Medium Term Curriculum Planning (5+6)

NON-NEGOTIABLES
Subject assessment criteria; Knowledge organiser; Vocabulary organiser

THINGS TO CONSIDER:
Offsite visit; Parental involvement; Take Home Tasks (tats)

Key stage 2 Working scientifically. All Science topics should include:

- 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 5

Year 5: Autumn term Properties

Properties And Changes Of Materials

- **N.C.5.4** 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
- **N.C.5.5** know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution

	• **N.C.5.6** Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • **N.C.5.7** Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • **N.C.5.8** Demonstrate that dissolving, mixing and changes of state are reversible changes • **N.C.5. 9** 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	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	
	Key learning: Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Mixtures can be separated by filtering, sieving and evaporation. Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.	**Possible Evidence:** Can use understanding of properties to explain everyday uses of materials. For example, how bricks, wood, glass and metals are used in buildings Can explain what dissolving means, giving examples Can name equipment used for filtering and sieving Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving Can describe some simple reversible and non-reversible changes to materials, giving examples
	Key vocabulary Thermal, conductor/insulator, electrical resistance, transparency, soluble/insoluble, solution, solvent, mixture, irreversible changes, reversible changes, changing of state.	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **Can you clean dirty water?** (N.C.5.4; N.C.5.5; N.C.5.8) **Which materials conduct heat?** (N.C.5.4; N.C.5.7)	
	Assessment guidance: Applying knowledge in familiar related contexts, including a range of enquiries	
	Key learning: Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat	**Possible Evidence:** Can create a chart or table grouping/comparing everyday materials by different properties Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose

	Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate Investigate rates of dissolving by carrying out comparative and fair test Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton)	Can group solids based on their observations when mixing them with water Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water Can explain the results from their investigations involving dissolving and non-reversible change
Year 5: Spring term 1 Earth and Space	**Earth and space** • **N.C.5.10** Describe the movement of the Earth, and other planets, relative to the Sun in the solar system • **N.C.5.11** Describe the movement of the Moon relative to the Earth • **N.C.5.12** Describe the Sun, Earth and Moon as approximately spherical bodies • **N.C.5. 13** Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	
	Assessment guidance: Applying knowledge in familiar related contexts, including a range of enquiries	
	Key learning: The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (here it is day) and half is facing away from the Sun (night). As the Earth rotates the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.	**Possible Evidence:** Can create a voice over for a video clip or animation Can show using diagrams the movement of the Earth and Moon Can explain the movement of the Earth and Moon Can show using diagrams the rotation of the Earth and how this causes day and night Can explain what causes day and night
	Key vocabulary: Star, planet, spherical bodies, axis, orbit, astronomer, geocentric model, heliocentric model, sun, moon	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **How does the moon move?** (N.C. 5.10;5.11)	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	

	Key learning: Use secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth. Use secondary sources to help make a model to show why day and night occur Make first-hand observations of how shadows caused by the Sun change through the day Make a sundial Research time zones Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel	**Possible Evidence:** Can use the model to explain how the Earth moves in relation to the Sun and the moon moves in relation to the Earth Can demonstrate and explain verbally how day and night occur Can explain evidence gathered about the position of shadows in term of the movement of the Earth. Can show this using a model Can explain how a sundial works Can explain verbally using a model why we have time zones Can describe the arguments and evidence used by scientists in the past
Year 5: Spring term 2 Forces	**<u>Forces</u>** • **N.C.5.14** Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • **N.C.5.15** Identify the effects of air resistance, water resistance and friction, that act between moving surfaces • **N.C.5.16** Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	
	Key learning: A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water or the air and water may be moving over a stationary object.	**Possible Evidence:** Can demonstrate the effect of gravity acting on an unsupported object Can give examples of friction, water resistance and air resistance Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance Can demonstrate how pulleys, levers and gears work

	A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.	
	Key vocabulary: Air resistance, water resistance, buoyancy, upthrust, gravitational pull, pulleys, levers, streamlines, newton, opposing forces	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **Why are zip-wires so fast?** (N.C 5.15)	
	Assessment guidance: Applying knowledge in familiar related contexts, including a range of enquiries	
	Key learning: Investigate the effect of friction in a range of contexts e.g. trainers, bath mats, mats for a helter-skelter Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats Explore how levers, pulleys and gears work Make a product that involves a lever, pulley or gear Create a timer that uses gravity to move a ball Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation	**Possible Evidence:** Can explain the results of their investigations in terms of the force, showing a good understanding that as the object tries to move through the water or air or across the surface, the particles in the water, air or on the surface slow it down Can demonstrate clearly the effects of using levers, pulleys and gears
Y e a	**Living Things And Their Habitats**	

	• **N.C.5.1** Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • **N.C.5.2** Describe the life process of reproduction in some plants and animals • **N.C. 5.3** Describe the changes as humans develop to old age	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	
	Key Learning: Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.	**Possible evidence:** Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways
	Key vocabulary: Metamorphosis, gametes, tuber runners, cuttings, embryo, pregnancy, cuttings, plantlet, egg sperm	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **How do words reproduce?** (N.C 5.2)	
	Assessment guidance: Applying knowledge in familiar related contexts, including a range of enquiries.	
	Key Learning: Use secondary sources and, where possible, first hand observations to find out about the life cycle of a range of animals Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth Look for patterns between the size of an animal and its expected life span Grow and observe plants that reproduce asexually e.g. strawberries, spider plant, potatoes Take cuttings from a range of plants e.g. African violet, mint Plant bulbs and then harvest to see how they multiply Use secondary sources to find out about pollination	**Possible evidence:** Can present their understanding of the life cycle of a range of animals in different ways e.g. drama, pictorially, chronological reports, creating a game Can identify patterns in life cycles Can compare two or more animal life cycles studied Can explain how a range of plants reproduce asexually
Year 5: Summer term 2 Animals	**<u>Animals, including humans</u>** THIS AREA IS LINKED RO SRE WILL BE SHARED ACROSS YEAR 5/6 PUPILS –PUBERTY AND REPRODUCTION • **N.C.5.3** describe the changes as humans develop to old age	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	
	Key Learning:	**Possible evidence:**

	When babies are young they grow rapidly. They are very dependent on their parents. As they develop they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. This needs to be taught alongside PSHE Useful guidance can be obtained at: http://www.ase.org.uk/news/aseviews/teaching-about-puberty/ http://www.ase.org.uk/documents/2016-joint-statement-on-reproduction/	Can explain the changes that takes place in boys and girls during puberty Can explain how a baby changes physically as it grows and also what it is able to do
	Key vocabulary: Gestation, asexual reproduction, sexual reproduction, puberty, prenatal, adolescence, menstruation, adulthood, life expectancy, fertilisation	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **Do we slow down as we get older? (N.C. 5.3)**	

Year 6

Year 6: Autumn term 1 Living things and their habitats	**Living Things And Their Habitats** • **NC.6.1** 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 • **NC.6.2** Give reasons for classifying plants and animals based on specific characteristics	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	
	Key learning: Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups – those that have backbones (vertebrates) and those that do not (invertebrates). Vertebrates can be divided into five small groups – fish, amphibians, reptiles, birds and mammals. Each group has common characteristics. Invertebrates can be	**Possible evidence:** Can give examples of animals in the five vertebrate groups and some of the invertebrate groups Can give the key characteristics of the five vertebrate groups and some invertebrate groups Can compare the characteristics of animals in different groups Can give examples of flowering and non-flowering plants

	divided into a number of groups including insects, spiders, snails and worms. Plants can be divided broadly into two main groups – flowering plants and non-flowering plants.	
	Key vocabulary: Linnaean system, flowering and non-flowering plants, variation, bacteria, microbes, decompose, ferment, single-celled, fungus, mould	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **Why are things classified? (N.C.6.1)**	
	Assessment guidance: Applying knowledge in familiar related contexts, including a range of enquiries	
	Key Learning: Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important Use first hand observation to identify characteristics shared by the animals in a group Use secondary sources to research the characteristics of animals that belong to a group Use information about the characteristics of an unknown animal or plant to assign it to a group Classify plants and animals presenting this in a range of ways – Venn diagrams, Carroll diagrams and keys Create an imaginary animal which has features from one or more groups	**Possible evidence:** Can use classification materials to identify unknown plants and animals Can create classification keys for plants and animals Can give a number of characteristics that explain why an animal belongs to a particular group
Year 6: Autumn term 2 Animals	**<u>Animals including humans</u>** • **NC 6:3** Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • **NC 6:4** Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • **NC 6:5** Describe the ways in which nutrients and water are transported within animals, including humans	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	
	Key Learning:	**Possible evidence:**

	The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well out heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins.	Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do Produces a piece of writing that demonstrates the key knowledge e.g. explanation text, job description of the heart
	Key vocabulary: Circulatory system, heart, blood vessels, oxygenated blood, atrium, artery, vein, capillary, plasma, platelets.	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **How does blood flow? (N.C. 6.3; 6.4)**	
	Assessment guidance: Applying knowledge in familiar related contexts, including a range of enquiries	
	Key learning: Create a role play model for the circulatory system Carry out a range of pulse rate investigations Fair test – effect of different activities on my pulse rate Pattern seeking – exploring which groups of people may have higher or lower resting pulse rates Observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate) Pattern seeking – exploring recovery rate for different groups of people Learn about the impact of exercise, diet, drugs and lifestyle on the body. This is likely to be taught through direct instruction due to its sensitive nature	**Possible evidence:** Use the role play model to explain the main parts of the circulatory system and their role Can use subject knowledge about the heart whilst writing conclusions for investigations Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body Present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body

Year 6: Spring term **Evolution and inheritance**	**<u>Evolution and inheritance</u>** • **NC 6.6** Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • **NC 6:7** Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • **NC 6:8** Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	
	Key Learning: All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time these inherited characteristics become more dominant within the population. Over a very long period of time these characteristics may be so different to how they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.	**Possible evidence:** Can explain the process of evolution Can give examples of how plants and animals are suited to an environment Can give examples of how an animal or plant has evolved over time e.g. penguin, peppered moth Give examples of living things that lived millions of years ago and the fossil evidence we have to support this Can give examples of fossil evidence that can be used to support the theory of evolution

<table>
<tr><td></td><td colspan="2">Key vocabulary: Inheritance, adaptation, inherit, natural selection, adaptive traits, inherited traits, Darwin, evolution, advantageous, theory of evolution, genetics</td></tr>
<tr><td></td><td colspan="2">Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations.
Why do birds have different beaks? (N.C. 6.8)</td></tr>
<tr><td></td><td colspan="2">Assessment guidance:
Applying knowledge in familiar related contexts, including a range of enquiries</td></tr>
<tr><td></td><td>Key Learning:
Design a new plant or animal to live in a particular habitat
Use models to demonstrate evolution e.g. Darwin’s finches bird beak activity
Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution
Make observations of fossils to identify living things that lived on Earth millions of years ago
Identify features in animals and plants that are passed on to offspring
Explore this process by considering the artificial breeding of animals or plants e.g. dogs
Compare the ideas of Charles Darwin and Alfred Wallace on evolution
Research the work of Mary Anning and how this provided evidence of evolution</td><td>Possible evidence:
Can identify characteristics that will make a plant or animal suited or not suited to a particular habitat
Can link the patterns seen in the model to the real examples
Can explain why the dominant colour of the peppered moth changed over a very short period of time</td></tr>
<tr><td>Year 6: Summer term 1
Light</td><td colspan="2"><u>Light</u>
• NC 6:9 Recognise that light appears to travel in straight lines
• NC 6:10 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
• NC 6:11 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
• NC 6:12 Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</td></tr>
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<tr><td></td><td>Key Learning:</td><td>Possible evidence:</td></tr>
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	Light appears to travel in straight lines and we see objects when light from them goes into our eyes. The light may come directly from light sources but for other objects some light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.	Can describe with diagrams or models as appropriate how light travels in straight lines either from sources or reflected from other objects into our eyes. Can describe with diagrams or models as appropriate how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape.
	Key vocabulary: Reflective light, visible spectrum, prism, refraction, light waves, wave length, periscope, straight lines, UV rating, visible light.	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **How does light travel? (N.C.6.9, 6.10 + 6.11)**	
	Assessment guidance: Applying knowledge in familiar related contexts, including a range of enquiries. Shows understanding of a concept using scientific vocabulary correctly	
	Key Learning: Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card Explore the uses of the behaviour of light, reflection and shadows such as in periscope design, rear view mirrors and shadow puppets.	**Possible evidence:** Can explain how evidence from enquiries shows that light travels in straight lines Can predict and explain with diagrams or models as appropriate how the path of light rays can be directed by reflection to be seen, for example reflection in car rear view mirrors or in a periscope. Can predict and explain with diagrams or models as appropriate how the shape of shadows can be varied.
Year 6: Simmer term 2 Electricity	**Electricity** • **NC 6:13** Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • **NC 6:14** 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 • **NC 6:15** Use recognised symbols when representing a simple circuit in a diagram	
	Assessment guidance: Shows understanding of a concept using scientific vocabulary correctly	
	Key Learning: Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors	**Possible evidence:** Can make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs can be changed by increasing or decreasing the number of cells or using cells of different voltages

	or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.	Can draw circuit diagrams of a range of simple series circuits using recognised symbols
	Key Vocabulary: Voltage, amps, resistance, electrons, volts, current, component, circuit diagram, natural electricity, human-made electricity.	
	Cornerstones Investigations for this area of study. Use the TASC wheel for these investigations. **Can you send a coded message? (N.C. 6.13; 6.14)**	
	Assessment guidance: Applying knowledge in familiar related contexts, including a range of enquiries	
	Explain how a circuit operates to achieve particular operations, such as control the light for a torch with different brightness's or make a motor go faster or slower Make circuits to solve particular problems such as a quiet and a loud burglar alarm Carry out fair tests exploring changes in circuits Make circuits that can be controlled as part of a D&T project	Can incorporate a switch into a circuit to turn it on and off Can change cells and components in a circuit to achieve a specific effect Can communicate structures of circuits using circuit diagrams with recognised symbols Can devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test Can predict results and answer questions by drawing on evidence gathered