

Science Department - Year 8 Scheme of Work

National Curriculum/ AAA links: https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study				
Term	Title	Unit content	Key vocabulary	Resource links:
AUTUMN 1				
Week 1	Key concepts recap	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> Data and showing data – continuous and discrete Plotting bar graphs with data given <p>Practical ideas:</p> <ul style="list-style-type: none"> Collect data – favourite ice-cream / bead colours / skittles / smarties colour / types of pasta and plot <p>Key skills developed:</p> <ul style="list-style-type: none"> Collect data in an appropriate results table Draw accurate bar graphs Analyze graphs to show understanding of the data they show 	Data, continuous, discrete, bar graph, line graph, x-axis, y-axis	Unit 1 Key concepts recap
Week2	Key concepts recap	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> Practical which enables collection of data for a bar chart Line graphs – looking at suitable scales for axes Plotting graphs collect water / chocolate cooling curve data and plot <p>Practical ideas:</p>	x-axis, y-axis, line graph, line of best fit, curve	Unit 1 Key concepts recap

		<ul style="list-style-type: none"> Plot graphs for water cooling curves <p>Key skills developed:</p> <ul style="list-style-type: none"> Collect data in an appropriate results table Draw accurate line graphs including a line of best fit 		
Week 3	Health and nutrition	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> Good and ill health. Cover WHO definition Balanced human diet – look at different foods decide what group they belong to Imbalances in diet – anaemia, rickets, scurvy, Kwashiorkor – use PowerPoint – blank worksheet for recap <p>Practical ideas:</p> <ul style="list-style-type: none"> Practical ideas: Test for starch, fats, sugar, proteins How much sugar is in food – look out different foods – weigh out the amount of sugar in these foods <p>Key skills developed:</p> <ul style="list-style-type: none"> Understand the importance of a balanced diet Understand some problems caused by an imbalanced diet including anemia, rickets, scurvy, Kwashiorkor 	WHO, health, balanced diet, protein, starch, vitamins, anemia, rickets, scurvy, kwashiorkor	Unit 2 Health and nutrition
Week 4	Health and nutrition	<p>Key knowledge taught:</p> <p>Digestive system</p> <p>Energy in food</p>	Mouth, small intestine, large intestine, stomach, anus,	Unit 2 Health and nutrition

		<p>Practical ideas:</p> <ul style="list-style-type: none"> • Watch demo – food blender and tights (add food groups and enzymes model what happens as food travels through the body. Use model of torso • Carry out practical to show the amount of energy in food – use lit food to see how much the temp rises <p>Key skills developed:</p> <ul style="list-style-type: none"> • Identify and label the key parts of the digestive system • Describe how our digestive system allow us to get what we need from our food • Identify how much energy different types of food have, link to balanced diet and the amount of calories different groups of people need daily 	energy, calories	
Week 5	Disease	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Communicable versus non-communicable disease • Pathogens - How we can prevent spread How our body protects us? • Non-communicable diseases and risk factors <p>Practical ideas:</p> <ul style="list-style-type: none"> • Research ways to prevent the spread of disease (IT task) <p>Key skills developed:</p> <ul style="list-style-type: none"> • State the difference between types of diseases • Explain what a pathogen is and how they make us sick • Describe some risk factors around common non-communicable diseases e.g. heart disease 	Communicable, non-communicable, pathogen, disease, spread, prevent	Unit 3 Disease

Week 6	Chemical reactions (metals and acids)	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Element, compounds and mixtures • Chemical and physical changes <p>Practical ideas:</p> <ul style="list-style-type: none"> • Example chemical and physical changes, e.g. changes of state, burning magnesium etc. <p>Key skills developed:</p> <ul style="list-style-type: none"> • Describe the difference between elements, compounds and mixtures • Give examples of chemical and physical changes • Explain the difference between chemical and a physical change 	Element, compound, mixture, chemical change, physical change, reaction	Unit 3 Disease
Week 7	Chemical reactions (metals and acids)	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • acid and metal reactions – word and symbol equations • Metal reactions with oxygen and water • Intro to balancing equations <p>Practical ideas:</p> <ul style="list-style-type: none"> • Metal and acid reactions, including test for hydrogen gas (squeaky pop) <p>Key skills developed:</p> <ul style="list-style-type: none"> • Write word and symbol equations for reactions of metal with common acids • Write word and symbol equations for reactions of metal with oxygen • Write word and symbol equations for reactions of metal with water • Describe how to test for hydrogen gas 	Acid, metal, hydrogen, squeaky pop, word equation, symbol equation	Unit 4 Chemical reactions

		<ul style="list-style-type: none"> • Write balanced symbol equations for the above reactions 		
AUTUMN 2				
Week 1	Chemical reactions (metals and acids)	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Reactivity series • Metal displacement reactions • Extracting metals <p>Practical ideas:</p> <ul style="list-style-type: none"> • Testing reactivity of metals in acid and water • Metal displacement reactions <p>Key Skills developed:</p> <ul style="list-style-type: none"> • Order metals by reactivity from observations of their reactions with acid and water • Show metal displacement reactions with word and symbol equations • Use the reactivity series to predict displacement reactions 	Reactivity, metal, acid, water, hydrogen, inert, reactive	Unit 4 Chemical reactions
Week 2	Assessment Week			
Week 3	Static and current electricity	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Electrostatic charges • Static discharge (van der graff, lightening etc) • Current and charge <p>Practical ideas:</p> <ul style="list-style-type: none"> • Demo static (Van der Graaf) 	Positive, negative, charge, attract, repel, current, electron	Unit 5 Static and current electricity

		<ul style="list-style-type: none"> • Static experiments – balloons, rulers and cloths etc. <p>Key skills developed:</p> <ul style="list-style-type: none"> • Describe static electricity in terms of charges (positive and negative) • Identify that an electron is a negative charge • Explain some simple examples of static electricity and its uses 		
Week 4	Static and current electricity	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Circuit symbols • Series and parallel circuits • Current and potential difference rules for series/parallel • Electrical resistance <p>Practical ideas:</p> <ul style="list-style-type: none"> • Test and compare series and parallel circuits • Investigate resistance through a wire <p>Key skills developed:</p> <ul style="list-style-type: none"> • Draw and build series and parallel circuits • Understand the difference between current and potential difference • Explain what is meant by electrical resistance • Calculate resistance of a wire using measurements of current and resistance 	Series, parallel, wire, bulb, current, potential difference, voltage, ammeter, voltmeter	Unit 5 Static and current electricity
Week 5	Magnetism and electromagnets	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Magnetic and non-magnetic materials • Magnetic forces • Magnetic fields 	North pole, south pole, attract, repel, magnetic field, electromagnet,	Unit 6 Magnetism and electromagnetism

		<ul style="list-style-type: none"> • Electromagnets <p>Practical ideas:</p> <ul style="list-style-type: none"> • Testing materials to see if they are magnetic • Measuring magnetic field of a bar magnet with a compass • Testing magnet strength with paperclips <p>Key skills developed:</p> <ul style="list-style-type: none"> • Identify the three magnetic elements • Use a plotting compass to draw the shape of the magnetic field of a bar magnet • Plan and carry out an investigation to compare strength of different types of magnets 	plotting compass	
Week 6	Magnetism and electromagnetism	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Electromagnets investigation • Motors <p>Practical ideas:</p> <ul style="list-style-type: none"> • Building and testing the strength of an electromagnet • Build a simple homopolar motor <p>Key skills developed:</p> <ul style="list-style-type: none"> • Describe how to make an electromagnet • Compare similarities and differences between electromagnets and permanent magnets • Describe how to build a simple motor and identify some 	Motor, electromagnet, iron, wire, current, magnetic field	Unit 6 Magnetism and electromagnetism

Week 7	Genetics and variation	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • DNA structure • Human genome <p>Practical ideas:</p> <ul style="list-style-type: none"> • Make a 3D DNA model <p>Key skills developed:</p> <ul style="list-style-type: none"> • Describe the structure of DNA (double helix) and identify base pairs that go together (T-A and G-C) • Explain what is meant by the human genome 	DNA, base pair, genome,	Unit 7 Genetics and variation
Week 8	Consolidation and revision			
Assessment point - NewY8AutumnAssessment.rtf				
SPRING 1				
Week 1	Exothermic and endothermic reactions	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Types of chemical reaction (chemical and physical change) • Conservation of mass • Combustion <p>Practical ideas:</p> <ul style="list-style-type: none"> • Reactions showing chemical and physical changes • Conservation of mass through changes of state. <p>Key skills developed:</p> <ul style="list-style-type: none"> • Explain the difference between chemical and physical change 	Chemical change, physical change, conservation of mass, combustion,	Unit 8 Exothermic and endothermic reactions

		<ul style="list-style-type: none"> • Explain the meaning of 'conservation of mass' • Write the word and symbol equation for combustion of fuels • Use conservation of mass to explain why mass appear to go up during combustion 		
Week 2	Exothermic and endothermic reactions	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Thermal decomposition • Exothermic and endothermic reactions (use double lesson for this) • Catalysts <p>Practical ideas:</p> <ul style="list-style-type: none"> • Reactions showing examples of exothermic and endothermic (identify by temperature change) <p>Key skills developed:</p> <ul style="list-style-type: none"> • write word equation for thermal decomposition • Identify if a reaction is exothermic or endothermic by its temperature change • Explain the effect of a catalyst on rate of reaction 	Thermal decomposition, exothermic, endothermic, catalyst, rate of reaction	Unit 8 Exothermic and endothermic reactions
Week 3	Photosynthesis and respiration	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Photosynthesis • Factors affecting photosynthesis • Leaf structure <p>Practical ideas:</p> <ul style="list-style-type: none"> • Measure rate of photosynthesis with different light intensity 	Chlorophyll, photosynthesis, leaf, oxygen, carbon dioxide, water	Unit 9 Photosynthesis and respiration

		<p>Key skills developed:</p> <ul style="list-style-type: none"> • Write the word and symbol equation for photosynthesis • Label a diagram showing leaf structure • Describe the effect of common factors on rate of photosynthesis 		
Week 4 and Week 5	Photosynthesis and respiration	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Plant minerals and deficiencies • Aerobic respiration • Anaerobic respiration in humans • Anaerobic respiration in plants and yeast (fermentation) <p>Practical ideas:</p> <ul style="list-style-type: none"> • Research task on mineral deficiencies in plants <p>Key skills developed:</p> <ul style="list-style-type: none"> • Identify key minerals needed by plants and the impact of their deficiencies • Write word and symbol equations for aerobic and anaerobic respiration • Write word for anaerobic respiration in plants to produce ethanol and carbon dioxide 	Nitrate, phosphate, potassium, aerobic, anaerobic, lactic acid	Unit 9 Photosynthesis and respiration
Week 6	Speed, acceleration and motion graphs	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Speed • Speed calculations • Distance-time graphs <p>Practical ideas:</p> <ul style="list-style-type: none"> • Measure speed of students or wind up toys 	Speed, m/s, distance, time, metres, second	Unit 10 Speed, acceleration and motion graphs

		<ul style="list-style-type: none"> • Real time distance time graphs <p>Key skills developed:</p> <ul style="list-style-type: none"> • Measure and calculate speed • Draw and analyze distance time graphs 		
SPRING 2				
Week 1	Speed, acceleration and motion graphs	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Gradients on distance-time graphs • Acceleration • Speed-time graphs <p>Practical ideas:</p> <ul style="list-style-type: none"> • Real-time distance time graphs <p>Key skills developed:</p> <ul style="list-style-type: none"> • Calculate gradient on a distance time graph to work out acceleration • Draw and analyse speed time graphs 	Gradient, acceleration,	Unit 10 Speed, acceleration and motion graphs
Week 2	Speed, acceleration and motion graphs	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Stopping distances • Safe driving and factors that affect stopping distance <p>Practical ideas:</p> <ul style="list-style-type: none"> • Research some thinking, braking and stopping distance for different speeds • Design a speed safety awareness poster 	Thinking distance, braking distance, stopping distance, friction,	Unit 10 Speed, acceleration and motion graphs

		Key skills developed: <ul style="list-style-type: none"> Identify that stopping distance is made up of thinking and braking distance Describe how various factors can impact stopping distance Explain the importance of stopping distances to avoid collisions 	alcohol, distraction	
Week 3	Consolidation / Revision			
Week 4	SCIENCE WEEK			
Week 5	Pressure and moments	Key knowledge taught: <ul style="list-style-type: none"> Understanding weight as a force Pressure with solids Gas pressure Practical ideas: <ul style="list-style-type: none"> Measure pressures using balances and 1cm² paper for surface area Key skills developed: <ul style="list-style-type: none"> Describe weight as a non contact force, measured in Newtons Calculate pressure using weight and surface area <p>Explain how surface area/ force impacts pressure</p> <p>Give example of uses of high and low pressure (e.g. sharp knives, snow shoes)</p>	Weight, pressure, gas, solid, mass, surface area	Unit 11 Pressure and moments
Week 6	Pressure and moments	Key knowledge taught: <ul style="list-style-type: none"> Atmospheric pressure Pressure in a liquid 	Pressures, atmosphere, pascals, liquid, force, Newtons	Unit 11 Pressure and moments

		<ul style="list-style-type: none"> Turning forces <p>Practical ideas:</p> <ul style="list-style-type: none"> Getting kids to step into massive bin bags and use vacuum to remove air in the bag – enables them to feel the weight of the atmosphere <p>Key skills developed:</p> <ul style="list-style-type: none"> Describe how atmospheric pressure changes with altitude Describe how pressure in liquids changes with depth State that pressure in liquids acts in all directions 		
Assessment		Can be moved: NewY8SpringAssessment.doc or NewY8SpringAssessment.doc.rtf		
SUMMER 1				
Week 1	Water, carbon and nitrogen cycles	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> Water cycle and link to potable water (the idea of recycling/conservation of mass is key here to differentiate from KS2) Making water potable Nitrogen cycle <p>Practical ideas:</p> <ul style="list-style-type: none"> Clean a dirty water sample Water cycle in a bag (sealed and taped to a window to show evaporation and condensation) <p>Key skills developed:</p> <ul style="list-style-type: none"> Understand the key parts of the water cycle 	Water cycle evaporation, precipitation, condensation, nitrogen ammonia, bacteria, nitrifying, potable water	Unit 12 Water, carbon and nitrogen cycles Biology Paper 1 - Plants and Ecosystems

		<ul style="list-style-type: none"> Describe the steps taken to clean water and make it 'potable' Understand the key stages of the nitrogen cycle 		
Week 2	Atmosphere and climate change	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> Carbon cycle The earth's early atmosphere The earth's (natural) atmosphere evolution <p>Practical ideas:</p> <ul style="list-style-type: none"> Model carbon cycle (with car, plants, animal figure etc to map out on A3 paper) <p>Key skills developed:</p> <ul style="list-style-type: none"> Describe the key stages of the carbon cycle Describe how and why the atmosphere has changed over time 	Carbon cycle, respiration, combustion, photosynthesis, carbon dioxide	Unit 13 Atmosphere and climate Biology Paper 1 - Plants and Ecosystems Unit 3 - Chemistry in our world
Week 3	Climate change and ecosystems	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> The earth's modern atmosphere (man-made climate change) Effects of climate change <p>Practical ideas:</p> <ul style="list-style-type: none"> Research the impact of climate change and how we can reduced it (IT task) <p>Key skills developed:</p> <ul style="list-style-type: none"> Explain the difference between the greenhouse effect and global warming Identify cause and effects of climate change Evaluate the human impact on Earths modern climate 	Carbon footprint, global warming, greenhouse effect, greenhouse gases	Unit 3 - Chemistry in our world

Week 4	Ecosystems and biodiversity	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Food webs and concept of biomass • Trophic levels and interdependence • Competition for resources <p>Practical ideas:</p> <ul style="list-style-type: none"> • Build food web models <p>Key skills developed:</p> <ul style="list-style-type: none"> • Describe a food web using key terms: producer, consumer, predator, prey carnivore, herbivore, omnivore • Identify the impact of one species on another within a food web • State what living things compete for 	<p>Producer, consumer, food chain, food web, predator, prey carnivore, herbivore, omnivore</p>	<p>Unit 14 Biodiversity and ecosystems</p> <p>(NO CONTENT)</p>
Week 5	Ecosystems and biodiversity	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Natural selection and evolution • Extinction • Measuring population (quadrats) <p>Practical ideas:</p> <ul style="list-style-type: none"> • Measure population of daisys in the field using quadrats <p>Key skills developed:</p> <ul style="list-style-type: none"> • Explain Darwins theory of evolution • Describe how we can estimate population of plants using quadrats • Describe some reasons why animals may become endangered or extinct 	<p>Variation, survival of the fittest, adaptation, population</p>	<p>Autumn 1 - Biology Paper 1</p>

Week 6	Biodiversity	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Biodiversity • Factors that affect biodiversity <p>Practical ideas:</p> <ul style="list-style-type: none"> • Research biodiversity in the rainforest, can use information to build a food chain/ web and link to human impact on cutting down the rainforest. <p>Key skills developed:</p> <ul style="list-style-type: none"> • Define what is meant by biodiversity • Explain the importance of biodiversity • Evaluate the human impact on biodiversity through deforestation, and use of chemicals on crops 	Biodiversity, habitat, deforestation,	Ecology - Biodiversity and Human Interaction
Week 7	Consolidation and revision			
SUMMER 2				
Week 1	Energy stores and transfers	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Concept of energy • Energy stores • Transferring energy (sankey diagrams) <p>Practical ideas:</p> <ul style="list-style-type: none"> • Examples of energy stores and transfers – e.g. solar panels used to generate electricity for a light bulb <p>Key skills developed:</p>	Energy, joules, kinetic energy, potential energy, thermal energy, light energy, sound energy, electrical energy,	Energy booklet: 7pe-energy.docx Energy Mastery booklet: energy-mastery-booklet.docx

		<ul style="list-style-type: none"> Explain what is meant by energy (that it is a metaphor for what we can “do work” with – just like how monetary value allows us to buy things, but is found in different forms) State the energy stores and identify examples: kinetic energy, potential energy, thermal energy, light energy, sound energy, electrical energy, and chemical energy. 	chemical energy	Unit 15 Energy stores and transfers
Week 2	Energy stores and transfers	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> Thermal energy and temperature Conduction Convection (use double lesson for this because requires a reteaching of density) <p>Practical ideas:</p> <ul style="list-style-type: none"> Compare rate of conduction using metal rods and hot water Compare insulation of materials by measuring rate of cooling e.g. newspaper, bubble wrap <p>Key skills developed:</p> <ul style="list-style-type: none"> Understand the three types of energy transfer Identify ways to reduce unwanted energy transfers using insulators 	Thermal, heat, joules, energy, conduction, convection, radiations	Unit 15 Energy stores and transfers
Week 3	GL Assessments			
Week 4	Energy	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> Power and relationship to energy Energy and fuel 	Coal, oil, gas, power, watts, energy, joules,	Unit 15 Energy stores and transfers

		<ul style="list-style-type: none"> Fossil fuels <p>Practical ideas:</p> <ul style="list-style-type: none"> Compare power of students by how quickly they can complete a physical task, alternative calculate power in a circuit <p>Key skills developed:</p> <ul style="list-style-type: none"> Calculate power using energy and time Identify fossil fuels and describe them as non-renewable Evaluation advantages and disadvantages of using fossil fuels to generate electricity 	time, seconds, non-renewable	
Week 5	Energy resources	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> inside a fossil fuel power station Wind turbines (construction kits) Tidal and wave power <p>Practical ideas:</p> <ul style="list-style-type: none"> Build a wind turbine <p>Key skills developed:</p> <ul style="list-style-type: none"> Describe the difference between renewable and non-renewable energy, give examples of both Explain how wind turbines work Evaluation advantages and disadvantages of using wind turbines, tidal and wave power to generate electricity 	Power station, generator, turbine, steam, coal, oil, gas, tidal, wave renewable	Unit 16 Energy resources

Week 6	Energy resources	<p>Key knowledge taught:</p> <ul style="list-style-type: none"> • Hydroelectric power • Geothermal and solar power • Nuclear power <p>Practical ideas:</p> <ul style="list-style-type: none"> • Solar panel investigation – effect of light intensity on current generated <p>Key skills developed:</p> <ul style="list-style-type: none"> • Identify if hydroelectric, geothermal, solar and nuclear power are renewable or non-renewable energy sources • Evaluation advantages and disadvantages of using hydroelectric, geothermal, solar and nuclear power to generate electricity 	Hydroelectric, Geothermal, renewable, carbon dioxide, reliable, evaluate	Unit 16 Energy resources
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