LITTLETON GREEN COMMUNITY SCHOOL

SCIENCE

My vision for science is to inspire and excite our children through a practical and engaging curriculum. Through this, we aim to inspire our children and foster a thirst for knowledge. These opportunities will ensure that our children are confident, life-long learners who will explore the science around them.

Mrs. G. Machin

Science Subject Lead

SCIENCE Curriculum Aims

- To develop **scientific knowledge** and **conceptual understanding** through the specific disciplines of biology, chemistry and physics
- To develop understanding of the **nature, processes and methods of science** through different types of **science enquiries** that help them to **answer scientific questions** about the world around them
- Are equipped with the scientific knowledge required **to understand the uses and implications of science**, today and for the future.

EYFS and Science

Understanding of the world educational programme (taken from the EYFS Framework 2020)

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

Early learning goals that link to science:

EYFS - Understanding the world

ELG The natural world

- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

What does Science look like at Littleton Green Community School?

Each topic begins with sharing a 'Big Question'. This enables the pupils to see the bigger picture and gives purpose to what they are learning.

BIG QUESTION

ENDPOINT ASSESSMENT

This is a product to showcase the learning which has taken place and the knowledge learnt. It can involve a prior session to create success criteria based on the concepts and a critical evaluation lesson.

ENDPOINT EXPLORATION

At the beginning of the topic, teachers share a WAGOLL (What a Good One Looks Like). Here the learning process is explored and the children have the opportunity to input to their journey to the endpoint.

THE LEARNING JOURNEY

A series of learning opportunities where concepts are built on. Here the meaning is made and connections are formed.

ACTIVATING PRIOR KNOWLEDGE

Throughout the topic, there are built in opportunities for children to access their prior knowledge to help them make connections and make the learning stick. This may be through key vocabulary, knowledge organisers, carefully thought out questioning and more.

KNOWLEDGE ORGANISERS

A resource which is available to children for them to learn the 'sticky knowledge' to master the learning. These are working documents that the children refer to and add their new learning to.

KEY VOCABULARY

At the start and throughout the learning journey, children will be taught key vocabulary need to access the learning and secure the key knowledge .

LITTLETON GREEN COMMUNITY SCHOOL

SCIENCE

START

EYFS

Early Years

UNDERSTANDING THE WORLD

- Exploring the natural world
- Make observations about animals and plants
- Understand changes in the world around them

Year 1

1

- Why do we need our senses?
- How do we know which material would be the best for the three little pigs house?
- Are all plants the same?
- How are animals unique?
- What does animal poo tell us?

Year 2

2

- What do humans need to survive?
- Which stuff is stickier?
- What's on your wellies?
- What lives in a place like this?
- What do I eat and what eats me?

Year 3

3

- Are fossils a key to the past?
- Why must we save the bees?
- Are we what we eat?
- What makes my shadow change?
- Are all metals mighty and magnetic?

Year 4

4

- How does my body process what I eat?
- Is toothpaste a solid, a liquid or a gas?
- What wonderful things live in the deep?
- What happens to a water droplet when it heats and cools?
- What makes the bulb illuminate?
- Can we see sound?

Year 5

5

- Are night and day always the same length?
- What is the greatest force?
- Do all life cycles start with an egg?
- Is there a relationship between gestation and mass in mammals?
- Can a substance always be recovered from a solution?

Year 6

6

- What is the relationship between blood, oxygen and plasma?
- How can we classify living things?
- Does voltage affect light brightness?
- How do our genes impact upon our appearance?
- How do reflection and refraction impact what we see?
- How are babies made?

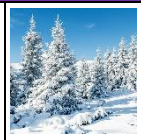
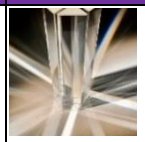
EYFS		
Understanding the Natural World		
• Explore the natural world around them, making observations and drawing pictures of animals and plants.	• Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.	• Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

KS1				
Animals, including Humans	**All living things and their habitats**	**Plants**	**Everyday Materials**	**Seasonal Change**
• Name common animals Carnivores, etc • Human body and senses • Animal reproduction • Healthy living • Basic needs	• Alive or dead • Habitats • Adaptations • Food chains	• Common plants • Plant structure • Plant and seed growth • Plant Reproduction • Keeping plants healthy	• Properties of materials • Grouping materials • Identify different materials • Name everyday materials • Compare the use of different materials • Compare movement on different surfaces	• The four seasons • Seasonal weather

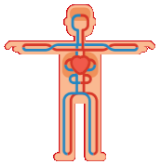
KS2					
Animals, including Humans	**All living things and their habitats**	**Plants**	**Properties and changes in materials**	**Earth and Space**	**Forces**
• Skeleton and muscles • Nutrition • Exercise and Health • Digestive system • Teeth • Food chains • Changes as humans develop from birth to old age • The circulatory system • Water transportation • Impact of exercise on the body	• Grouping living things • Classification keys • Adaptation of living things • Life cycles – plants and animals • Reproductive processes • Famous naturalist • Classification of living things and the reasons for it	• Plant life • Basic structure and functions • Life cycle • Water transportation	• Compare properties of everyday materials • Soluble/ dissolving • Reversible and irreversible substances	• Movement of the Earth and the planets • Movement of the Moon • Night and day	• Different Forces • Magnets • Gravity • Friction • Forces and motion of mechanical devices
Evolution and Inheritance	**Rocks**	**Sound**	**States of Matter**	**Light**	**Electricity**
• Identical and non-identical off-spring • Fossil evidence and evolution • Adaptation and evolution	• Fossil formation • Compare and group rocks • Soil	• How sounds are • made • Sound vibrations • Pitch and Volume	• Compare and group materials • Solids, liquids and gases • Changing state • Water cycle	• Reflections • Shadows • How light travels Reflection • Ray models of light	• Uses of electricity • Simple circuits and switches • Conductors and Insulators • Electricity

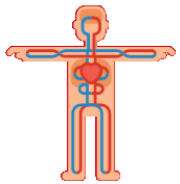
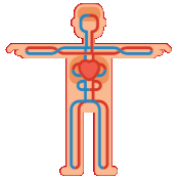
Year group Coverage and Progression of Knowledge

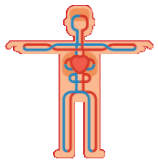
EYFS				
Key Concepts	**Biology**	**Chemistry**	**Physics**	**Scientific Knowledge**
Understanding the world	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.		• Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter	

	Block 1		Block 2		Block 3	
Preschool/ Nursery	 **Exploring Autumn**	 ***Exploring Winter***	 ***Natural Phenomena***		 ***Shadows and reflections***	 ***Water***
PRODUCT	Explain what they have found on an Autumn scavenger hunt	Dress a scarecrow to keep them warm during the winter	Make a rainbow		Create shadow puppets	Build a boat that floats
Reception	 ***Materials***		 ***Signs of spring***	 ***Animal parts and habitats***	 ***Moving on – How we have grown***	
PRODUCT	Create a recycling centre		Grow spring flowers from bulbs	Sort animals and their habitats using a Venn diagram	Demonstrate how they have changed since they were born	

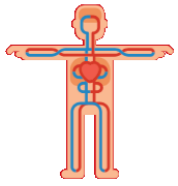
Transition to KS1	*Through our bespoke curriculum, Reception children are introduced to a fascinating world of exploration and discovery. They learn about their bodies and different body parts through engaging songs and direct teaching, helping them develop a strong understanding of themselves. The concept of investigation is introduced, encouraging children to ask questions and explore ways to find answers. Throughout the year, they explore a variety of materials and their properties, fostering curiosity about the world around them. They also begin to understand the four seasons, learning about the types of weather that accompany each one, which helps them care for and grow their own seeds. As part of their plant topic, children identify various plants and their features, while also developing classification skills by sorting and comparing living things. This hands-on learning approach builds their scientific thinking and understanding of the natural world.*

YEAR 1				
Key Concepts	**Biology**	**Chemistry**	**Physics**	**Working Scientifically**
 **Animals including humans** **Why do we need our senses?**	• Know the name of parts of the human body that can be seen			• Ask questions **such as:** ○ Why are flowers different colours? • Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked • Measures (within Year 1 mathematical limits) to help find out more about the investigations undertaken
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Explain why we need our senses	*Feely boxes*	*Abdomen, animal, ankle, arm, calf, chest, chin, elbow, ear, eye, finger, foot, forearm, forehead, hand, hair, head, hearing, human, knee, leg, limb, mouth, neck, nose, pelvis, sense, shoulder, sight, skin, smell, taste, thigh, toe, tongue, touch, upper arm, wrist*	
 **Everyday materials** **How do we know which material would be best for the three little pigs' house?**		• Know the name of the materials an object is made from • Know about the properties of everyday materials	• Name the seasons and know about the type of weather in each season	• Ask questions **such as**: ○ Why are flowers different colours? • Set up a test to see which materials keeps things warmest, know if the test has been successful and can say what has been learned • Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked • Measures (within Year 1 mathematical limits) to help find out more about the investigations undertaken
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Build a prototype waterproof house suitable for testing	*Go on a barefoot walk to notice textures* ***Scientist** – Charles Macintosh*	*Absorbent, bendy, brick, ceramic, clay, concrete, cotton, fabric, glass, hard, leather, material, metal, natural, paper, plastic, sand, stone, stretchy, waterproof, wood, wool*	
Sp1 British Science Week Questions will be linked to the BSW theme				• Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	BSW		*Compare, describe, equipment, investigation, observe, record*	
 **Plants**	• Know and name a variety of common wild and garden plants • Know and name the petals, stem, leaves and root of a plant • Know and name the roots, trunk, branches and leaves of a tree		• Name the seasons and know about the type of weather in each season	• Ask questions **such as**: ○ Why are flowers different colours?

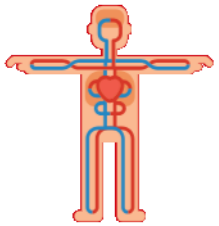
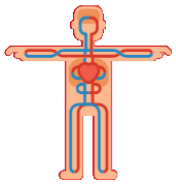
Are all plants the same?	**PRODUCT**	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Illustrate a plant showing the parts	*Share the story of Jack and the Beanstalk* *Grow runner beans* ***Scientist** – George Washington Carver*	*Bark, blade, blossom, branch, bud, bulb, deciduous, evergreen, flower, fruit, hedgerow, leaf, petal, plant, root, seed, soil, stalk, stem, tree, trunk, vein, woodland*	
 **Animals including humans** **How are animals unique?**	• Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds • Know how to sort by living and non-living things			• Ask questions **such as**: ○ Why are flowers different colours?
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Classify living things into their correct classification	*Have class stick insects*	*Camouflage, carnivore, claw, domestic animal, feathers, fur, herbivore, markings, omnivore, paw, scales, whiskers*	
 **Animals including humans** **What does animal poo tell us?**	• Know and classify animals by what they eat (carnivore, herbivore and omnivore)		• Name the seasons and know about the type of weather in each season	• Ask questions **such as**: ○ Why are flowers different colours? • Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Analyse a 'mystery poo' sample	*Read The Little Mole who knew it was none of his Business then play poo bingo*	*Carnivore, diet, dropping, herbivore, omnivore, poo*	

YEAR 2				
Key Concepts	**Biology**	**Chemistry**	**Physics**	**Working Scientifically**
Questions will be linked to the investigations that you choose to do.				• Ask questions such as: • Why do some trees lose their leaves in Autumn and others do not? • Draw conclusions from fair tests and explain what has been found out
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	The product will be linked to the investigations you choose to do.	*Make 'I am a scientist' badges to understand more about what a scientist does*	*Compare, describe, equipment, investigation, observe, record, fair test*	
 **Animals including humans** **What do humans need to survive?**	• Know the basic stages in a life cycle for animals, (including, humans) • Know why exercise, a balanced diet and good hygiene are important for humans			• Ask questions such as: • Why do some trees lose their leaves in Autumn and others do not? • Classify or group things according to a given criteria, e.g. deciduous and coniferous trees
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Explain what humans need to survive	*Have a baby role play area*	*Adult, air, amphibian, arachnid, bird, consumer, crustacean, egg, fish, grow, growth, hatch, hatchling, insect, invertebrate, larva, life cycle, metamorphosis, mollusc, myriapod, offspring, pupa, pupation, reptile, worm*	
 **Everyday materials** **Which stuff is stickier?** ***British Science week*** *Questions that are asked will be linked to the BSW theme*			• Know how materials can be changed by squashing, bending, twisting and stretching. • Know why a material might or might not be used for a specific job.	• Ask questions such as: • Why do some trees lose their leaves in Autumn and others do not? • Know how to set up a fair test • Draw conclusions from fair tests and explain what has been found out • Use measures (within Year 2 mathematical limits) to help find out more about the investigations they are engaged with
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Create unicorn slime	*Have a slime-making experience*	*Compare, data, diagram, equipment, investigation, observe, predict, question, record, fair test, absorbent, capacity, consistency, emulsion, flexible, freeze, measure, melt, mixture*	
 **Plants** **What's on your wellies?**	• Know and explain how seeds and bulbs grow into plants • Know what plants need in order to grow and stay healthy (water, light & suitable temperature)			• Ask questions such as: ○ Why do some trees lose their leaves in Autumn and others do not? • Use microscopes to find out more about plants
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Analyse the bottoms of wellingtons following a muddy walk	*Look at different flowers and explore them by looking at the parts of the*	*Bud, bulb, flower, foliage, fruit, germinate, herb, leaf, petal, poisonous, rainforest, root, scent, seed, shoot, stem, weed*	

<table>
<tr><td></td><td></td><td>flower and smelling them
Scientist – Alan Titchmarsh</td><td colspan="2"></td></tr>
<tr><td rowspan="4"> 
<u>Living things and their habitats</u>
What lives in a place like this?</td><td>• Classify things by living, dead or never lived
• Know how a specific habitat provides for the basic needs of things living there (plants and animals)
• Match living things to their habitat</td><td></td><td></td><td>• Ask questions such as:
• Why do some trees lose their leaves in Autumn and others do not?
• Classify or group things according to a given criteria, e.g. deciduous and coniferous trees</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td>Explain why a particular habitat is suited to a specific animal</td><td>Read meerkat mail
Scientist – David Attenborough</td><td colspan="2">Adaptation, air, amphibian, animal, bird, camouflage, carnivore, excretion, fish, food, habitat, non-living, nutrient, quill, respiration, sensitivity, shelter, temperature,</td></tr>
<tr><td rowspan="4"> 
<u>Living things and their habitats</u>
What do I eat and what eats me?</td><td>• Name some different sources of food for animals
• Know about and explain a simple food chain</td><td></td><td></td><td>• Ask questions such as:
• Why do some trees lose their leaves in Autumn and others do not?</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td>Interpret a given seaside food chain</td><td>Grow tomatoes
Read The Very Hungry Caterpillar</td><td colspan="2">Algae, beach, crustacean, exoskeleton, mollusc, predator, prey, seabird</td></tr>
</table>

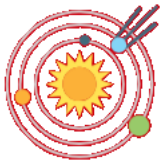
YEAR 3				
Key Concepts	**Biology**	**Chemistry**	**Physics**	**Working Scientifically**
 **Rocks** **Are fossils a key to the past?**			• Compare and group rocks based on their appearance and physical properties, giving reasons • Know how soil is made and how fossils are formed • Know about and explain the difference between sedimentary, metamorphic and igneous rock	• Ask questions such as: • Why does the moon appear as different shapes in the night sky? • Use research to find out what the main differences are between sedimentary and igneous rocks • Test to see which type of soil is most suitable when growing two similar plants
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Illustrate the formation of fossils using sweets and bread	*Read A Pebble In My Pocket* *Palaeontology role play* ***Scientist** – Mary Anning*	*Clay soil, compact, crystal, dinosaur, fossil, fossilisation, geology, igneous, layer, metamorphic, mineral, palaeontology, permeable, pressure, remains, rock, sandy soil, sediment, sedimentary, silty soil, skeleton, subsoil, topsoil,*	
 **Plants** **Why must we save the bees?**	• Know how water is transported within plants • Know the plant life cycle, especially the importance of flowers • Know the function of different parts of flowering plants and trees			• Ask questions such as: • Why does the moon appear as different shapes in the night sky? • Gather and record information using a chart, matrix or tally chart, depending on what is most sensible • Group information according to common factors e.g. plants that grow in woodlands or plants that grow in gardens
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Summarize why bees are imperative to the survival of our planet	*Dissection of a flowering plant* ***Scientist**- Charles Henry Turner*	*Anchor, anther, bud, carbon dioxide, carpel, filament, flower, fruit, germination, growth, leaf, life cycle, nutrient, offspring, petal, phloem, photosynthesis, pollen, pollination, pollinator, root, seed, seedling, sepal, stalk, stamen, stem, vessel, xylem*	
 **Animals including humans** **Are we what we eat?** **British Science Week** ***Questions investigated will be linked to the BSW theme***	• Know about the importance of a nutritious, balanced diet • Know how nutrients, water and oxygen are transported within animals and humans • Know about the skeletal and muscular system of a human			• Ask questions such as: • Why does the moon appear as different shapes in the night sky? • Test to see if their right hand is as efficient as their left hand • Explain to a partner why a test is a fair one e.g. lifting weights with right and left hand, etc • Be prepared to change ideas as a result of what has been found out during a scientific enquiry
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	BSW *Model how sugar and acidic liquids impact upon tooth enamel*	*Grow a range of herbs* ***Scientist** – Elsie Widdowson*	*Ball and socket joint, biceps, bone marrow, carbohydrates, carnivore, cartilage, contract, cranium, dairy, diet, endoskeleton, exoskeleton, femur, fibre, fibula, hamstrings, herbivore, hinge joint, humerus, invertebrate, joint, ligament, limb, malnutrition, mandible, mineral, muscle, nutrient, nutrition, oils, omnivore, patella, pelvis, pivot joint, predator, prey, proteins, radius, rib, ribcage, skeletal muscle, skeleton, spine, sternum, tendon, tibia, triceps, ulna, vertebrate, vitamin*	

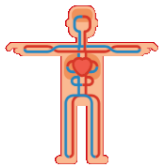
<table>
<tr><td rowspan="2"> 
<u>Light</u>
What makes my shadow change?</td><td></td><td></td><td>• Know that dark is the absence of light
• Know that light is needed in order to see and is reflected from a surface
• Know and demonstrate how a shadow is formed and explain how a shadow changes shape
• Know about the danger of direct sunlight and describe how to keep protected</td><td>• Ask questions such as:
• Why does the moon appear as different shapes in the night sky?
• Observe at what time of day a shadow is likely to be at its longest and shortest
• Be prepared to change ideas as a result of what has been found out during a scientific enquiry</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td></td><td>Summarise the findings of a shadow experiment</td><td>Shadow puppets show
Scientist – Prof Brian Cox</td><td colspan="2">Artificial, block, darkness, light, light source, mirror, moon, natural, opaque, ray, reflect, reflective, reflector, shadow, shiny, translucent, transparent, ultraviolet light</td></tr>
<tr><td rowspan="2"> 
<u>Forces</u>
Are all metals mighty and magnetic?</td><td></td><td></td><td>• Know about and describe how objects move on different surfaces
• Know how a simple pulley works and use to on to lift an object
• Know how some forces require contact and some do not, giving examples
• Know about and explain how magnets attract and repel
• Predict whether magnets will attract or repel and give a reason</td><td>• Ask questions such as:
• Why does the moon appear as different shapes in the night sky?
• Measure carefully (taking account of mathematical knowledge up to Year 3) and add to scientific learning
• Be prepared to change ideas as a result of what has been found out during a scientific enquiry</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td></td><td>Recognise which metals are magnetic through an investigation</td><td>Play a magnetic version of hook a duck</td><td colspan="2">Alloy, attract, attraction, contact force, force, force meter, friction, magnet, magnetic, magnetic force, Newton, pull, push, repel, repulsion, balance, lever, motion, pivot</td></tr>
</table>

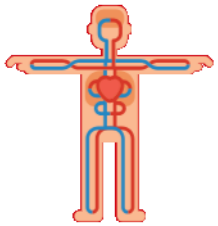
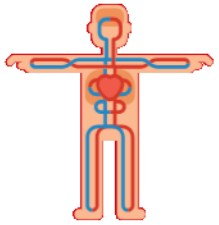
YEAR 4				
Key Concepts	**Biology**	**Chemistry**	**Physics**	**Working Scientifically**
 **Animals including humans** **How does my body process what I eat?**	• Identify and name the parts of the human digestive system • Know the functions of the organs in the human digestive system • Identify and know the different types of human teeth • Know the functions of different human teeth			• Ask questions such as: • Why are steam and ice the same thing? • Use research to find out how much time it takes to digest most of our food
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Model the human digestive system	*Grow strawberries* ***Scientist** - Dr Xand Van Tulleken*	*Abdomen, absorb, bile, bowel, canine, colon, decay, dentine, digestion, digestive system, enamel, enzyme, faeces, filling, gum, incisor, large intestine, mandible, maxilla, milk teeth, molar, oesophagus, plaque, premolar, pulp, rectum, root, small intestine, stomach, wisdom tooth*	
 **States of matter** **Is toothpaste a solid, a liquid or a gas?**		• Group materials based on their state of matter (solid, liquid, gas)		• Ask questions such as: • Why are steam and ice the same thing? • When making predictions there are plausible reasons as to why they have done so • Able to amend predictions according to findings
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Argue if toothpaste is a solid, liquid or a gas	*Dentist visitor*	*Boiling point, compress, condense, condensation, cool, evaporate, evaporation, foam, freeze, freezing, freezing point, gas, gel, heat, liquid, melt, melting, melting point, reversible, solid, state of matter, steam, temperature, viscous, water vapour*	
 **Animals including humans** **What wonderful things live in the deep?** ***British Science Week*** ***Questions to be investigated will be linked to the theme***	• Use and construct food chains to identify producers, predators and prey	• Use classification keys to group, identify and name living things • Know how changes to an environment could endanger living things		• Ask questions such as: • Why are steam and ice the same thing? • Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	BSW *Present information about a chosen deep-sea creature*	*Have animal visitors e.g. pets visit the classroom* ***Scientists** – Sarah Fowler OBE*	*Adaptation, algae, annelid, arthropod, cnidarian, consumer, crustacean, echinoderm, fish, food chain, invertebrate, mammal, mollusc, organism, predator, prey, producer, reptile, vertebrate, amphibian, arthropod, classification, classification key, exoskeleton, segmented, shell, taxonomy*	

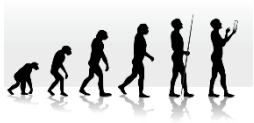
<table>
<tr><td rowspan="3"> 
<u>States of matter</u>
What happens to a water droplet when it heats and cools?</td><td></td><td>• Know the temperature at which materials change state
• Know about and explore how some materials can change state
• Know the part played by evaporation and condensation in the water cycle</td><td></td><td>• Ask questions such as:
• Why are steam and ice the same thing?
• Explain to others why a test that has been set up is a fair one e.g. discover how fast ice melts in different temperatures
• Measure carefully (taking account of mathematical knowledge up to Year 4) and add to scientific learning
• Use a data logger to check on the time it takes ice to melt to water in different temperatures
• Use a thermometer to measure temperature and know there are two main scales used to measure temperature</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td>Explain the water cycle</td><td>Visit Carding Mill Valley</td><td colspan="2">Boil, condense, evaporate, freeze, heating, liquid, melt, mixture, molecule, solid, state, temperature, thermometer</td></tr>
<tr><td rowspan="3"> 
<u>Electricity</u>
What makes the bulb illuminate?</td><td></td><td></td><td>• Identify and name appliances that require electricity to function
• Construct a series circuit
• Identify and name the components in a series circuit (including cells, wires, bulbs, switches, and buzzers)
• Predict and test whether a lamp will light within a circuit
• Know the function of a switch
• Know the difference between a conductor and an insulator, giving examples of each</td><td>• Ask questions such as:
• Why are steam and ice the same thing?
• Use research to find out which materials make effective conductors and insulators of electricity
• Group information according to common factors e.g. materials that make good conductors or insulators</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td>Create a working series circuit</td><td>Play a buzz wire game
Scientist – Thomas Edison</td><td colspan="2">Appliance, battery, battery holder, buzzer, cell, circuit, conductor, conductive, crocodile clip, electrical conductivity, electric current, filament, insulator, light bulb, LED, motor, non-conductive, series circuit, socket, switch, wire</td></tr>
<tr><td rowspan="3"> 
<u>Sound</u>
Can we see sound?</td><td></td><td></td><td>• Know how sound is made, associating some of them with vibrating
• Know how sound travels from a source to our ears
• Know the correlation between pitch and the object producing a sound
• Know the correlation between the volume of a sound and the strength of the vibrations that produced it
• Know what happens to a sound as it travels away from its source</td><td>• Ask questions such as:
• Why are steam and ice the same thing?
• Carry out tests to see, for example, which of two instruments make the highest or lowest sounds and to see if a glass of ice weighs the same as a glass of water
• Set up a fair test with more than one variable e.g. using different materials to cut out sound</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td>Demonstrate how sound can be seen</td><td>Sound walk</td><td colspan="2">Cochlea, decibel, ear canal, eardrum, insulator, ossicles, outer ear, pinna, pitch, sound, soundproof, vibration, volume</td></tr>
</table>

YEAR 5

Key Concepts	Biology	Chemistry	Physics	Working Scientifically
 **<u>Earth and space</u>** **Are night and day always the same length?**			• Know about and explain the movement of the Earth and other planets relative to the Sun • Know about and explain the movement of the Moon relative to the Earth • Know and demonstrate how night and day are created • Describe the Sun, Earth and Moon (using the term spherical)	• Keep an on-going record of new scientific words that they have come across for the first time • Frequently carry out research when investigating a scientific principle or theory
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Explain how day and night differ in length during the year	*Make models of the solar system using fruit* ***Scientists** – Stephen Hawking*	*Atmosphere, axis, constellation, dwarf planet, galaxy, gas giant, heliocentric model, lunar, lunar eclipse, moon, orbit, eclipse, phases of the moon, rotate, satellite, solar, star, Solar system, universe*	
 **<u>Forces</u>** **What is the greatest force?**		• Know what gravity is and its impact on our lives • Identify and know the effect of air and water resistance • Identify and know the effect of friction • Explain how levers, pulleys and gears allow a smaller force to have a greater effect		• Set up a fair test when needed e.g. which surfaces create most friction? • Know what the variables are in a given enquiry and can isolate each one when investigating e.g. finding out how effective parachutes are when made with different materials • Use all measurements as set out in Year 5 mathematics (measurement), including capacity and mass • Use other scientific instruments as needed e.g. thermometer, rain gauge, spring scales (for measuring Newtons) • Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs • Able to give an example of something focused on when supporting a scientific theory e.g. how much easier it is to lift a heavy object using pulleys
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Discuss their own personal 'greatest force'	*Visit the play park and discover forces in action* ***Scientist** – Sir Isaac Newton*	*Aerodynamic, air resistance, contact force, drag, force meter, friction, fulcrum, gear, gravity, gravitational force, lever, magnetism, mass, mechanism, Newton, pulley, streamline, water resistance, weight*	
 **<u>Living things and their habitats & plants</u>** **Do all life cycles start with an egg?** ***British Science Week***	• Know the life cycle of different living things e.g. mammal, amphibian, insect and bird • Know the differences between different life cycles • Know the process of reproduction in plants			• Use diagrams, as and when necessary, to support Writing • Able to relate causal relationships when, for example, studying lifecycles
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	BSW *Illustrate their understanding of reproduction in plants*	*Read Tadpole's Promise* *Grow sunflowers*	*Annelid, arachnid, crustacean, gastropod, insect, life cycle, metamorphosis, myriapod, pupa, anther, bud, carpel, filament, flower, fruit, germination, growth, life cycle, petal, pollen, pollination, pollinator, seed, seedling, sepal, stalk, stamen, ovary, ovule*	

Questions investigated will be linked to the BSW theme				
 **Animals including humans** **Is there a relationship between gestation and mass in mammals?**	• Know the process of reproduction in animals • Create a timeline to indicate stages of growth in humans			• Set up an enquiry-based investigation e.g. find out what adults / children can do now that they couldn't when a baby
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Calculate the relationship between the gestation and mass in mammals	*Have a baby and toddler visit and compare what differences they have* ***Scientist** – Jane Goodall*	*Acne, adolescent, adult, ageing, gestation, growth, growth spurt, hormone, infant, juvenile, puberty*	
 **Properties and changes in materials** **Can a substance always be recovered from a solution?**		• Compare and group materials based on their properties (e.g.hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets • Know and explain how a material dissolves to form a solution • Know and show how to recover a substance from a solution • Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) • Know and demonstrate that some changes are reversible and some are not • Know how some changes result in the formation of a new material and that this is usually irreversible		• Set up an investigation when it is appropriate e.g. finding out which materials dissolve or not • Make predictions based on information gleaned from investigations • Create new investigations which take account of what has been learned previously • Is evaluative when explaining findings from scientific enquiry • Clear about what has been found out from recent enquiry and can relate this to other enquiries, where appropriate
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Demonstrate how to recover a substance from a solution	*Go on a materials treasure hunt in the school environment* ***Scientist** – Spencer Silver*	*Absorbent, bendy, chemical change, conductor, dissolve, filter, filtration, heterogeneous, homogeneous, insoluble, insulator, irreversible change, magnetic, mixture, property, reversible change, sieving, soluble, solution*	

YEAR 6				
Key Concepts	**Biology**	**Chemistry**	**Physics**	**Working Scientifically**
 **Animals including humans** **What is the relationship between blood, oxygen and plasma?**	• Identify and name the main parts of the human circulatory system • Know the function of the heart, blood vessels and blood • Know the impact of diet, exercise, drugs and lifestyle on health • Know the ways in which nutrients and water are transported in animals, including humans			• Know how to set up an enquiry-based investigation e.g. what is the relationship between oxygen and blood?
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Explain the relationship between blood, oxygen and plasma	*CPR training* *Heart dissection* ***Scientist** – Christiaan Barnard*	*Arteries, blood group, blood pressure, blood vessels, capillaries, circulation, platelets, plasma, red blood cells, vein, white blood cells, antibody, aorta, atrium, bone marrow, cell, circulatory system, clot, deoxygenate, haemoglobin, heart rate, oxygenated, platelet, septum, valve, ventricle*	
 **Animals including humans** **How can we classify living things?**	• Classify living things into broad groups according to observable characteristics and based on similarities and differences • Know how living things have been classified • Give reasons for classifying plants and animals in a specific way			• Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	
	Demonstrate how to classify living things	*Play animal classification snap* ***Scientist** – Mary Leakey*	*Animal kingdom, characteristic, classification, kingdom, fungus kingdom, monera kingdom, plant kingdom, protista kingdom*	
BRITISH SCIENCE WEEK **Question investigated will be linked to the BSW theme**		• Compare and give reasons for why components work and do not work in a circuit • Draw circuit diagrams using correct symbols • Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer		• Make accurate predictions based on information gleaned from their investigations and create new investigations as a result
	PRODUCT	**CULTURAL CAPITAL**	**KEY VOCABULARY**	

<table>
<tr><td> 
<u>Electricity</u>
Does voltage affect light brightness?</td><td>Create a working circuit showing how voltage affects the brightness of the bulb</td><td>Make a Lego lighthouse
Scientist - Alhazen</td><td colspan="2">Appliance, battery, battery holder, buzzer, cell, circuit, conductor, conductive, crocodile clip, electrical conductivity, electric current, filament, insulator, light bulb, LED, motor, non-conductive, series circuit, socket, switch, wire, voltage</td></tr>
<tr><td rowspan="3"> 
<u>Evolution</u>
How do our genes impact upon our appearance?</td><td>• Know how the Earth and living things have changed over time
• Know how fossils can be used to find out about the past
• Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents)
• Know how animals and plants are adapted to suit their environment
• Link adaptation over time to evolution
• Know about evolution and can explain what it is</td><td></td><td></td><td>• Keep an on-going record of new scientific words that they have come across for the first time and use these regularly in future scientific write ups
• Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class
• Able to give an example of something they have focused on when supporting a scientific theory e.g. classifying vertebrate and invertebrate creatures or why certain creatures choose their unique habitats</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td>Demonstrate how Galapagos tortoises are adapted to their island homes</td><td>Role play ‘Darwin’s finches’
Scientist – Rosalind Franklin</td><td colspan="2">Adaptation, ancestor, evolution, evolve, extinct, fossil, inheritance, natural selection, naturalist, origin, palaeontologist, variation</td></tr>
<tr><td rowspan="3"> 
<u>Light</u>
How do reflection and refraction impact what we see?</td><td></td><td></td><td>• Know how light travels
• Know and demonstrate how we see objects
• Know why shadows have the same shape as the object that casts them
• Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.</td><td>• Set up a fair test when needed e.g. does light travel in straight lines?
• Use a range of written methods to report findings, including focusing on the planning, doing and evaluating phases
• Frequently carry out research when investigating a scientific principle or theory</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td>Recall how reflection and refraction impact what we see</td><td>Eye spy with a homemade periscope</td><td colspan="2">Absorb, beam, concave, cone, convex, cornea, electromagnetic spectrum, iris, lens, light source, light wave, opaque, optic nerve, plane mirror, prism, pupil, ray, reflect, refract, retina, spectrum, translucent, transparent, ultraviolet light, visible light, wavelength, white light</td></tr>
</table>

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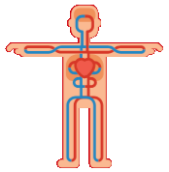
<tr><td rowspan="4"> 
<u>Animals including humans</u>
How are babies made?</td><td colspan="4">Understand the human life cycle including conception</td></tr>
<tr><td>PRODUCT</td><td>CULTURAL CAPITAL</td><td colspan="2">KEY VOCABULARY</td></tr>
<tr><td>Recall how babies are conceived</td><td>Read Where Willy Went</td><td colspan="2">Human, sexual reproduction, semen, sperm, egg, fallopian tube, uterus, penis, testicles, vagina, male, female</td></tr>
</table>