Science Subject Journey

EYFS - Scientific beginnings (Understanding the World)

Horizon Academy Trust

Minimum expectations for Nursery		Minimum expectations for Reception	Early Learning Goal
• Repeat actions that have an effect. • Explore materials with different properties. • Explore natural materials, indoors and outside.	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.	• Explore the natural world around them. • Understand the effect of changing seasons on the natural world around them.	**Understanding the world** **The Natural World ELG** **Children at the expected level of development will:** • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Science Subject Journey

Year 1 -3

Autumn Year 1

Animals, including humans (Biology)
Seasons: Autumn/ Winter (Physics)

In this unit pupils will be able to describe and compare the structure of a range of common animals. They will name and identify a variety of common animals that are carnivores, herbivores and omnivores. They will identify, name draw and label the basic parts of the human body and day which part of the human body is associated with each sense.

Seasonal Changes: at the start and end of this term pupils will observe and describe weather changes across autumn and winter and how the day length varies

Spring Year 1

Everyday materials (Chemistry)
Seasons: Winter/ Spring (Physics)

In this unit pupils will identify and name a variety of everyday materials. They will be able to compare and group together these everyday materials on the basis of their simple physical properties. They will be able to distinguish between an object and the material from which it is made.

Seasonal Changes: at the start and end of this term pupils will observe and describe weather changes across winter and spring and how the day length varies

Summer Year 1

Plants (Biology)
Seasons: Spring / Summer (Physics)

In this unit pupils will identify and describe the basic structure of a variety of common wild, garden and flowering plants, including deciduous and evergreen trees.

Seasonal Changes: at the start and end of this term pupils will observe and describe weather changes across winter and spring and how the day length varies. At end of this year pupils will have a good understanding of seasonal change over the year.

Autumn Year 2

Animals, including humans (Biology)

During this unit pupils will notice animals including humans have offspring which grow into adults. They will find out about and describe the basic needs of animals, including humans, for survival. Children will describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.

Spring Year 2

Uses of everyday materials (Chemistry)

Through this unit of work children will identify and compare the suitability of a variety of everyday materials. In addition they will find out how the shapes of solid objects made from some materials can be changed.

Summer Year 2

Plants (Biology)
Living things and their habitats (Biology)

Plants: in this unit pupils will find out and describe what plants need to grow and stay healthy. They will also observe and describe how seeds and bulbs grow into mature plants.

Living things and their habitats: In this unit children will explore and compare the differences between things that are living, dead, and things that have never been alive. They will also 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. They will identify and name a variety of plants and animals in their habitats including micro habitats. They will describe how animals obtain their food from plants and other animals using the idea of a simple food chain and identify different sources of food.

Autumn Year 3

Rocks and Soils (Chemistry)
Forces (Physics)

Rocks and Soils: pupils will compare, and group together different kinds of rocks based on their appearance and physical properties. They will describe in how fossils are formed. They will recognise that soils are made from rocks and organic matter.

Forces and Magnets: pupils will compare how things move on different surfaces in relation to friction. They will observe how magnets attract or repel each other and attract some materials and not others with comparisons. Pupils can identify some magnetic materials and describe magnets as having two poles. They can then make predictions based on their knowledge.

Spring Year 3

Animals, including humans (Biology)

In this unit pupils will 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. They will identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Summer Year 3

Light (Physics), Plants (Biology)

Light: pupils will understand that we need light in order to see things and that dark is the absence of light. They will know that light is reflected from surfaces and recognise that light from the sun can be dangerous and that there are ways to protect their eyes. They will know that shadows are formed when the light from a light source is blocked by an opaque object and explore shadow patterns.

Plants: pupils will identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. They will explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and variations from plant to plant. They will investigate the way in which water is transported within plants and explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Science Subject Journey

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Year 4 -6

Autumn Year 4

States of Matter (Chemistry)

In this unit pupils will compare and group materials together, according to whether they are solids, liquids or gases. They 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). They will then identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Spring Year 4

Electricity (Physics)
Animals, including humans (Biology)

Electricity: pupils will identify common appliances that run on electricity and construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches, and buzzers. They will identify whether a lamp will light in a simple series circuit, using their knowledge of circuits and power sources. They recognise that a switch opens and closes a circuit and associate this with lights in a simple series circuit. Pupils recognise common conductors and insulators, and associate metals with being good conductors.

Animals including humans: pupils describe the functions of the digestive system in humans. They will identify the different types of teeth in humans and their functions. Pupils will construct and interpret a variety of food chains, identifying producers, predators and prey.

Summer Year 4

Sound (Physics)
Living things and their habitats (Biology)

Sound: pupils identify how sounds are made, associating them with something vibrating. Pupils recognise that vibrations from sounds travel through a medium to the ear. They can find patterns between the pitch of a sound and features of the object that produced it. They will find patterns between the volume of a sound and the strength of the vibrations that produced it. They recognise that sounds get fainter as the distance from the sound source increases.

Living things and their Habitats: pupils recognise that living things can be grouped in a variety of ways. Pupils will explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. They recognise that environments can change and that this can sometimes pose dangers to living things.

Summer Year 5

Living things and their habitats (Biology)
Animals, including humans (Biology)

When studying living things and their habitats pupils will describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. They describe the life process of reproduction in some plants and animals.

When studying animals including humans pupils will describe the changes as humans develop to old age.

Spring Year 5

Properties and changes of materials (Chemistry)

Properties and Changes of Materials pupils will compare and group together everyday materials based on their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Pupils know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. The pupils will also investigate reversible and irreversible changes and try to separate different mixtures.

Autumn Year 5

Forces (Physics)
Earth and Space (Physics)

Forces pupils will explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. They will identify the effects of air resistance, water resistance and friction, that act between moving surfaces. Pupils will recognise that some mechanisms, including levers, pulleys and gears, allow a small force to have a greater effect.

Pupils will describe the movement of the Earth, and other planets, relative to the Sun in the solar system. They describe the movement of the Moon relative to the Earth. The Sun, Earth and Moon are described as approximately spherical bodies. Pupils use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Autumn Year 6

Living things and their habitats (Biology)
Light (Physics)

Living things and their habitats: pupils 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. They will give reasons for classifying plants and animals based on specific characteristics.

Light: pupils recognise that light appears to travel in straight lines and use this idea to explain that objects are seen because they give out or reflect light into the eye. They will 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. Pupils use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Spring Year 6

Animals, including humans (Biology)
Electricity (Physics)

Animals including humans: pupils identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. They will recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Pupils will describe the ways in which nutrients and water are transported within animals, including humans.

Electricity: pupils will associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. They 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. Pupils use recognised symbols when representing a simple circuit in a diagram.

Summer Year 6

Evolution and inheritance (Biology)

In this unit pupils will recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. They recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Pupils identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

High end points in Science

By the end of Y6 children will...

Exploring / Observing
Use correct scientific knowledge and language to discuss observations
Understand changes that have occured over a very long period of time (evolution) and how this has impacted the world
Be able to explore abstract systems/ functions/ changes/ behaviour and record their understanding of these

Grouping and Classifying
Compare and contrast things beyond their own locality.
Use classification systems, keys and other information to help identify things.

Questioning
Develop their own scientific question to investigate e.g. How would exercise affect pulse rate?
Use observations to further identify areas of research / questioning.
Independently ask scientific questions and decide the type of enquiry needs to answer them.

Research
Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.
Interview people to find out information

Planning and testing
Predict what might happen before collecting results, including making hypotheses where they say how one thing will affect another.
Identify variables to change, measure and keep the same in order for a test to be fair.
Independently plan investigations and explain planning decisions.

Using equipment and measures
Decide when to repeat any readings and justify the reasons for doing so. Make their own decisions about what measurements to take.
Decide on the most appropriate equipment to collect data

Communicating
Articulate understanding of the concept using correct scientific language, when describing abstract ideas, observations and findings.
Record data and resutls of increasing complexity using diagrams and labels, recognised symbols, tables, bar and line graphs and models.
Make decisions about how to present and explain their findings.

Describing/Explaining/ Trusting Results
Say how confident they are that results are reliable and give a reason
Identify evidience that refutes or supports their hypothesis.
Independently from a conclusion based on the evidence of their tests.
Spot unexpected results that do not fit the pattern (anomalies).
Describe causal relationships using change and measure variables.

Journey of Scientific Enquiry

Year Group	Topic	Term	Scientific Enquiry focus	Big question
1	Animals, including humans	Autumn	Identifying, classifying and grouping	How can we organise animals?
	Seasons	Autumn	Observing Over Time	What happens and what changes in Autumn and Winter?
		Spring	Observing Over Time	What happens and what changes in Winter and Spring?
		Summer	Observing Over Time	What happens and what changes in Spring and Summer?
	Everyday materials	Spring	Pattern Seeking	What is it made from?
	Plants	Summer	Identifying, classifying and grouping	Are all plants the same?
2	Animals, including humans	Autumn	Pattern seeking	What do humans need to survive?
	Uses of everyday material	Spring	Identifying, classifying and grouping	What are the uses of everyday materials?
	Plants	Summer	Observing over time	What conditions do plants thrive in?
	Living things and their habitats	Summer	Research using secondary sources	What are the habitats of different living things and how do they differ?
3	Rocks and soils	Autumn	Identifying, classifying and grouping	What different types of rocks are there?
	Forces	Autumn	Identifying, classifying and grouping	What is a force?
	Animals, including humans	Spring	Research using secondary sources	Where do we get our nutrients from? What is the function of a skeleton?
	Light	Summer	Comparative and fair testing	How are shadows formed?
	Plants	Summer	Observing over time	How can you grow a healthy plant?

Journey of Scientific Enquiry

Year Group	Topic	Term	Scientific Enquiry focus	Big question
4	States of matter	Autumn	Research secondary sources	What is a state of matter?
	Electricity	Spring	Comparative and fair testing	Can you create a switch?
	Animals, including humans	Spring	Identifying, classifying and grouping	Which drinks can damage our teeth?
	Sound	Summer	Comparative and fair testing	How does sound travel?
	Living things and their habitats	Summer	Pattern seeking	How can animals be grouped?
5	Forces	Autumn	Pattern seeking	How do forces affect the world around us?
	Earth and space	Autumn	Research Secondary Sources	Why do we have night and day?
	Properties and changes of materials	Spring	Identifying, classifying and grouping	How do materials change state?
	Living things and their habitats	Summer	Observing over time	How do plants and animals ensure their survival?
	Animals, including humans	Summer	Research secondary sources	What are the stages of human development?
6	Living things and their habitats	Autumn	Identifying, classifying and grouping	How will we create and use a classification key specific to our school environment?
	Light	Autumn	Comparative and fair testing	How does light travel?
	Animals, including humans	Spring	Research secondary sources	How does the circulatory system work?
	Electricity	Spring	Comparative and fair testing	How can we compare variations in how electrical components function?
	Evolution and inheritance	Summer	Observing over time	How do organisms evolve?