Science Curriculum skills and progression map KS2

Key Stage 2

Science is among the mandatory subjects that must be taught at all state-funded schools during KS2. In addition to this, the National Curriculum outlines a list of topics that should be covered by teachers in science lessons.

The KS2 Science Curriculum is designed to give children the foundational knowledge required for understanding the world around them and to prepare KS2 children for their secondary education.
Click for link: Science National Curriculum KS2

Year 3/4			
Cycle one			
	Autumn	**Spring**	**Summer**
Topic	**Skeletons** **Movement** **Nutrition and diet** **Food waste** **Rocks**	**Fossils** **Soils** **Light**	**Plants A** **Forces** **Magnets** **Plants B** **Sustainability**

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Pupils should know... (Core knowledge and concepts to be learned linked to NC PoS)	Pupils should be taught to: • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement Pupils should be taught to: • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter	Pupils should be taught to: • recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change	Pupils should be taught to: • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal Pupils should be taught to: • compare how things move on different surfaces • notice that some forces need contact between 2 objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether

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			they are attracted to a magnet, and identify some magnetic materials • describe magnets as having 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing
Pupils should **be able to do...** (Skills developed at ARE within BSquared at progression step 7 are…)	**Biology – Animals, including Humans** Recognises how they change through the human life cycle and that change is on-going Identifies physical differences between females and males Names and labels the organs which are protected by different parts of the skeleton, e.g. ribs Identifies, names and labels the different teeth in humans and their functions, e.g. canine, incisor Simply describes the process of food digestion using given vocabulary Understands the simple functions of the basic parts of the human digestive system, e.g. saliva, small intestine Names and describes the functions of the main parts of the digestive system **Chemistry – Rocks** Describes how soil is made Lists some organic matter that may make up soil Gives reasons why types of rocks are used for specific purposes based on their investigations Identifies that there are	**Biology – Evolution & Inheritance** Identifies animals from the same habitat and lists similar adaptations they have made to survive there Recognises that the term "species" means a group of animals or plants that share the same characteristics Defines the term "evolution" Describes features or characteristics which can be inherited Explores how and why some animals metamorphosis at particular points in their life Examines the reasons why or how animals hibernate Examines different strategies animals use to survive, e.g. migration Describes how fossils are formed Suggests how palaeontologists find out about things which have lived long ago Recognises that the past can be divided into different periods **Physics – Seasonal Changes** Compares the climate, choosing the same month in different countries, e.g. December in Australia and the U.K.	**Biology – Plants** Predicts how different conditions may affect seed growth Explores the requirements for life and growth for different types of plants Explains simply why seeds need to be dispersed Looks for patterns in colours or textures of flowers when discussing how the seeds are dispersed Classifies plants into broad groups using observable features Names, locates and describes the main parts of a plant involved in transporting water and nutrients Relates the terms "pollen" and "pollination" to plant life cycles Relates the term "photosynthesis" to plant nutrients and growth Describes and labels a flowering plant, giving an explanation of the functions of the main parts, e.g. flower, leaves, root Observes and makes detailed drawings of parts of a flower, labelling different parts **Physics – Forces & Magnets** States that different poles attract and like poles repel Names the poles on a magnet as north and south Recognises that the surface area can affect the speed of an object dropping to Earth Describes a force as "balanced" as appropriate Describes the downward force as gravity

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	many layers of different rocks Describes simply how sedimentary rock is formed, e.g. by sequencing information Demonstrates a basic understanding about the process of changes a fossil went through to be formed Groups and identifies rocks in different ways according to their properties, based on first-hand observation Compares physical properties of rocks	Identifies different forms of precipitation Explains difference between the terms weather and climate Names months that fall within different seasons **Physics – Light** Sorts objects or materials into transparent, translucent and opaque Recognises that shiny objects are not light sources Recognises that light is reflected off different objects Explains how light is reflected off mirrors to create reflections of reflections Gives examples of materials that reflect light Explains why it is dangerous to look at the Sun directly Recognises that when it is dark, there is no light source Uses the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects and the shape of shadows Recognises that we need light to see things	Describes forces using the terms "friction", "water resistance" and "air resistance" correctly in context Shows the direction of different forces acting on objects in diagrams using arrows Sorts objects to show which mechanism they use, e.g. lever, pulley, wedge Describes the effect of forces that act at a distance (magnetic forces, including those between like and unlike poles)

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Key Terminology	Refer to the WR scheme of learning for each block above for individual key terminology lists. e.g. **Skeletons – Pg 15** https://assets.whiteroseeducation.com/Resources/science/year-3/autumn-block-1-sample/Y3%20Autumn%20Block%201%20Skeletons%20SOL.pdf	Refer to the WR scheme of learning for each block above for individual key terminology lists.	Refer to the WR scheme of learning for each block above for individual key terminology lists.
Cycle two			
	Autumn	**Spring**	**Summer**
Topic	**Group and classify living things** **States of matter**	**Sound** **Electricity** **Sustainability**	**Habitats** **Deforestation** **The digestive system** **Food chains**
Pupils should know... (Core knowledge and	Pupils should be taught to: • 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	Pupils should be taught to: • identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to	Pupils should be taught to: • describe the simple functions of the basic parts of the digestive system in humans • identify the different types of teeth in humans and their simple functions

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concepts to be learned linked to NC PoS)	local and wider environment • recognise that environments can change and that this can sometimes pose dangers to living things Pupils should be taught to: • 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	the ear • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases Pupils should be taught to: • 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	• construct and interpret a variety of food chains, identifying producers, predators and prey

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		a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors	
Pupils should **be able to do...** (Skills developed at ARE within BSquared at progression step 7 are…)	**Biology – Living Things and their Habitats** Describes the requirements of plants for life and growth Explains how environmental changes may have an impact on living things Suggests why all living things are closely dependent on their environment Describes life cycles in some plants and animals simply, including reproduction Identifies the main stages of the human life cycle Raises and answers questions about local living things and their habitats, e.g. by exploring their local environment at different stages throughout the school year Explores the dependency between animals and habitats and predicts what might happen if something changes Creates a simple classification key to name, identify and group living things Names, identifies and groups a variety of living things using classification keys Groups living things in a variety of different ways Constructs and	**Chemistry – Everyday Materials & Uses of Everyday Materials** Suggests how the uses for different materials may change in the future Lists different materials an object can be made from and why Suggests ways to identify materials more specifically, e.g. types of metal Classifies the properties of a material using scientific vocabulary Discusses how to improve a material, e.g. wrapping foil around a cup to keep temperature longer Includes scientific vocabulary when giving reasons why an object is made from a specific material, e.g. electrical conductor **Physics – Sound** Recognises that sound can travel through air, walls, windows, etc. Recognises that sound travels to the ears from its source Describes the difference in vibrations	**Biology – Animals, including Humans** Recognises how they change through the human life cycle and that change is on-going Identifies physical differences between females and males Names and labels the organs which are protected by different parts of the skeleton, e.g. ribs Identifies, names and labels the different teeth in humans and their functions, e.g. canine, incisor Simply describes the process of food digestion using given vocabulary Understands the simple functions of the basic parts of the human digestive system, e.g. saliva, small intestine Names and describes the functions of the main parts of the digestive system **Biology – Living Things and their Habitats** Describes the requirements of plants for life and growth Explains how environmental changes may have an impact on living things Suggests why all living things are closely dependent on their

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	interprets food chains **Chemistry – Properties & Changes of Materials** Recognises that some changes may result in a new material, e.g. in cooking Describes ways to recover substances from a solution Suggests how they can test materials to check their properties Describes ways to separate different materials Compares a variety of materials using different properties, e.g. solubility, conductivity Suggests ways to dissolve a substance **Chemistry – States of Matter** Measures or researches to find out the temperature materials change shape Describes how some common materials can change state Explores different objects to test if they are solid, liquid or gas Classes changes to water as a reversible change Explains the different stages of the water cycle Describes how water can keep on changing between states Describes the characteristics of different states of matter and groups materials on this basis; and describes how materials change state at different temperatures, using this to explain everyday phenomena, including the	made when a loud or soft noise is heard Recognises that sound travels to our ears Uses the idea that sounds are associated with vibrations, and that they require a medium to travel through, to explain how sounds are made and heard Describes the relationship between the pitch of a sound and the features of its source; and between the volume of a sound, the strength of the vibrations and the distance from its source **Physics – Electricity** Explains the function of a switch in a circuit Describes the difference between an electrical conductor and insulator, giving examples Identifies what makes a complete electrical circuit Checks components in the circuits oneby-one to find a problem Recognises a circuit must have a power source, which is part of a complete loop, to work Draws their circuit using pictorial representation **Physics – Sound** Describes how a sound is made using scientific vocabulary Listens to a variety of orchestral, world or classroom instruments	environment Describes life cycles in some plants and animals simply, including reproduction Identifies the main stages of the human life cycle Raises and answers questions about local living things and their habitats, e.g. by exploring their local environment at different stages throughout the school year Explores the dependency between animals and habitats and predicts what might happen if something changes Creates a simple classification key to name, identify and group living things Names, identifies and groups a variety of living things using classification keys Groups living things in a variety of different ways Constructs and interprets food chains

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	water cycle	and discusses how the sound is produced	
Key Terminology	Refer to the WR scheme of learning for each block above for individual key terminology lists. e.g. **Group and classify living things - Pg 13** https://assets.whiteroseeducation.com/Resources/science/year-4/autumn-block-1-sample/Y4%20Autumn%20Block%201%20Group%20and%20classify%20living%20things%20SOL.pdf	Refer to the WR scheme of learning for each block above for individual key terminology lists.	Refer to the WR scheme of learning for each block above for individual key terminology lists.
Year 5/6			
Cycle one			
	Autumn	**Spring**	**Summer**
Topic	**Forces** **Space**	**Properties of materials** **Animals including humans**	**Reproduction A** **Reversible and irreversible changes**

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	Global Warming	Life cycles	Plastic pollution Reproduction B
Pupils should know... (Core knowledge and concepts to be learned linked to NC PoS)	Pupils should be taught to: • 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 Pupils should be taught to: • 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	Pupils should be taught to: • 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 Pupils should be taught to: • 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 • 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	Pupils should be taught to: • describe the changes as humans develop to old age Pupils should be taught to: • 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

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	rotation to explain day and night and the apparent movement of the sun across the sky	• give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • 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	
Pupils should be able to do... (Skills developed at ARE within BSquared at progression step 8 are…)	**Physics – Forces & Magnets** Identifies simple mechanisms, including levers, gears and pulleys that increase the effect of a force Demonstrates forces acting on a range of objects Explains that a floating object is balancing water resistance and gravity Describes magnetism using the terms "attraction" and "repulsion" Recognises that forces act	**Biology – Plants** Identifies that photosynthesis happens to every plant Suggests how environmental changes could affect different plant life	**Biology – Animals, including Humans** Recognises how human bodies change in old age Records the general order of the main changes that girls and boys experience in puberty Classifies changes in puberty which are different and similar in both sexes Identifies that puberty occurs so that the reproductive organs can become functional Relates technical terms and popular terms of male and female organs Describes the effects of

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	in a particular direction Recognises forces acting on an object may be equal, causing the object to be static Recognises gravity causes objects to have weight Recognises that gravity exerts a downward force on all things Describes the effects of simple forces that involve contact (air and water resistance, friction) and gravity **Physics – Seasonal Changes** Suggests why countries on the Equator experience an almost constant length of day (sunrise to sunset) Describes the correlation between the position of a country to which months different seasons fall Describes the correlation between the movement of the Earth on its axis around the Sun to how the Seasons are formed **Physics – Earth & Space** Explains that the Moon reflects the Sun's light Describes some effects of the earth spinning on its axis Predicts when shadows will be longest or shortest Describes the shapes and relative movements of the Sun, Moon, Earth and other planets in the solar system; and explains the apparent movement of the Sun across the sky in	Demonstrates a basic understanding of the relationship between plants using carbon dioxide and creating oxygen Gives examples of and can explain the importance of seed dispersal Explains how the size, shape or colour etc. of a seed affects how it is dispersed Names, locates and describes the functions of the main parts of plants, including those involved in reproduction **Chemistry – States of Matter** Compares the properties of solids, liquids and gases Begins to use the correct terms when describing the water cycle, e.g. accumulation, infiltration, precipitation **Chemistry – Everyday Materials & Uses of Everyday Materials** Identifies a wide variety of different materials Groups a wide variety of different materials Groups and identifies materials in	diet, exercise, drugs and lifestyle on how the body functions Describes the function of the blood, blood vessels and heart Names and describes the functions of the main parts of the circulatory system Describes and compares different reproductive processes and life cycles in animals **Chemistry – Properties & Changes of Materials** Compares and groups materials based on their properties, e.g. thermal and electrical conductivity Identifies and describes what happens when dissolving occurs in everyday situations; and describes how to compare separate mixtures and solutions into their components Identifies, with reasons, whether changes in materials are reversible or not Recognises that mixing materials can cause change Gives examples of changes which cannot be reversed Understands and uses the terms correctly "insoluble", "soluble", "solution"

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	terms of the Earth's rotation and that this results in day and night States that the Earth, Sun and Moon are approximately spherical	different ways according to their properties, based on first-hand observation; and justifies the use of different everyday materials for different uses, based on their properties	
Key Terminology	Refer to the WR scheme of learning for each block above for individual key terminology lists. e.g. **Forces – Pg 14** https://assets.whiteroseeducation.com/Resources/science/year-5/autumn-block-1-sample/Y5%20Autumn%20Block%201%20Forces%20SOL.pdf	Refer to the WR scheme of learning for each block above for individual key terminology lists.	Refer to the WR scheme of learning for each block above for individual key terminology lists.
Cycle two			
	Autumn	**Spring**	**Summer**
Topic	**Living things and their habitats** **Electricity** **Sustainability**	**Light** **Light pollution** **The circulatory system** **Diet, drugs and lifestyle**	**Variation** **Adaptations** **Fossils** **Themed projects**

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Pupils should know... (Core knowledge and concepts to be learned linked to NC PoS)	Pupils should be taught to: • 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 • give reasons for classifying plants and animals based on specific characteristics Pupils should be taught to: • 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	Pupils should be taught to: • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • describe the ways in which nutrients and water are transported within animals, including humans Pupils should be taught to: • 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	Pupils should be taught to: • 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

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		shadows have the same shape as the objects that cast them	
Pupils should be able to do... (Skills being developed) BSquared progression steps 6-8	**Biology – Living Things and their Habitats** Describes the types of animals found in a biome and their physical adaptations to their environments Describes the life cycles of different types of animals, e.g. amphibian, insect, mammal Subdivides living things into smaller groups using different classification systems Describes the process of reproduction in plants Creates a classification key using subgroups, e.g. is it an invertebrate? Is it a herbivore? Uses the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or in other methods **Physics – Electricity** Explains that their series circuit will pass through all components one after the other Describes the effect of changing components within a circuit Uses simple apparatus to construct and control a series circuit, and describes how the	**Physics – Light** Makes comparative statements about the brightness of a shadow Lists some materials which reflect light into the eyes Explains the movement of light and the reflection of light in a periscope Describes the difference in the size of a pupil in different amounts of light Uses the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain the formation and size of shadows **Biology – Animals, including Humans** Recognises how human bodies change in old age Records the general order of the main changes that girls and boys experience in puberty Classifies changes in puberty which are different and similar in both sexes Identifies that puberty occurs so that the reproductive organs can become functional Relates technical terms and popular terms of male and female organs Describes the effects of diet, exercise,	**Biology – Evolution & Inheritance** Uses the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved; and provides evidence for evolution Recognises that it takes many generations to develop adaptation Recognises that evolution is a result of adaptation Identifies how different living things have adapted to their environment Recognises that fossils are a record of evolution Recognises that offspring are not identical to their parents and can give examples to back up their view Describes a change over time as a variation or adaptation Suggest why an animal has evolved a certain feature, e.g. giraffe's neck Suggests reasons why a living thing became extinct, e.g. mammoth **Chemistry – Rocks** Lists some elements that soil contains, e.g. worn down rock, humus, water and air Describes uses for rocks, e.g. tools in the Stone Age Suggests why not all living things that die become fossilised Describes the difference between sedimentary

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	circuit may be affected when changes are made to it; and uses recognised symbols to represent simple series circuit diagrams Explains why a circuit does not work by looking at the circuit diagram	drugs and lifestyle on how the body functions Describes the function of the blood, blood vessels and heart Names and describes the functions of the main parts of the circulatory system Describes and compares different reproductive processes and life cycles in animals	and igneous rock
Key Terminology	Refer to the WR scheme of learning for each block above for individual key terminology lists. e.g. **Living things and their habitats** Pg.13 https://assets.whiteroseeducation.com/Resources/science/year-6/autumn-block-1-sample/Y6%20Autumn%20Block%201%20Living%20things%20and%20their%20habitats%20SOL.pdf	Refer to the WR scheme of learning for each block above for individual key terminology lists.	Refer to the WR scheme of learning for each block above for individual key terminology lists.