

## Year 6 – Classification of Living Things

National Curriculum Objectives	Key Knowledge	Vocabulary	
<ul style="list-style-type: none"> <li>Classify living things into broad groups according to observable characteristics and based on similarities and differences.</li> <li>Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>	<ul style="list-style-type: none"> <li>Different classes of vertebrates and major characteristics: fish, amphibians, reptiles, birds, mammals (review from Year 4)</li> <li>Scientists have divided living things into five large groups called kingdoms. Each Kingdom is divided into smaller groupings as follows: Phylum, Class, Order, Family, Genus, Species, Variety</li> <li>Variation exists within a population (and between offspring of some plants).</li> <li>Organisms best suited to their environment are more likely to survive long enough to reproduce.</li> <li>Organisms reproduce and offspring have similar characteristic patterns.</li> </ul>	<p><b>Classification:</b> animals, vertebrate, invertebrate, mammal, fish, bird, amphibian, reptile, organism, classify, compare, kingdom, order, genus</p> <p><b>Variation/adaptation:</b> similar, different, variation, adaption, evolution, offspring, reproduction</p> <p><b>Characteristics/inheritance:</b> common, family, related, characteristic, environmental, inherited, offspring, reproduction, genetic, genes, dominant, recessive</p>	
		<b>Key Scientists</b>	<b>Linked Texts</b>
		Carl Linnaeus (Identifying, Naming and Classifying Organisms)  Charles Darwin (Variation and Adaptation)	<i>Variation and Classification</i> (Melanie Waldron)  <i>On The Origin of Species</i> (Sabina Radeva)

Prior Learning	Key Questions	Future Learning
<ul style="list-style-type: none"> <li>Classification of Plants and Animals: Cold-blooded or warm-blooded, vertebrates or invertebrates, characteristics of animal classes, classification of plants.(Y4)</li> <li>Recognise that living things can be grouped in a variety of ways. (Y4)</li> <li>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4) Recognise that environments can change and that this can sometimes pose danger to living things.</li> <li>Evolution: Fossils, adaptation, characteristics passing through generations, Mary Anning, Alfred Wallace, Charles Darwin, Darwin’s sketches of finches. (Y5)</li> </ul>	<p>What is classification? How do we classify animals? What groups of vertebrates are there? What makes a mammal a mammal? What are the difficulties with classification? What are the groups invertebrates? What is variation? Why does it exist? What is adaptation? Why does it exist? What does inheritance mean? What are environmental characteristics? Why do animals compete? Why do animals evolve? What is the difference between variation and adaptation? What is the difference between micro and macro evolution? Which is more important, inherited or environmental characteristics?</p>	<ul style="list-style-type: none"> <li>The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere.</li> <li>The adaptations of leaves for photosynthesis.</li> <li>The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops.</li> <li>The importance of plant reproduction through insect pollination in human food security.</li> <li>How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.</li> </ul>

 Comparative & Fair tests	 Identify & Classify	 Observation over time	 Pattern Seeking	 Research	<b>BIG Question: Assessment Opportunity</b>
Which is the most common invertebrate on our school playing field?	How would you make a classification key for vertebrates/invertebrates?		Do all birds have the same beaks?	How did Charles Darwin discover microevolution?	In what ways can we sort living things?

# Year 6 – Chemistry

National Curriculum Objectives		Key Knowledge		Vocabulary	
<ul style="list-style-type: none"> <li>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.</li> <li>comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic.</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>Explain that some changes result in the formation of new materials. This kind of change is usually not reversible, including changes such as burning and the action of acid on bicarbonate of soda.</li> </ul>		<p><b>Atoms, molecules, and compounds</b></p> <ul style="list-style-type: none"> <li>Basics of atomic structure: protons (positive), neutrons (neutral), electrons (negative)</li> <li>Atoms are constantly in motion, electrons move around the nucleus in paths called shells (or energy levels).</li> <li>Atoms may join together to form molecules/compounds.</li> <li>Common compounds and their formula</li> </ul> <p><b>Elements</b></p> <ul style="list-style-type: none"> <li>Elements have atoms of only one kind, having the same number of protons. There are a little more than 100 different elements.</li> <li>The periodic table: organises elements with common properties: Atomic symbol and atomic number</li> <li>Some well-known elements and their symbols</li> <li>Two categories of elements: metals and non-metals.</li> </ul> <p><b>Chemical and physical change</b></p> <ul style="list-style-type: none"> <li>Chemical change changes what a molecule is made from/ results in a new substance with new molecular structure.</li> <li>Physical change changes only the properties or appearance of the substance, but does not change what the substance is made up of.</li> </ul>		<p><b>Atoms, molecules, and compounds:</b> atom, proton, neutron, electron, matter, particle, molecule, compound, formula, nucleus, shells</p> <p><b>Elements:</b> atom, proton, neutron, electron, matter, particle, element, periodic table, metal, non-metal, atomic number, atomic symbol</p> <p><b>Chemical and physical change:</b> reversible, irreversible, solution, dissolving, mixture, suspension, chemical change, physical change, molecule, substance,</p>	
Prior Learning		Key Questions		Future Learning	
<ul style="list-style-type: none"> <li>Compare and group materials according to whether they are solids, liquids or gases.</li> <li>Observe that some materials change state when heated or cooled.</li> <li>Identify the part played by evaporation and condensation in the water cycle.</li> <li>Chemistry: Properties- solubility, conductivity, flexibility etc., fair testing, solubility, mixtures, reversible changes- dissolving, mixing, change of state. (Y5)</li> </ul>		<p>What is an atom?                      What are the three subatomic particles?                      What are the three states of matter?                      What is a reversible/irreversible change?                      Why is the periodic table such a useful tool?                      What is molecule?                      How are compounds created?                      What are the properties of metals?                      What does an elements atomic number tell us?                      Why do some elements not react with others?                      What is the difference between physical/chemical change?                      Give 3 examples of uses of elements based upon their properties.</p>		<ul style="list-style-type: none"> <li>Pure &amp; impure substances</li> <li>Chemical reactions</li> <li>Energetics</li> </ul>	
 <b>Comparative &amp; Fair tests</b>	 <b>Identify &amp; Classify</b>	 <b>Observation over time</b>	 <b>Pattern Seeking</b>	 <b>Research</b>	<b>BIG Question: Assessment Opportunity</b>
Which material rusts fastest/slowest? How can we change the 'jellyness' of jelly?	Can you identify and classify these reactions and changes into reversible, and irreversible?	How does a nail in salt water change over time?	What patterns can you notice in different reactions? How does the amount of bicarbonate of soda, washing up liquid and vinegar affect the reaction?	What are smart materials and how can they help us?	How can we change materials reversibly and irreversibly?

## Year 6 – Plants (structure and processes)

National Curriculum Objectives		Key Knowledge		Vocabulary	
<ul style="list-style-type: none"> <li>Identify and describe the functions of different parts of the flowering plant: roots, stem/trunk/leaves and flowers.</li> <li>Explore the part flowers play in a flowering plants life cycle, including: pollination, seed formation and seed dispersal.</li> <li>Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary between plants.</li> <li>Know the way in which water is transported between plants</li> </ul>		<p><b>Structure: non-vascular and vascular plants</b></p> <ul style="list-style-type: none"> <li>Non-vascular plants (for example: algae)</li> <li>Vascular plants have tube-like structures that allow water and dissolved nutrients to move through the plant</li> <li>Parts and functions of vascular plants: roots, stems and buds, leaves</li> </ul> <p><b>Photosynthesis:</b> Plants are producers, they make their own food.</p> <ul style="list-style-type: none"> <li>Their leaves absorb sunlight and carbon dioxide.</li> <li>Photosynthesis is an important life process that occurs in plant cells, but not animal cells (photo = light; synthesis = putting together).</li> <li>Role in photosynthesis of: energy from sunlight, chlorophyll, carbon dioxide and water</li> </ul>		<p><b>Vascular/non-vascular plants:</b> air, light, water, soil, growth, root, stem, bud, leaves, vascular, non-vascular, dissolved, nutrients,</p> <p><b>Photosynthesis:</b> light, energy, leaves, carbon dioxide, oxygen, photosynthesis, absorb, chlorophyll, cell, xylem, phloem, stomata</p>	
				<b>Key Scientists</b>	<b>Linked Texts</b>
				David Attenborough (Naturalist and Nature Documentary Broadcaster)	<i>The Hidden Forest (Jeannie Baker)</i>  <i>George and Flora's Secret Garden (Jo Elworthy)</i>
<b>Prior Learning</b>		<b>Key Questions</b>		<b>Future Learning</b>	
<ul style="list-style-type: none"> <li>identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers (Y3)</li> <li>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 (Y3)</li> <li>investigate the way in which water is transported within plants (Y3)</li> <li>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3)</li> </ul>		<ul style="list-style-type: none"> <li>Can a plant live without its leaves?</li> <li>What conditions are perfect for a seed to grow?</li> <li>Do plants take in water through their roots?</li> <li>How does water move through the plant?</li> <li>How do plants make their food?</li> <li>How does light affect plant growth?</li> </ul>		<ul style="list-style-type: none"> <li>Photosynthesis: the reactants in, and products of, photosynthesis, and a word summary for photosynthesis; the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere; the adaptations of leaves for photosynthesis.</li> <li>The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops (KS3)</li> <li>The importance of plant reproduction through insect pollination in human food security (KS3)</li> </ul>	
 <b>Comparative &amp; Fair tests</b>	 <b>Identify &amp; Classify</b>	 <b>Observation over time</b>	 <b>Pattern Seeking</b>	 <b>Research</b>	<b>BIG Question: Assessment Opportunity</b>
How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?		What happens to celery when it is left in a glass of coloured water? How do flowers in a vase change over time?			

## Year 6 – Plants (reproduction)

National Curriculum Objectives		Core Knowledge		Vocabulary	
<ul style="list-style-type: none"> <li>Identify and describe the functions of different parts of the flowering plant: roots, stem/trunk/leaves and flowers.</li> <li>Explore the part flowers play in a flowering plants life cycle, including: pollination, seed formation and seed dispersal.</li> <li>Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary between plants.</li> <li>Know the way in which water is transported between plants</li> </ul>		<b>REPRODUCTION IN PLANTS</b> <ul style="list-style-type: none"> <li>Sexual reproduction flowering plants</li> <li>Sexual reproduction of non-flowering seed plants</li> <li>Sexual reproduction by spore bearing plants</li> <li>Asexual reproduction</li> <li>Functions of sepals and petals, stamen (male), anther, pistil (female), ovary (or ovule)</li> <li>Process of seed and fruit production: pollen, wind, insect and bird pollination, fertilisation, growth of ovary, mature fruit</li> <li>Seed germination and plant growth: seed coat, embryo and endosperm, germination (sprouting of new plant)</li> </ul>		<b>Reproduction in plants:</b> seed, flower, petal, pollen, fruit, asexual, sexual, reproduction, spore, sepal, stamen, filament, anther, ovary, pistil, fertilisation, germination, dispersal, vegetative	
				<b>Key Scientists</b>	<b>Linked Texts</b>
				David Attenborough (Naturalist and Nature Documentary Broadcaster)	<i>The Hidden Forest</i> (Jeannie Baker)
				James Brodie (Reproduction of Plants by Spores)	<i>George and Flora's Secret Garden</i> (Jo Elworthy)
Prior Learning		Key Questions		Future Learning	
<ul style="list-style-type: none"> <li>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers (Y3)</li> <li>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 (Y3)</li> <li>investigate the way in which water is transported within plants (Y3)</li> <li>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3)</li> </ul>		<ul style="list-style-type: none"> <li>Do plants reproduce in the same ways as us?</li> <li>How do plants spread their seeds?</li> <li>How do plants reproduce?</li> <li>Do all flowers look the same?</li> <li>How do insects know which flowers to pollinate?</li> <li>Why do flowers smell?</li> <li>What do seeds do?</li> </ul>		<ul style="list-style-type: none"> <li>The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops (KS3)</li> <li>The importance of plant reproduction through insect pollination in human food security (KS3)</li> </ul>	
 <b>Comparative &amp; Fair tests</b>	 <b>Identify &amp; Classify</b>	 <b>Observation over time</b>	 <b>Pattern Seeking</b>	 <b>Research</b>	<b>BIG Question: Assessment Opportunity</b>
Which conditions help seeds germinate faster?	How many different ways can you group our seed collection?	How does a bean change as it germinates?	What colour flowers do pollinating insects prefer?	What are all the different ways that seeds disperse?	Do all plants and animals reproduce in the same way?

## Year 6 – Human Body (reproduction)

National Curriculum Objectives		Core Knowledge		Vocabulary	
<ul style="list-style-type: none"> <li>Describe the changes as humans develop to old age.</li> <li>Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird.</li> <li>Know the differences between different life cycles.</li> <li>Know the process of reproduction in animals.</li> </ul>		<p><b>Human growth stages:</b> Different animals mature at different rates and live to different ages. Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction</p> <p>Puberty</p> <p><b>The reproductive system</b> in females &amp; males; sexual reproduction. Some organisms reproduce sexually where offspring inherit information from both parents.</p> <p><b>The endocrine system:</b> Hormones control these changes; which can be physical and/or emotional.</p> <p>The human body has two types of glands: duct glands (such as the salivary glands), and ductless glands, also known as the endocrine glands.</p> <ul style="list-style-type: none"> <li>Endocrine glands</li> <li>Pituitary gland</li> <li>Thyroid gland</li> <li>Pancreas</li> <li>Adrenal glands</li> </ul>		<p>Human growth stages: <b>parent, infant, puberty, adult, reproduction, penis, vagina, growth spurt, hair growth, breasts, voice change, pregnancy</b></p> <p>Reproduction in mammals: <b>ovaries, fallopian tubes, uterus, menstruation, testes, scrotum, urethra, semen, intercourse, fertilisation, zygote, implantation, embryo</b></p> <p>The endocrine system: <b>hormones, endocrine, glands, ducts, pituitary, thyroid, pancreas, adrenal,</b></p>	
		Key Scientists		Linked Texts	
		<p>Miriam Menkin</p> <p>Antonie van Leeuwenhoek</p>		<p><i>What's Happening To Me?</i> (Usbourne books)</p> <p><i>How To Build A Human Body</i> (Tom Jackson)</p> <p><i>What Makes Me Me?</i> (Robert Winston)</p>	
Prior Learning		Key Questions		Future Learning	
<p>The Human Body: Circulation: The circulatory system, the heart, the blood vessels, the blood, blood pressure and heart rate. (Yr 5)</p> <p>The Human Body : The muscular system, the skeletal system, the nervous system. (Yr 4)</p> <p>Cycles in Nature: Seasonal cycles and plants, animal migration. Life cycles of a plant and a frog. (Yr 3)</p> <p>The Human Body: Cells, organ systems, the digestive system, teeth and senses, a healthy diet, vitamins and minerals (Yr 3)</p>		<ul style="list-style-type: none"> <li>Do all animal embryos look the same?</li> <li>How do humans change?</li> <li>Why do humans change?</li> <li>What is a life cycle? What types of life cycles are there?</li> <li>Are life cycles the same?</li> <li>What causes puberty?</li> <li>What changes do we go through during puberty?</li> <li>Are there any patterns between vertebrate animals and their gestation periods?</li> </ul>		<ul style="list-style-type: none"> <li>Reproduction: reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta (KS3)</li> </ul>	
 <b>Comparative &amp; Fair tests</b>	 <b>Identify &amp; Classify</b>	 <b>Observation over time</b>	 <b>Pattern Seeking</b>	 <b>Research</b>	<b>BIG Question: Assessment Opportunity</b>
<p>How does age affect a human's reaction time?</p> <p>Who grows the fastest, girls or boys?</p>	<p>Can you identify all the stages in the human life cycle?</p> <p>Compare this collection of animals based on similarities and differences in their lifecycle.</p>	<p>How do different animal embryos change?</p>	<p>Is there a relationship between a mammal's size and its gestation period?</p>	<p>What are the differences between the life cycle of an insect and a mammal?</p> <p>Why do people get grey/white hair when they get older?</p>	<p>Do all plants and animals reproduce in the same way?</p>

## Year 6 – Famous Scientists and their Discoveries

National Curriculum Objectives	Key Knowledge	Vocabulary	
<ul style="list-style-type: none"> <li>Not NC linked</li> </ul>	<p>To understand the role of prominent scientists in their respective fields.</p> <ul style="list-style-type: none"> <li>Stephen Hawking – physics (event horizons and black holes)</li> <li>Marie Maynard Daily – chemistry (first African American woman to earn a PhD in chemistry)</li> <li>Alexander Fleming – biology (discovery of penicillin)</li> <li>Mary Leakey – paleoanthropologist</li> <li>Daniel Hale Williams – biology (first doctor to complete open heart surgery)</li> </ul>	<p>Each scientist that will be studied will have vocabulary linked to their work and subject matter. This will be reflected in the children’s work as well as through glossaries in their writing.</p>	
		<b>Key Scientists</b>	<b>Linked Texts</b>
		Stephen Hawking	<i>Little People, Big Dreams, Stephen Hawkins</i>
		Marie Maynard Daily	<i>Alexander Fleming for Kids Ruth Richards</i>
		Alexander Fleming	
		Mary Leakey	<i>Mary Leakey: Archaeologist Who Really Dug Her Work – Mike Venezia</i>
		Daniel Hale Williams	<i>Daniel Hale Williams: Surgeon Who Opened Hearts and Minds– Mike Venezia</i>
Prior Learning	Key Questions	Future Learning	
<ul style="list-style-type: none"> <li>All year groups have science biographies.</li> </ul>	<ul style="list-style-type: none"> <li>What did this scientist discover?</li> <li>What do you know about their life and work?</li> <li>What are the effects of black holes?</li> <li>What are the characteristics of invertebrates;</li> </ul>	<p>Students will learn more about the work of these and other scientists as they move into KS3.</p>	