= NC objectives

SWITCHED ON SCIENCE – RISING STARS
DEEP DIVE- PROGRESSION OF SKILLS (Scientific Knowledge & working scientifically)

Progression of Skills – Science

KS1 – National Curriculum Statutory Requirements

(Assessment Framework 'Pupil can' statements are denoted by A.F)

Working Scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- *asking simple questions and recognising that they can be answered in different ways*
- *observing closely, using simple equipment*
- *performing simple tests*
- *identifying and classifying*
- *using their observations and ideas to suggest answers to questions*
- *gathering and recording data to help in answering questions.*

YEAR 1/2

(National Curriculum Statutory Requirements)

BIOLOGY					CHEMISTRY		PHYSICS
Plants		**Animals, including humans**		**Living things and their habitats**	**Everyday materials (incl. uses of)**		**Seasonal changes**
Year 1	**Year 2**	**Year 1**	**Year 2**	**Year 2**	**Year 1**	**Year 2**	**Year 1**
Pupils should be taught to: -identify and name a variety of common wild and garden plants, including deciduous and evergreen trees -identify and describe the basic structure of a variety of common flowering plants, including trees. **Pupils might work scientifically by:** ▪ Observing closely, perhaps using magnifying glasses.	Pupils should be taught to: -observe and describe how seeds and bulbs grow into mature plants **A.F. – describe the main changes as seeds and bulbs grow into mature plants** -find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. **A.F. - describe basic needs of plants for survival and the impact of changing these** Pupils should be taught to:	-describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) **A.F. - describe and compare the observable features of animals from a range of groups** -identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense **A.F. - name and locate parts of the human body, including those related to the senses** Animals: Humans:	Pupils should be taught to: notice that animals, including humans, have offspring which grow into adults THIS OBJECTIVE IS COVERED WITHIN THE PSHE TOPICS IN CYCLE B TERM 6 **A.F. – describe the main changes as young animals, including humans, grow into adults** find out about and describe the basic needs of animals, including humans, for survival (water, food and air) **A.F. -**	Pupils should be taught to: explore and compare the differences between things that are living, dead, and things that have never been alive **A.F. - identify whether things are alive, dead or have never lived.** -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 identify and name a variety of plants and animals in their habitats, including microhabitats **A.F. - name different plants and animals and describe how they are suited to different habitats**	Pupils should be taught to: -distinguish between an object and the material from which it is made **A.F. - use their knowledge and understanding of the properties of materials, to distinguish objects from materials** -identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock **A.F. - identify materials** -describe the simple physical properties of a variety of everyday materials -compare and group together a variety of everyday materials on	Pupils should be taught to: -identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses **A.F. - compare the suitability of materials for different uses.** -find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Pupils should be taught to: ▪ Identify and compare the suitability of a variety of	Pupils should be taught to: -observe changes across the four seasons -observe and describe weather associated with the seasons and how day length varies. **A.F. - describe seasonal changes** Pupils should be taught to: ▪ Observe changes across the four seasons. ▪ Observe and describe weather

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DEEP DIVE- PROGRESSION OF SKILLS (Scientific Knowledge & working scientifically)

▪ Comparing and contrasting familiar plants. ▪ Describing how they were able to identify and group them, and ▪ Drawing diagrams showing the parts of different plants including trees. ▪ Keeping records of how plants have changed over time, for example the leaves falling off trees and buds opening. ▪ Comparing and contrasting what they have found out about different plants.	▪ Observe and describe how seeds and bulbs grow into mature plants ▪ Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. ▪ Plants are living and eventually die **Pupils might work scientifically by:** ▪ Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or ▪ Observing similar plants at different stages of growth; Setting up a comparative test to show that plants need light and water to stay healthy.	Pupils should be taught to: ▪ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. ▪ Recognise that humans are animals. ▪ Compare and describe differences in their own features (eye, hair, skin colour, etc.). ▪ Recognise that humans have many similarities. **Pupils might work scientifically by using their observations to:** ▪ Compare and contrast animals (humans) at first hand or through videos and photographs. Using their senses to compare different textures, sounds and smells. Animals, other animals: Pupils should be taught to:	**describe the basic needs of animals for survival** -describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. **A.F. - describe the importance of exercise, balanced diet and hygiene for humans** Pupils should be taught to: ▪ Notice that animals, have offspring which grow into adults. ▪ Find out about and describe the basic needs of animals, for survival (water, food and air). **Pupils might work scientifically by:** ▪ Observing, through video or first-hand observation and measurement, how different animals grow; Asking questions about what things animals need for	describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. **A.F. - describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships** Pupils should be taught to: ▪ Explore and compare the differences between things that are living, dead, and things that have never been alive. ▪ 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. ▪ Identify and name a variety of plants and animals in their habitats, including micro-habitats. ▪ Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. ▪ Different kinds of plants and animals live in different kinds of places.	the basis of their simple physical properties. Pupils should be taught to: ▪ Distinguish between an object and the material from which it is made. ▪ Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. ▪ Describe the simple physical properties of a variety of everyday materials. ▪ Compare and group together a variety of everyday materials on the basis of their simple physical properties. **Pupils might work scientifically by:** ▪ performing simple tests to explore questions, for example: – 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?'	everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses ▪ Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching ▪ Some materials can be found naturally; others have to be made **Pupils might work scientifically by:** ▪ Comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); ▪ Observing closely, ▪ Identifying and classifying the uses of different materials, and ▪ Recording their observations. Thinking about unusual and creative uses for everyday materials.	associated with the seasons and how day length varies. **Pupils might work scientifically by:** ▪ Making tables and charts about the weather and ▪ Making displays of what happens in the world around them, including day length, as the seasons change. Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT across the curriculum This unit provides an ideal opportunity for using data logging equipment to record temperatures

		▪ Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. ▪ Identify and name a variety of common animals that are carnivores, herbivores and omnivores. ▪ Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets). ▪ Find out and describe how animals look different to one another. ▪ Group together animals according to their different features. ▪ Recognise similarities between animals: – Structure: head, body, way of moving, senses, body covering, tail. ▪ Animals have senses to explore the world around them and to help them to survive. ▪ Recognise that animals need to be treated with care and	survival suggesting ways to find answers to their questions. Pupils should be taught to: ▪ Notice that humans, have offspring which grow into adults. ▪ Find out about and describe the basic needs of humans, for survival (water, food and air). ▪ Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. ▪ Medicines can be useful when we are ill. ▪ Medicines can be harmful if not used properly. **Pupils might work scientifically by:** ▪ Observing, through video or first-hand	▪ There are different kinds of habitat near school which need to be cared for ▪ Habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples). **Pupils might work scientifically by:** ▪ Sorting and classifying things as to whether they are living, dead or were never alive. ▪ Recording their findings using charts ▪ Describing how they decided where to place things, ▪ Exploring questions such as: 'Is a flame alive? Is a deciduous tree dead in winter?' ▪ Talking about ways of answering their questions. ▪ Constructing a simple food chain that includes humans (e.g. grass, cow, human); ▪ Describing the conditions in different habitats and micro-habitats (under log, on stony path, under bushes); Finding out how the conditions affect the number and type(s) of plants and animals that live there.			

		sensitivity to keep them alive and healthy. ▪ Animals are alive; they move, feed, grow, use their senses and reproduce. **Pupils might work scientifically by using their observations to:** ▪ Compare and contrast animals at first hand or through videos and photographs. ▪ Describing how they identify and group them. ▪ Grouping animals according to what they eat. Using their senses.	observation and measurement, how humans grow. ▪ Recording their findings using charts. ▪ Asking questions about what things animals [humans]. need for survival and what humans need to stay healthy. Suggesting ways to find answers to their questions.				

SWITCHED ON SCIENCE – RISING STARS
DEEP DIVE- PROGRESSION OF SKILLS (Scientific Knowledge & working scientifically)

LKS2 – National Curriculum Statutory Requirements
(Assessment Framework 'Pupil can' statements are denoted by A.F)

Working Scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- *asking relevant questions and using different types of scientific enquiries to answer them*
- *setting up simple practical enquiries, comparative and fair tests*
- *making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers*
- *gathering, recording, classifying and presenting data in a variety of ways to help in answering questions*
- *recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables*
- *reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions*
- *using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions*
- *identifying differences, similarities or changes related to simple scientific ideas and processes*
- *using straightforward scientific evidence to answer questions or to support their findings*

YEAR 3/4
(National Curriculum Statutory Requirements)

BIOLOGY				CHEMISTRY		PHYSICS			
Plants	**Living things and their habitats**	**Animals, including humans**		**Rocks**	**States of Matter**	**Light**	**Sound**	**Forces and Magnets**	**Electricity**
Year 3	**Year 4**	**Year 3**	**Year 4**	**Year 3**	**Year 4**	**Year 3**	**Year 4**	**Year 3**	**Year 4**
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	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 local and wider environment -recognise that environments can change and that this	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	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 -construct and interpret a variety of food chains, identifying producers, predators and prey.	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	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)	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	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 the ear -find patterns between the pitch	Pupils should be taught to: -compare how things move on different surfaces -notice that some forces need contact between two objects, but magnetic forces can act at a distance -observe how magnets attract	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

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-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: ▪ 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. ▪ Roots grow downwards and anchor the plant.	can sometimes pose dangers to living things 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 local and wider environment. ▪ Recognise that environments can change and that this can sometimes pose dangers to living things. ▪ Use and make identification keys for plants and animals. **Pupils might work scientifically by:** ▪ Using and making simple guides or keys [sorting, grouping, comparing,	and muscles for support, protection and movement Animals (health and nutrition): 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. ▪ An adequate and varied diet is beneficial to health (along with a good supply of air and clean water). ▪ Regular and varied exercise *from a variety of different activities* is	Animals (teeth, eating and digestion): 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. ▪ Construct and interpret a variety of food chains, identifying producers, predators and prey. ▪ Describe how teeth and gums have to be cared for in order to keep them healthy. **Pupils might work scientifically by:** ▪ Comparing the teeth of carnivores and herbivores. ▪ Suggesting reasons for differences.	-recognise that soils are made from rocks and organic matter. 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. ▪ Rocks and soils can feel and look different. ▪ Rocks and soils can be different in different places/environments.	-identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 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. ▪ Solids, liquids and gases can be identified by their observable properties.	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: ▪ 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.	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: Vibrations ▪ Identify how sounds are made, associating some of them with something vibrating. ▪ Recognise that vibrations from sounds travel through a medium to the ear. ▪ Find patterns between the volume of a sound and the strength of the vibrations that produced it.	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 they are attracted to a magnet, and identify some magnetic materials -describe magnets as having two poles -predict whether two magnets will attract or repel each other, depending on which poles are facing. Pupils should be taught to: ▪ Compare how some things move on different surfaces. ▪ Notice that some forces need contact	-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 Pupils should be taught to: ▪ Identify common appliances that run on electricity. ▪ Construct a simple series electrical circuit, identifying and naming its basic

▪ Water, taken in by the roots, goes up the stem to the leaves, flowers and fruit. ▪ Nutrients (not food) are taken in through the roots. ▪ Stems provide support and enable the plant to grow towards the light. ▪ Plants make their own food in the leaves using energy from the sun. ▪ Flowers attract insects to aid pollination. ▪ Pollination is when pollen is transferred between plants by insects, birds, other animals and the wind. ▪ Fertilisation occurs in the ovary of the flower. ▪ Seeds are formed as a result of fertilisation. ▪ Many flowers produce fruits which protect the seed and/or aid seed dispersal. ▪ Seed dispersal, by a variety of methods, helps ensure that new plants survive. ▪ Plants need nutrients to grow healthily (either naturally from	classifying] to explore and identify local plants and animals. ▪ Making a guide [sorting, grouping, comparing, classifying] to local living things. ▪ Raising and answering questions based on their observations of animals. ▪ What they have found out about other animals that they have researched.	beneficial to health (focus on *energy in versus energy out*. Include information on making informed choices). **Pupils might work scientifically by:** ▪ Comparing and contrasting the diets of different animals (including their pets). ▪ Decide ways of grouping them according to what they eat. ▪ Researching different food groups and how they keep us healthy. Designing meals based on what they find out	▪ Finding out what damages teeth and how to look after them. ▪ Drawing and discussing their ideas about the digestive system. ▪ Comparing them with models or images.	**Notes and Guidance (non-statutory):** Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment. **Pupils might work scientifically by:** ▪ Observing rocks, including those used in buildings and gravestones. ▪ Exploring how and why they might have changed over time. ▪ Using a hand lens or microscope to help them. ▪ Identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.	▪ Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action). ▪ Liquids can pour and take the shape of the container in which they are put. ▪ Liquids form a pool not a pile. ▪ Solids in the form of powders can pour as if they were liquids but make a pile not a pool. ▪ Gases fill the container in which they are put. ▪ Gases escape from an unsealed container. ▪ Gases can be made smaller by squeezing/pressure. ▪ Liquids and gases can flow. **Pupils might work scientifically by:** ▪ Grouping and classifying a variety of different materials. ▪ Exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make	▪ 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 a solid object. ▪ Find patterns in the way that the size of shadows change. **Pupils might work scientifically by:** Looking for patterns in what	▪ Recognise that sounds get fainter as the distance from the sound source increases. ▪ Sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body). ▪ Sounds travel away from their source in all directions. ▪ Vibrations may not always be visible to the naked eye. **Pitch** ▪ Find patterns between the pitch of a sound and features of the object that produced it. ▪ Sounds can be high or low pitched. ▪ The pitch of a sound can be altered.	between two 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 they are attracted to a magnet, and identify some magnetic materials. ▪ Describe magnets as having two poles. ▪ Predict whether two magnets will	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.

the soil or from fertiliser added to soil). ***Pupils might work scientifically by:*** ▪ Comparing the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser; ▪ Discovering how seeds are formed by ▪ Observing the different stages of plant cycles over a period of time; ▪ Looking for patterns in the structure of fruits that relate to how the seeds are dispersed. ▪ Observing how water is transported in plants, for example, by putting cut, white carnations into coloured water. Observing how water travels up the stem to the flowers.		Animals (Skeletons and Movement): Pupils should be taught to: ▪ Identify that humans and some other animals have skeletons and muscles for support, protection and movement. ▪ Identify animals (vertebrates) which have a skeleton which supports their body, aids movement & protects vital organs (be able to name some of the vital organs). ▪ Identify animals without internal skeletons/backbones (invertebrates) and describe how they		▪ Research and discuss the different kinds of living things whose fossils are found in sedimentary rock. ▪ Explore how fossils are formed. ▪ Explore different soils. ▪ Identify similarities and differences between them. ▪ Investigate what happens when rocks are rubbed together or what changes occur when they are in water. Raise and answer questions about the way soils are formed.	food such as chocolate crispy cakes and ice-cream for a party). ▪ Researching the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. ▪ Observing and recording evaporation over a period of time, such as a puddle in the playground or washing on a line. ▪ Investigating the effect of temperature on washing drying or snowmen melting. ▪ Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT. ▪ This unit provides an ideal opportunity for using data logging equipment to detect/measure and compare temperatures.	happens to shadows when the light source moves or the distance between the light source and the object changes.	▪ Pitch can be altered either by changing the material, tension, thickness or length of vibrating objects or changing the length of a vibrating air column. Muffling/blocking sounds ▪ Recognise that vibrations from sounds travel through a medium to the ear. ▪ Sounds are heard when they enter our ears (although the structure of the ear is not important key learning at this age phase). ▪ Sounds can travel through solids, liquids and air/gas by making the materials vibrate. ▪ Sound travel can be reduced by changing the material	attract or repel each other, depending on which poles are facing. **Pupils might work scientifically by:** ▪ Comparing how different things move and grouping them. ▪ Raising questions and carrying out tests to find out how far things move on different surfaces. ▪ Gathering and recording data to find answers to their questions. ▪ Exploring the strengths of	▪ Electricity can be dangerous. ▪ Electricity sources can be mains or battery. ▪ Batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work. ▪ Faults in circuits can be found by methodically testing connections. ▪ Drawings, photographs and diagrams can be used to represent circuits (although standard symbols need not be introduced until UKS2). **Pupils might work scientifically by:** Observing patterns, for example, that

		have adapted other ways to support themselves, move & protect their vital organs. ▪ Know how the skeletons of birds, mammals, fish, amphibians or reptiles are similar (backbone, ribs, skull, bones used for movement) and the differences in their skeletons. ▪ Know that muscles, which are attached to the skeleton, help animals move parts of their body. ▪ Explore how humans grow bigger as they reach maturity by making comparisons linked to body					that the vibrations travel through. ▪ Sound travel can be blocked. **Pupils might work scientifically by:** ▪ Finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. ▪ They might make ear muffs from a variety of different materials to investigate which provides the best insulation against sound. ▪ They could make and play their own instruments by using what they have found out about pitch and volume.	different magnets and finding a fair way to compare them. ▪ Sorting materials into those that are magnetic and those that are not. ▪ Looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another. Identifying how these properties make magnets useful in everyday items and suggesting	bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

		proportions and skeleton growth – e.g. do people with longer legs have longer arm spans? ▪ Recognise that animals are alive; they move, feed, grow, use their senses and reproduce. **Pupils might work scientifically by:** ▪ Identifying and grouping animals with and without skeletons. ▪ Observing and comparing their movement. ▪ Exploring ideas about what would happen if humans did not have skeletons. .					Additional suggestion from Lancashire for working scientifically opportunities which enhance learning and support using ICT across the curriculum This unit provides an ideal opportunity for using data logging equipment to detect/measure and compare sounds.	creative uses for different magnets.	

UKS2 – National Curriculum Statutory Requirements
(Assessment Framework 'Pupil can' statements are denoted by A.F)

Working Scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- *planning different types of scientific enquiries to answer questions, including recognising, and controlling variables where necessary*
- *taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate*
- *recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs*
- *using test results to make predictions to set up further comparative and fair tests*
- *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*
- *identifying scientific evidence that has been used to support or refute ideas or arguments*

YEAR 5/6
(National Curriculum Statutory Requirements)

BIOLOGY					CHEMISTRY	PHYSICS			
Living things and their habitats		**Animals including humans**		**Evolution and Inheritance**	**Properties and changing of materials**	**Earth and Space**	**Light**	**Forces**	**Electricity**
Year 5	**Year 6**	**Year 5**	**Year 6**	**Year 6**	**Year 5**	**Year 5**	**Year 6**	**Year 5**	**Year 6**
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 **Observing Life Cycles:** Pupils should be taught to:	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 microorganisms, plants and animals -give reasons for classifying plants and animals based on specific characteristics.	Pupils should be taught to: -describe the changes as humans develop to old age. **Animals: Human Lifecycles:** Pupils should be taught to: ▪ Describe the changes as humans develop to old age.	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	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	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	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	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	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	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

SWITCHED ON SCIENCE – RISING STARS
DEEP DIVE- PROGRESSION OF SKILLS (Scientific Knowledge & working scientifically)

▪ 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 might work scientifically by:** ▪ Observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times). ▪ Asking pertinent questions. ▪ Suggesting reasons for similarities & differences.	Environment- Classification: 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. ▪ Living things can be grouped into micro-organisms, plants and animals. ▪ Vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals.	▪ Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete. **Pupils might work scientifically by:** ▪ Researching the gestation periods other animals and comparing them with humans. ▪ By finding out and recording the length and mass of a baby as it grows.	within animals, including humans 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. ▪ The heart is a major organ and is made of muscle. ▪ The heart pumps blood around the body through vessels and this can be felt as a pulse. ▪ The heart pumps blood through the lungs in order	-identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 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	substance from a solution -use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating -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. Testing Material Properties: Pupils should be taught to: ▪ Compare and group together	-use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. 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 Sun/Earth/ Moon as approximately spherical bodies. ▪ Use the idea of the Earth's rotation to explain day and night. ▪ The Earth spins once	-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. 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	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: ▪ 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	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: ▪ 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

▪ They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. ▪ Observe changes in an animal over a period of time (for example, by hatching and rearing chicks). ▪ Comparing how different animals reproduce and grow.	▪ Invertebrates can be grouped as snails and slugs, worms, spiders and insects. ▪ Plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses). **Pupils might work scientifically by:** ▪ Using classification systems and keys. ▪ Identifying some animals and plants in the immediate environment. Researching unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.		to obtain a supply of oxygen. ▪ Blood carries oxygen/essential materials to different parts of the body. ▪ During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase. ▪ Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete. ▪ An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals). ▪ Tobacco, alcohol and other 'drugs' can be harmful.	adaptation may lead to evolution. **Pupils might work scientifically by:** ▪ Observing and raising questions about local animals and how they are adapted to the environment. ▪ Comparing how some living things adapt to survive in extreme conditions, e.g. cactuses, penguins and camels. ▪ Analysing the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly	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. ▪ Compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity). Temperature and Thermal Insulation:	around its own axis in 24 hours, giving day and night. ▪ The Earth orbits the Sun in one year. ▪ We can see the Moon because the Sun's light reflects off it. ▪ The Moon orbits the Earth in approximately 28 days and changes to the appearance of the moon are evidence of this. ▪ The Sun appears to move across the sky from East to West and this causes shadows to change during the day.	reflect light into the eye. ▪ Explain that we see things because the light that 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. **Pupils might work scientifically by:** ▪ Deciding [observe/explore] where to place rear-view	, including levers, pulleys and gears, allow a smaller force to have a greater effect. ▪ There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity). ▪ Gravity can act without direct contact between the Earth and an object. ▪ Friction, air resistance and water resistance are forces which slow down moving objects. ▪ Friction, air resistance	position of switches. ▪ Use recognised symbols when representing a simple circuit in a diagram. ▪ Circuit diagrams can be used to construct a variety of more complex circuits predicting whether they will 'work'. **Pupils might work scientifically by:** ▪ Systematically identifying the effect of changing one [thing] component at a time in a circuit. Designing and making a set of traffic lights, a

			▪ All medicines are drugs, not all drugs are medicines. **Pupils might work scientifically by:** ▪ Exploring the work of scientists. ▪ Scientific research about the relationship between diet, exercise, drugs, lifestyle and health. *Additional suggestion beyond NC2014 to support pupils working scientifically and to provide an opportunity to use ICT to collect/interpret data Observing/Measuring changes to breathing, heartbeat and or pulse rates after exercise.	coloured and scented flowers.	▪ Heat always moves from hot to cold. ▪ Some materials (insulators) are better at slowing down the movement of heat than others. ▪ Objects/liquids will warm up or cool down until they reach the temperature of their surroundings. **Pupils might work scientifically by:** ▪ Carry out tests to answer questions such as 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' Compare materials in order to make a switch in a circuit. Material Changes (Reversable Changes):	▪ Changes to shadow length over a day or changes to sunrise and sunset times over a year are evidence supporting the movement of the Earth. **Pupils might work scientifically by:** ▪ Comparing the time of day at different places on the Earth through internet links and direct communication. ▪ Creating simple models of the solar system. ▪ Constructing simple shadow clocks and	mirrors on cars. ▪ Designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. ▪ Investigating the relationship between light sources, objects and shadows by using shadow puppets. ▪ Extend their experience [explore and observe] of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects	and water resistance can be useful or unwanted. ▪ The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect. ▪ More than one force can act on an object simultaneously (either reinforcing or opposing each other). **Pupils might work scientifically by:** ▪ Exploring falling paper cones or cup-cake cases. ▪ Designing and making [exploring] a	burglar alarm or some other useful circuit.

					▪ 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. ▪ Changes can occur when different materials are mixed. ▪ Some material changes can be reversed and some cannot. ▪ Recognise that dissolving is a reversible change. ▪ Distinguish between melting and dissolving.	sundials, calibrated to show midday and the start and end of the school day. ▪ Finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.	looking bent in water and coloured filters (they do not need to explain why these phenomena occur).	variety of parachutes. ▪ Carrying out fair tests to determine which designs are the most effective. ▪ Exploring resistance in water by making and testing boats of different shapes. ▪ Design and make artefacts that use simple levers, pulleys, gears and/or springs and explore their effects.	

					▪ Mixtures of solids (of different particle size) can be separated by sieving. ▪ Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (un-dissolved). ▪ Evaporation helps us separate soluble materials from water. ▪ Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind speed). ▪ Freezing, melting and boiling changes can be reversed (revision from YR4). Material Changes (Irreversible Changes): Pupils should be taught to:				

					▪ 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 might work scientifically by:** ▪ Observing and comparing the changes that take place, for example, when burning different materials or baking bread or cakes. ▪ Researching and discussing how chemical changes have an impact on our lives, for example cooking. ▪ Discuss [research] the creative use of new materials such as polymers, super-sticky and super-thin materials.				

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