • Can they set up a simple test to make comparisons?
Yr3 specific	• Can they explain the importance of a nutritionally balanced diet? Can they describe and explain the skeletal system of a human?	• Can they explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal? • Can they plan and set up a fair test and explain why it was fair? • Can they explain what they have found out and use their measurements to say whether it helps to answer their question? • Can they set up a simple test to make comparisons?
Class 2	• Can they describe how **nutrients**, water and **oxygen** are transported within animals and humans? • Can they identify that animals, including humans, cannot make their own food: they get nutrition from what they eat? • Can they describe and explain the muscular system of a human? • Can they describe what they have found using scientific language? • Can they describe what they have found out using secondary sources?	• Can they identify and describe the functions of different parts of flowering plants? (roots, stem/trunk, leaves and flowers)? Range of plants. • Can they explore the requirement of plants for life and growth (air, light, water, nutrients from soil, and room to grow)? • Can they investigate the way in which water is transported within plants? • Can they record their observations in different ways? (Labelled diagrams, charts etc.) Use secondary sources

	Year 3 Greater Depth	
	• Can they explain how the muscular and skeletal systems work together to create movement? • Can they classify living things and non-living things by a number of characteristics that they have thought of? • Can they explain how people, weather and the environment can affect living things? • Can they explain how certain living things depend on one another to survive?	• Can they classify a range of common plants according to many criteria (environment found, size, climate required, etc.)?

	Skills Map - Science		
	Class 2 Yr2/Yr3 – Rocks, Forces and Magnets, Light		
	Rocks	**Forces and Magnets**	**Light**
Year 2 specific	With support or as a group: • can they describe the differences between sedimentary and igneous rocks, possibly considering the way they are formed? • Can they describe in simple terms how	With support or as a group: • Can they make and record a **prediction** before testing? (Oral)	• Can they begin to explain the difference between transparent, translucent and opaque? (*reviewed in yr3)*

	fossils are formed when things that have lived are trapped within rock?		
Year 3 specific	• Can they describe and explain the differences between **sedimentary** and **igneous** rocks, considering the way they are formed? • Can they record in simple terms how fossils are formed when things that have lived are trapped within rock? •	• Can they observe & record that magnetic forces can be transmitted without direct contact? • Can they observe & record how some magnets **attract** or **repel** each other? •	• Can they explain the difference between **transparent**, **translucent** and **opaque**? •
Yr2/3	• Can they compare and group together different rocks on the basis of their appearance and simple physical properties? • Can they describe and explain how different rocks can be useful to us? • Can they recognise that soils are made from rocks and organic matter? • Can they describe what they have found using scientific language? • Can they classify objects in different ways? • Can they describe what they have found using scientific language? • Can they use different ideas and suggest how to find something out?	• Can they compare how things move on different surfaces? • Can they observe that **magnetic forces** can be transmitted without direct contact? • Can they observe how some magnets **attract** or **repel** each other? • Can they identify and classify which everyday materials are attracted to magnets and which are not? • Can they notice that some forces need contact between two objects, but magnetic forces can act at a distance? • Can they describe magnets have having two poles (N & S) and predict whether two magnets will attract or repel each other depending on which poles are facing? • Can they make and record a prediction before testing? • Can they take accurate measurements	• Can they recognise that they need light in order to see things? • Can they recognise that dark is the absence of light? • Can they notice that light is reflected from surfaces? • Can they recognise that light from the sun can be dangerous and that there are ways to protect their eyes? • Can they recognise that shadows are formed when the light from a light source is blocked by a solid object? • Can they find patterns in the way that the size of shadows change? • Can they set up a simple fair test to make comparisons? • Can they describe what they have found using scientific language? • Can they record their observations

		using different equipment and units of measure? • Can they set up a simple fair test to make comparisons? • Can they explain what they have found out and use their measurements to say whether it helps to answer their question? • Can they record their observations in different ways? - labelled diagrams, charts etc.?	in different ways? - labelled diagrams, charts etc.
	Year 3 Greater Depth		
•	• Can they classify **igneous** and **sedimentary rocks**? • Can they begin to relate the properties of rocks with their uses?	• Can they investigate the strengths of different magnets and find fair ways to compare them?	• Can they explain why lights need to be bright or **dimmer** according to need? • Can they say what happens to the electricity when more batteries are added? • Can they explain why their shadow changes when the light source is moved closer or further from the object?

Science Curriculum Coverage

Hainford Curriculum Skills and Progression Map: Science

Key vocabulary in red: Pupils should read, spell and pronounce scientific vocabulary correctly.

Class 3		
Year A	**Year B**	**Year C**
States of Matter (Year 4) • 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. **Forces (Year 5)** – Sail boats • 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. **Earth and Space (Year 5)** • 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.	**Evolution and Inheritance (Year 6)** • 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. **Animals including Humans (Year 4)** • 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. **Electricity (Year 6)** • 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.	**Living Things and Their Habitats (Year 5)** • 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. Properties and **Changes of Materials (Year 5)** • 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 • 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. **Living Things and Their Habitats (Year 6)**

Light (Year 6)
- 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.

Electricity (Year 4)
- 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.

Animals Including Humans (Year 6)
- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood

Forces (Year 5) - Vehicles
- 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.

Sound (Year 4) - Instruments
- identify how sounds are made, associating some of them with something vibrating
- 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

Animals including Humans (Year 4)
- describe the simple functions of the basic parts of the digestive system in humans

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics

Living Things and Their Habitats (Year 4)
- 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.

Properties and Changes of Materials (Year 5)
- 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
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

• 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.		**Sound (Year 4)** – Ear defenders • 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.

Skills Map - Science	
Class 3	
Year 4	**Year 5/6**
CONDUCT ENQUIRIES • Ask a relevant question about ____ and use a scientific enquiry to answer it. • Set up a simple practical enquiry for finding out about ____. • Set up a simple comparative test for finding out about ____. • Set up a simple fair test for finding out about ____. • Take accurate measurements of ____ using standard units (e.g. ruler, thermometer, beaker…). • Make systematic and careful observations of ____. • Take systematic and careful measurements of ____. **RECORD FINDINGS** • Record data about ____ using simple tables. • Classify findings about ____ using simple labelled diagrams or keys. • Present data about ____ using a simple bar chart. • Present findings about ____ using simple drawings and labels. **USE RESULTS**	**CONDUCT ENQUIRIES** • Plan a practical enquiry to answer a question about _____, recognising and controlling variables. • Plan a fair test to answer a question about _____, recognising and controlling variables. • Plan a comparative test to answer a question about _____, recognising and controlling variables. • Take measurements of ____ with accuracy and precision (e.g. newton meters, graduated cylinder, data loggers…). • Take systematic measurements of ____, taking repeat readings when necessary. **RECORD FINDINGS** • Record data about ____ using tables. • Classify findings about ____ using a classification key. • Present data about ____ using line graphs. • Present data about ____ using scatter graphs. • Present findings about ____ using diagrams and scientific language.

• Use results to answer questions and make simple conclusions about ____. • Use results to make predictions about ____. • Use results to raise further questions about ____. • Use results to suggest improvements for their enquiry into ____. **REPORT FINDINGS** • Report on findings about ____ as an oral explanation of results and conclusions. • Report on findings about ____ as a written explanation of results and conclusions. • Report on findings about ____ as a display of results and conclusions **INTERPRET EVIDENCE** • Identify differences, similarities or changes related to ____. • Use straightforward scientific evidence to answer a question about ____. • Use straightforward scientific evidence to support their findings about ____.	**USE RESULTS** • Use results to make conclusions about ____, identifying casual relationships. • Use test results to make predictions about ____, identifying casual relationships. • Use results to set up further tests about ___, identifying casual relationships. **REPORT FINDINGS** • Report on findings about ____ as an oral presentation, explaining their results and the degree of trust in them. • Report on findings about ____ as a written presentation, explaining their results and the degree of trust in them. • Report on findings about ____ as a display, explaining their results and the degree of trust in them. **INTERPRET EVIDENCE** • Identify scientific evidence that has been used to support ideas or arguments. • Identify scientific evidence that has been used to refute ideas or arguments.
Greater Depth	
Can they ask insightful questions for appropriate further tests and make scientific conclusions?	Can they independently make decisions about each step of a fair test, recognising and controlling variables?