

# Riston Science Progression Document

## National Curriculum Expectations

### Purpose of study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

### Aims

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

**Attainment targets** - By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

### Key stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science

content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

### **Lower key stage 2 – years 3 and 4**

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

### **Upper key stage 2 – years 5 and 6**

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Science - where does it fit in?			
Cycle A	Autumn	Spring	Summer
EYFS	Harvest/Autumn Animals and hibernation Keeping healthy	Growing Winter/Spring Keeping healthy	Under the sea Summer Keeping healthy
Year 1/2	Seasonal Changes Materials	Seasonal Changes Animals including humans Living Things and their habitats	Plants Seasonal Changes
Year 3/4	Plants	Sound Electricity	States of matter Animals including humans
Year 5/6	Light Forces	Properties of matter	Living things and their habitats Evolution
Cycle B	Autumn	Spring	Summer

EYFS	Materials Seasonal changes Keeping healthy	Our environment Seasonal changes Keeping healthy	Seasonal changes Animals and their habitats Growing Keeping healthy
Year 1/2	Materials Seasonal Changes	Living things and their habitats Animals including humans	Seasonal Changes Plants Enrichment
Year 3/4	Rocks Magnets and forces	Animals inc Humans Light	Living things and habitats
Year 5/6	Earth and Space Electricity	Living Things and their Habitats	Animals including humans

## Key Knowledge & Vocabulary

Knowledge (Disciplinary & Substantive), Vocabulary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Animals (including Humans)</b>	<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>Describe and compare the structure of a variety of common animals (fish,</p>	<p>Understand that animals, including humans, have offspring which grow into adults</p> <p>Describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Describe the importance for humans of exercise, eating the right amounts of</p>	<p>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</p> <p>Identify that humans and some other animals have skeletons and muscles for</p>	<p>Describe the simple functions of the basic parts of the digestive system in humans (<b>LINK BACK: Y3 the different food groups our body needs- nutrients</b>)</p> <p>Identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains,</p>	<p>Describe the changes as humans develop to old age</p> <p>(see <b>Life Cycles - Living things and their habitats</b>)</p> <p><b>puberty</b> <b>life-cycle</b> <b>reproduce</b></p>	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p>

	<p>amphibians, reptiles, birds and mammals, including pets)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</p> <p>arm, leg, hand, foot, eyes, ears, mouth, nose see, hear, taste, smell, touch</p> <p>fish, amphibian, reptile, bird and mammal herbivore, carnivore, omnivore</p>	<p>different types of food, and hygiene</p> <p>offspring, adult, baby, parents dead, alive, never-alive</p>	<p>support, protection and movement</p> <p>carbohydrates, protein, fats, sugar, dairy, fruit and vegetables, balanced diet, energy skeleton,vertebrates/invertebrates, muscles, bones, ribs, skull, joints, spine, pelvis</p>	<p>identifying producers, predators and prey</p> <p>molars, canines, incisors oesophagus, saliva, stomach, intestines, anus, digestion, nutrients food chain, energy, producer, predator, prey, decomposer</p>		<p>Describe the ways in which nutrients and water are transported within animals, including humans</p> <p>heart, blood, lungs, oxygenated, deoxygenated, plasma, platelets, red and white blood cells,plasma blood vessels, veins, arteries, pulse</p>
Living Things and their Habitats	<p>fish, amphibian, reptile, bird and mammal herbivore, carnivore, omnivore</p>	<p>Explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>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</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and</p>		<p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things</p> <p>classify, classification, classification key environment,deforestation, pollution, extinction, endangered producer, decomposer</p>	<p>Describe the differences in the life cycles of a mammal, amphibian, insect and a bird</p> <p>Describe how different plants reproduce using the vocabulary related to pollination, asexual reproduction and seed dispersal</p> <p>life cycle, reproduction, pollination,fertilisation, asexual reproduction, seed dispersal, fruit, stigma, anther, ovary, ovule, pollen, nectar,</p>	<p>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</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p> <p>microorganism, germ, microbe, characteristic, Linnaean system</p>

		<p>identify and name different sources of food.</p> <p>dead, alive, never alive habitat- desert, arctic, rainforest, ocean food chain, predator, prey diet</p>				
Plants	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>deciduous, evergreen, plant, tree, leaf, stem, flower, petals, roots</p>	<p>Observe and describe how seeds and bulbs grow into mature plants</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p> <p>seed, bulb, germination, temperature, sunlight, water, healthy, root, shoot</p>	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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</p> <p>Investigate the way in which water is transported within plants</p> <p>nutrients, photosynthesis, function</p>	<p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p> <p>pollination, seed dispersal, stigma, anther, ovary, ovule, pollen, nectar,</p>	<p>See Living things and their habitats- Plant reproduction, seed dispersal, life cycles )</p> <p>life cycle, reproduction, asexual reproduction,</p>	<p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <p>adaptation, evolution,</p>
Evolution & Inheritance	<p>(Links with Animals including Humans work on Parents and Offspring)</p> <p>parent, baby</p>		fossil (from unit on rocks)			<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p>

						<p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <p>offspring characteristic adaptation, natural selection, identical, genes, Charles Darwin</p>
Seasonal Changes	<p>Observe changes across the four seasons</p> <p>Observe and describe weather associated with the seasons and how day length varies</p> <p>autumn, winter, spring, summer, rain, snow, frost, wind, sun, fog, mist, clouds, temperature (warm/cold/freezing) day, night,</p>			<p>water cycle- different types of precipitation</p> <p>precipitation- snow, hail, rain</p>	<p>Link to Space unit- Why do we have different Seasons?</p>	



<p><b>Materials and States of Matter</b></p>	<p>Distinguish between an object and the material from which it is made</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>Describe the simple physical properties of a variety of everyday materials</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties</p> <p>object, material, wood, plastic, metal, water, rock, fabric property- everyday language e.g hard/soft, stretchy, rough, bendy, see-through, strong etc sort, waterproof</p>	<p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p> <p>squash, bend, twist, stretch</p>	<p>(Rocks, Light, Magnets)</p> <p>absorbent/not absorbent, durable</p> <p>transparent, translucent, opaque</p> <p>magnetic</p>	<p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> <p>Know that some materials are good thermal insulators that prevent the transfer of heat from warm to cold</p> <p>solid, liquid, gas, state, heat, cool, melt, freeze, evaporate, condense, thermometer, temperature, degrees celsius, The water cycle, precipitation, thermal insulator</p>	<p>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</p> <p>Recognise that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>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</p>	
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					dissolve, soluble, insoluble, solution, conductor, insulator, filter, filtering, filter paper, sieving, evaporation, reversible change, irreversible change, burning	
Electricity		Know that electricity is needed to make some things work. Know that some appliances need batteries and some use mains electricity to work.		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  electricity, mains electricity, battery, wire, bulb, buzzer, motor, switch, circuit, electrical conductor, electrical insulators, metals		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  cell, voltage, component, circuit diagram, symbols

Earth and Space	day, night, sun, moon (links with plants)				<p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <p>Describe the movement of the Moon relative to the Earth</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p> <p>solar system, orbit, sphere, Earth's axis, planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune) gas giant, terrestrial planet, meteor, star crater</p>	
Force and Magnets		Explore cars moving quicker on different surfaces.	<p>Compare how things move on different surfaces</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>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</p>		<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms, including levers, pulleys and gears,</p>	

			<p>Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing</p> <p>magnet, magnetic, poles, north pole, south pole, magnetic force, attract, repel, metals, friction, force metre</p>		<p>allow a smaller force to have a greater effect</p> <p>gravity, air resistance, water resistance,</p> <p>mechanism, machine, lever, pulley, gears, work</p>	
Light			<p>Recognise that he/she needs 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 eyes Find patterns in the way that the size of shadows change</p> <p>source of light darkness reflect, mirror translucent transparent opaque shadow</p>		<p>(Link and revisit- Year 5 work on Space, Day and Night, Shadows on the Moon)</p>	<p>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. Notice how light can be split into different colours using a prism.</p> <p>prism periscope</p>

Sound		Exploring how to change the volume and pitch of a sound during music lessons.	Exploring how to change the volume and pitch of a sound during music lessons.	<p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source</p> <p><b>vibration</b> <b>volume</b> <b>pitch</b></p>		
Rocks			<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>Recognise that soils are made from rocks and organic matter</p> <p><b>fossil</b> <b>rock</b> <b>sedimentary</b> <b>soil</b> <b>organic matter</b> <b>crystals</b> <b>molten rock, lava</b></p>			<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p><b>paleontologist</b></p>

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