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| Flat_BL@2x-100 | Wollaston School: 2023/24 Curriculum Map for (***Science***).Curriculum Lead: (***Eliot Pugh***) | cid:image001.png@01D52C2F.ED74AF70 |
| **Curriculum Aim and scope**: *The science curriculum nurtures students’ innate curiosity by providing learners with a range of core scientific knowledge, concepts, and skills that they will be able to choose and apply in their future learning, employment, and life. The curriculum is underpinned by our values of developing knowledgeable, innovative, and ethical scientists.* *The units are planned to ensure progression of scientific knowledge from Key Stage 3 (KS3) in Year 7 through to A Level Science at Key Stage 5 (KS5). Subject specific vocabulary and skills is mapped out, and every unit has a practical aspect where pupils learn the scientific skills of making predictions, ensuring validity, analysing and evaluating results and drawing conclusions.* *Our Key Stage 3 curriculum builds on primary science and will enable learners to understand themselves, others, and the World in which they live. Their three-year course is designed by subject specialists to ensure precision of subject specific vocabulary and contextual knowledge and will prepare students for their Key Stage 4 (KS4) Science choices. KS4 and KS5 is the period when students build on their earlier learning and prepare for adult life, higher education, and employment.* What are your aims for this subject? |

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| **Year** | **Term** | **Unit** | **Description of what is being taught including end learning goals****Clearly outline substantive knowledge required (not just skills)** | **Links to National Curriculum**  | **Subject Specific Terminology and Key Words** | **Prior knowledge (including previous key stage/retrieval required** | **Assessment and Homework****(How is the learning being checked- how do you know it is is being remembered?**  |
| **Year 7**  | 1 | Space  | Details of the properties in our solar system including appearance and position relative to Earth. Explain what a light year is and why scientists use them. Explain why the Earth has day, night, seasons, and years.Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year.Describe the movement and phases of the moon and why they occur. Describe the position of the moon, the Earth and the Sun in solar and lunar eclipses using diagrams. Describe how space exploration and observations of stars are affected by the scale of the universe | our Sun as a star, other stars in our galaxy, other galaxiesthe seasons and the Earth’s tilt, day length at different times of year, in different hemispheresthe light year as a unit of astronomical distance | Light year Galaxy Solar system Waxing Waning Gibbous Crescent Season Solar eclipseLunar eclipse  | Plants in the solar system. The Earth rotates on its axis and orbits the sun. The moon orbits the Earth.The Sun is a star at the centre of our solar system. Students should know what we mean by daytime, night time and the different seasons.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 1 | Interdependence  | Use a key to identify organisms and describe the differences between organismsExplain how adaptations enable organisms to survive.Use ideas of consumers and producers to explain the order of organisms in a food chain and explain what the arrow represents. Use a food web diagram to predict and explain effects that a change in the size of a population could have on other populations in the same community.Explain what pyramids of biomass and number represent. Explain the effect of bioaccumulation on organisms. Select and use suitable sampling methods to collect data from a habitat | the interdependence of organisms in an ecosystem, including food webs and insect pollinated cropshow organisms affect, and are affected by, their environment, including the accumulation of toxic materials | ProducerConsumer CarnivoreHerbivoreOmnivorePredator Prey Bioaccumulation HabitatSpecies Organism  | Plants create their own food and Animals must consume food. Knowledge of common animals and their diets and habitats.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.Homework tasks based on food webs and classification.  |
|  | 1 | Particles  | Use the particle model to describe the properties of solids, liquids, and gases, including differences in melting points. Describe how the arrangement and movement of particles alters when a substance changes state.Describe the difference in energy between a solid, liquid and gas. Explain what diffusion is using the term concentration. Explain the factors that effect the rate of diffusion. Explain what causes gas pressure and what factors can effect it. Explain what density is using the particle model and use volume calculations to calculate the density of a regular object.  | the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressurechanges of state in terms of the particle model.the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure **Matter**changes of state in terms of the particle model.similarities and differences, including density differences, between solids, liquids and gases | Solid Liquid Gas Particle Intermolecular Energy Diffusion Pressure Collision Density Expand Contract Concentration  | Solid, liquid, and gas are the three states of matter. | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.States of matter compare and contrast homework task.  |
|  | 1 | Forces | One effect of a force is to change an object’s form, causing it to be stretched or compressed.An unbalanced force acting on an object is called the resultant force.When the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line.**Skill** Sketch the forces acting on an object and label their size and direction.Describe what happens to the length of a spring when the force on it changes.Mass is a property of the object; weight depends upon mass but also on gravitational field strength. Skill: Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg).Compare your weight on Earth with your weight on different planets using the formula. | Forces as pushes or pulls, arising from the interaction between two objects.Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water Forces measured in newtons, measurements of stretch or compression as force is changedForce-extension linear relation; Hooke’s Law as a special casenon-contact forces: gravity forces acting at a distance on Earth and in space.Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) | Push Pull Compress Stretch Deform Friction Upthrust Gravity Air resistance  | Forces effect the speed or shape of an object. Gravity is force that we experience on Earth. Friction and its effects e.g. heating up or slowing down objects.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 7** | 2 | Cells  | Characteristic processes of living organisms (MRS GREN).The hierarchical organisation of multicellular organisms. How to use microscopes and calculate magnification.Know the structure and function of organelles in general and specialised plant and animal cells.Describe what a unicellular organism is and give examples of how they are adapted to carry out their functions. Know what stem cells are, what they do, and why they are important. Understand and discuss the social and ethical issues of stem cell research.  | Cells and organisationcells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscopethe functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplaststhe similarities and differences between plant and animal cellsthe role of diffusion in the movement of materials in and between cellsthe structural adaptations of some unicellular organismsthe hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. | CellOrganism Tissue Organ Mitochondria Cytoplasm Cell wallCell membraneNucleus Vacuole Amoeba Fungi Euglena Bacteria Algae  | Living things are made up of small units called cells. Plants and animals have characteristic life processes.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.Homework task to learn keywords and microscope parts.  |
|  | 2 | Separating mixtures  | Mixtures may be separated due to differences in their physical properties.Explain how substances dissolve using the particle model and the observed disappearance of a solute in terms of breaking into parts that are too small to see. How temperature affects solubility in liquids and gases Suggest a combination of methods to separate a complex mixture and justify the choices.Describe how to separate immiscible liquids. Describe the process and carry out chromatography of ink pens Describe what happens to the particles in distillation and predict the distillate of a simple distillation process.  | The concept of a pure substance Mixtures, including dissolving Diffusion in terms of the particle model Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography The identification of pure substances | Solute Soluble Solution Dissolve Insoluble Chromatography Distillation Miscible Immiscible Filtration  | Salt dissolves when added to water and seems to disappear but is still present.  Oil and water do not mix Ideas of evaporation and condensation from the particles topic.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.Homework to assess key words and spellings.  |
|  | 2 | Reproduction  | Distinguish between ‘getting bigger’ (an increase in size) and growth (an increase in the number of cells) in multicellular organisms.Describe the life cycles of different plants and animals (e.g. a flowering plant, a human and a butterfly).Differentiate between internal and external fertilisationEvaluate the advantages and disadvantages of fertilisation strategies and relate this to body structure and behaviourLabel and state function of male and female reproductive systemDescribe the adaptations of gametes Describe the process of ovulation and fertilisationDescribe the gestation period and the development of the embryoDiscuss the effect of maternal lifestyle on the foetus through the placentaDescribe the process of labour and birthDescribe the changes that occur in both boys and girls during puberty.To understand that changes in bodies are caused by hormonesDescribe how various forms of contraception reduces fertilisation and pregnancyIdentify and recall the main structures of a flower.Explain how structures promote insect pollinationDescribe differences between wind and insect pollinated flowers.Explain how structures promote wind pollinationEvaluate insect and wind pollination strategiesDescribe the process of fertilisation in plantsDescribe variety of plants seeds and dispersal methods | 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 Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. | Style Stigma Petal Sepal Filament Ovule Pollination Pollen Anther Reproduction Fertilisation Internal External Sperm Egg Ovary Cervix Vagina Vulva Testes Penis Urethra Hormone Gestation Amniotic Embryo Foetus  | Sexual and asexual reproduction in plants and animals Knowledge of the human reproductive system, gestation, fertilisation and maternal lifestyle. Flower structure, wind and insect pollination, seed dispersal.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 7** | 3 |  Heating and cooling  | Explain the difference between heat and temperature.The thermal energy of an object depends upon its mass and temperature.When there is a temperature difference, energy transfers from the hotter to the cooler object.Describe how energy is transferred by conduction.Use kinetic theory / particle model to explain conduction.Explain expansion, density change and convection. Describe which materials radiate the most hear using the idea that heat energy is transferred through a vacuum. Use particle ideas to describe changes of state and plot a heating/cooling curve. Explain how insulation works in terms of conduction, convection, and radiation.  | heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators | Conduction Convection Radiation Energy Transfer Thermal Vacuum  | temperature difference between 2 objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference; use of insulators | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 3 | Geology  | Describe the three rock layers inside Earth; the crust, the mantle and the core.Explain why a rock has a particular property based on how it was formed.Predict planetary conditions from descriptions of rocks on other planets.Describe the process for the formation of sedimentary rockExplain the properties and uses of sedimentary rock based on it’s formation e.g. clay for ceramics and limestoneDescribe the process for the formation of metamorphic rockExplain the properties and uses of metamorphic rock based on it’s formationThe process of physical and chemical weatheringSedimentary, igneous and metamorphic rocks can be interconverted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.Construct a labelled diagram to identify the processes of the rock cycle.Describe similarities and differences between the rock cycle and everyday physical and chemical processes. | The composition of the Earth The structure of the Earth The rock cycle and the formation of igneous, sedimentary and metamorphic rocks  | Sedimentary Metamorphic Igneous Volcano Lava Crystal Porous Weathering Erosion  | Structure of the earth Different rocks have different physical properties. How fossils are formed in rocks  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 8** | 1 | Skeletal system  | The parts of the human skeleton work as a system for support, protection, movement and the production of new blood cells.Explain how a physical property of part of the skeleton relates to its function. Identify simple joints on the skeleton.Antagonistic pairs of muscles create movement when one contracts and the other relaxesExplain why some organs contain muscle tissue. Explain how antagonistic muscles produce movement around a joint.Use a diagram to predict the result of a muscle contraction or relaxation.Suggest factors that affect the force exerted by different muscles.Predict the consequences of damage to a joint, bone or muscle.Consider the benefits and risks of a technology for improving human movement.Give reasons why oral hygiene is so important. | The structure and functions of the human skeleton, to include support, protection, movement and making blood cells biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles the function of muscles and examples of antagonistic muscles | Skeleton Skeletal Tendons Ligaments Muscle Teeth Bones Joints Vertebra Skull RelaxContractTissue  | identify that humans and some other animals have skeletons and muscles for support, protection and movement. | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 1 | Waves light and sound  | Describe sound as vibrations which travel as longitudinal waves. Explain how particles move in a longitudinal waveExplain why sound does not travel through a vacuum.Define frequency, amplitude and wavelength. Describe how changing frequency and amplitude effect sounds.Suggest a relationship between frequency and wavelengthIdentify which state of matter sound travels fastest throughLabel the parts of the ear and explain how we hear soundsIdentify causes of hearing loss and compare the hearing range of different animals.Give the hearing range of humans.Explain that sound is reflected, transmitted or absorbed by different mediaDefine an echo and explain how echoes can be usedTo name the different types of radiation in the EM spectrum, give the dangers and uses of the different types of radiationCalculate wave speedDefine transparent, translucent and opaque, explain these in terms of transmission and absorptionDraw ray diagrams, define the ‘normal line’Describe the relationship between the angle of incidence and the angle of reflectionDescribe the relationship between the angle of incidence and the angle of refraction for more and less dense mediums. Explain why light bendsDescribe the refraction of light through a prismExplain how objects appear different coloursExplain how images are formed from a pinhole camera Explain how lenses work, investigate how lens thickness affects focal lengthSuggest how the lens in our eyes change for near and far objectsLabel the parts of an eye and explain how the eye forms images | frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound sound needs a medium to travel, the speed of sound in air, in water, in solids sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal auditory range of humans and animals.the similarities and differences between light waves and waves in matter light waves travelling through a vacuum; speed of light the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface Science use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. | Frequency Amplitude Longitudinal TransverseReflection Refraction Wavelength Prism Vacuum Pitch Transmit Absorb Electromagnetic LensConvex Concave  | From KS2:identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it  find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases. | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 1 | Earths atmosphere  | Draw the carbon cycle. Give equations for photosynthesis and respiration.Explain the processes of photosynthesis, respiration, and combustionDescribe how human activities affect the carbon cycle. Explain why the concentration of carbon dioxide in the atmosphere is rising, and why this is an issue.Describe the composition of gases in the Earth’s atmosphere.Name the greenhouse gases. Define global warming and climate change.Describe how global warming can impact on climate and local weather patterns.Explain how human activity may impact the levels of these gases.Describe how human activities have contributed to global warming and the impact on the Earth.Describe how plankton can be used to reduce carbon emissions.Explain the role of iron fertilisation on reducing carbon emissions. | the composition of the Earththe structure of the Earththe carbon cyclethe composition of the atmospherethe production of carbon dioxide by human activity and the impact on climate. | Atmosphere Carbon dioxide Photosynthesis Respiration Combustion Decomposition Climate Greenhouse gasGlobal warming  | The air is made up of gases Some human activities have a negative impact on the earth  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 8**  | 2 | Respiration  | Describe the role of each part of the respiratory system including adaptations. Process of breathing to take in oxygen and remove carbon dioxide, this involves muscle action in the ribs and diaphragm. Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.Explain observations about changes to breathing rate and volumeIn gas exchange, oxygen and carbon dioxide move between alveoli and the blood. The amount of oxygen required by body cells determines the rate of breathing.Predict how a change in the gas exchange system could affect other processes in the body.Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Use word equations to describe aerobic respiration.Compare aerobic respiration and its distinction from breathing. The effect of exercise intensity on heart rate. Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.Yeast fermentation is used in brewing and breadmaking.Suggest how organisms living in different conditions use respiration to get their energy. | Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for lifeA word summary for aerobic respirationThe process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respirationThe differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism | Respiration Aerobic Anaerobic Organism Breathing Lungs Diaphragm Volume Exchange Cells Oxygen Carbon dioxide Glucose Fermentation  | Breathing is necessary for life and involves the lungs. When we breathe in we take in air into our lungs, when we breathe out we expel air from our lungs. Respiration is a process that takes place in cells in our body. We breathe in oxygen and breathe out carbon dioxide.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 2 | Atoms, elements, and compounds  | Draw and explain the structure of the atom. Recall the charges and masses of protons, neutrons and electrons. Use the periodic table to find the numbers of protons, neutrons, and electrons in an atomDraw and write the electronic structure for atoms. Identify patterns in the periodic table Describe the difference between atoms, elements and compounds. Describe the properties of elements and how they compare to compounds containing the element. Describe how you can tell if a chemical reaction is happening. Construct word equations for chemical reactions. Name chemical compounds based on the elements in the compound Use chemical formula to write symbol equations. Balance symbol equationsDescribe the law of the conservation of mass. | a simple (Dalton) atomic modeldifferences between atoms, elements and compounds chemical symbols and formulae for elements and compounds conservation of mass changes of state and chemical reactionschemical reactions as the rearrangement of atoms representing chemical reactions using formulae and using equations | Atom Element Compound Proton Neutron Electron Nucleus Conservation Period Group  | Substances are made of particles. Knowledge of some compounds and formula e.g. water and carbon dioxide  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 2 | Energy  | Describe energy and list energy stores Explain energy transfers and categorise these as useful and wasted Calculate useful and wasted energy from input and output data Explain how energy is dissipated and why processes cannot go on forever. Explain the advantages and disadvantages of different energy resources and how they work, including power stations and renewable sources.We pay for our domestic electricity usage based on the amount of energy transferred.Calculate the cost of home energy usage, using the formula: cost = power (kW ) x time (hours) x price (per kWh).Compare the energy usage and cost of running different home devices.Food labels list the energy content of food in kilojoules (kJ).Compare the amounts of energy transferred by different foods and activities.  | Comparing energy values of different foods (from labels) (kJ)Comparing power ratings of appliances in watts (W, kW)Comparing amounts of energy transferred (J, kJ, kW hour)Domestic fuel bills, fuel use and costs Fuels and energy resources. | Renewable Fossil fuel Dissipate Kinetic Thermal Gravitational Nuclear Chemical Electromagnetic Elastic Joules  | Devices in the home use electricity to work. Ideas of energy relating to heating and cooling, thermal energy transfers.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 8**  | 3 | Digestion  | To describe what makes up our food and to explain what is needed for a healthy diet. Discuss how an unbalanced diet can lead to health problemsThe body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells.Describe possible health effects of unbalanced diets from data providedCalculate food requirements for a healthy diet, using information provided.To test a variety of foods for starch, protein, sugars and lipidsTo describe the tests you carried out and how you know if there is a reactionTo describe the tests for lipids, starch, glucose and proteinTo compare foods based on their nutritional contentTo describe how food moves through our digestive system and describe the processes our food undergoesOrgans of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.Describe how organs and tissues involved in digestion are adapted for their role.Describe the events that take place in order to turn a meal into simple food molecules inside a cell.To describe what enzymes are and state the names of the 3 main groups of enzymes. Explain how enzymes digest our food and investigate the effect of temperature on enzymes. To apply knowledge to suggest how pH affects enzymes | content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is neededcalculations of energy requirements in a healthy daily dietthe consequences of imbalances in the diet, including obesity, starvation and deficiency diseasesthe tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biologicalcatalysts) the importance of bacteria in the human digestive system | Carbohydrate Lipid Protein Vitamin Mineral Fibre Cells Small intestine Large intestine Stomach Oesophagus Pancreas Enzyme Amylase Protease Temperature Obesity Deficiency  | Pupils should be introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions. | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 3 | Periodic table  | Use the periodic table to work out atomic structure, draw the electronic structure of atoms and recall the masses and charges of protons, neutrons and electrons Describe the physical and chemical properties of metals and non-metals Describe how the modern periodic table is arrange and how this compares to previous versions of the periodic table.Explain why Mendeleev’s periodic table was readily accepted by scientists. Describe the trends in reactivity and properties of group 1 elements Describe the trends in reactivity and properties of group 7 elements.Describe the properties of group 0 and explain why they are unreactive. Describe the properties of transition metals and explain how they are different to the metals in group 1. | the varying physical and chemical properties of different elements the principles underpinning the Mendeleev Periodic Table the Periodic Table: periods and groups; metals and non-metals how patterns in reactions can be predicted with reference to the Periodic Table the properties of metals and non-metals the chemical properties of metal and non-metal oxides with respect to acidity. | Mendeleev Groups Periods Trend Reactivity Electron Proton Neutron Non-metal Metal Transition metal Octave Unreactive  | Knowledge of atomic structure and the periodic table from the atoms, elements, and compounds topic.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 3 | Electricity  | Understand how charge can effect the behaviour of objects. What is an electric circuit. How to safely set up and use and electric circuit. How to draw circuits. Describe the rules for current in series circuits and parallel circuits and compare. Describe the rules for potential difference in series circuits and parallel circuits and compare. Understand how plugs and fuses work.what is resistance and how can it be investigated. Use Ohms law to describe the relationship between resistance, current, and potential difference.  | electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current differences in resistance between conducting and insulating components (quantitative). separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects the idea of electric field, forces acting across the space between objects not in contact. | Current Amps Potential difference Voltage Series Parallel Cell Battery Wire Bulb Ohms Resistance FusePlug Live Neutral Earth Ammeter Voltmeter  | identify common appliances that run on electricityconstruct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzersidentify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuitrecognise some common conductors and insulators, and associate metals with being good conductors. | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 9** | 1 | Earths atmosphere  | Draw the carbon cycle. Give equations for photosynthesis and respiration.Explain the processes of photosynthesis, respiration, and combustionDescribe how human activities affect the carbon cycle. Explain why the concentration of carbon dioxide in the atmosphere is rising, and why this is an issue.Describe the composition of gases in the Earth’s atmosphere.Name the greenhouse gases. Define global warming and climate change.Describe how global warming can impact on climate and local weather patterns.Explain how human activity may impact the levels of these gases.Describe how human activities have contributed to global warming and the impact on the Earth.Describe how plankton can be used to reduce carbon emissions.Explain the role of iron fertilisation on reducing carbon emissions. | the composition of the Earththe structure of the Earththe carbon cyclethe composition of the atmospherethe production of carbon dioxide by human activity and the impact on climate. | Atmosphere Carbon dioxide Photosynthesis Respiration Combustion Decomposition Climate Greenhouse gasGlobal warming  | The air is made up of gases Some human activities have a negative impact on the earth  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  |  | Respiration  | Describe the role of each part of the respiratory system including adaptations. Process of breathing to take in oxygen and remove carbon dioxide, this involves muscle action in the ribs and diaphragm. Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.Explain observations about changes to breathing rate and volumeIn gas exchange, oxygen and carbon dioxide move between alveoli and the blood. The amount of oxygen required by body cells determines the rate of breathing.Predict how a change in the gas exchange system could affect other processes in the body.Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Use word equations to describe aerobic respiration.Compare aerobic respiration and its distinction from breathing. The effect of exercise intensity on heart rate. Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.Yeast fermentation is used in brewing and breadmaking.Suggest how organisms living in different conditions use respiration to get their energy. | Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for lifeA word summary for aerobic respirationThe process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respirationThe differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism | Respiration Aerobic Anaerobic Organism Breathing Lungs Diaphragm Volume Exchange Cells Oxygen Carbon dioxide Glucose Fermentation  | Breathing is necessary for life and involves the lungs. When we breathe in we take in air into our lungs, when we breathe out we expel air from our lungs. Respiration is a process that takes place in cells in our body. We breathe in oxygen and breathe out carbon dioxide.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  |  | Periodic table  | Use the periodic table to work out atomic structure, draw the electronic structure of atoms and recall the masses and charges of protons, neutrons and electrons Describe the physical and chemical properties of metals and non-metals Describe how the modern periodic table is arrange and how this compares to previous versions of the periodic table.Explain why Mendeleev’s periodic table was readily accepted by scientists. Describe the trends in reactivity and properties of group 1 elements Describe the trends in reactivity and properties of group 7 elements.Describe the properties of group 0 and explain why they are unreactive. Describe the properties of transition metals and explain how they are different to the metals in group 1. | the varying physical and chemical properties of different elements the principles underpinning the Mendeleev Periodic Table the Periodic Table: periods and groups; metals and non-metals how patterns in reactions can be predicted with reference to the Periodic Table the properties of metals and non-metals the chemical properties of metal and non-metal oxides with respect to acidity. | Mendeleev Groups Periods Trend Reactivity Electron Proton Neutron Non-metal Metal Transition metal Octave Unreactive  | Knowledge of atomic structure and the periodic table from the atoms, elements, and compounds topic.  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  |  | Electricity  | Understand how charge can effect the behaviour of objects. What is an electric circuit. How to safely set up and use and electric circuit. How to draw circuits. Describe the rules for current in series circuits and parallel circuits and compare. Describe the rules for potential difference in series circuits and parallel circuits and compare. Understand how plugs and fuses work.what is resistance and how can it be investigated. Use Ohms law to describe the relationship between resistance, current, and potential difference.  | electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current differences in resistance between conducting and insulating components (quantitative). separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects the idea of electric field, forces acting across the space between objects not in contact. | Current Amps Potential difference Voltage Series Parallel Cell Battery Wire Bulb Ohms Resistance FusePlug Live Neutral Earth Ammeter Voltmeter  | identify common appliances that run on electricityconstruct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzersidentify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuitrecognise some common conductors and insulators, and associate metals with being good conductors. | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | 2 | Inheritance  | heredity as the process by which genetic information is transmitted from one generation to the nexta simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA modelthe importance of maintaining biodiversity and the use of gene banks to preserve hereditary materialthe variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selectionchanges in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction | heredity as the process by which genetic information is transmitted from one generation to the next a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model differences between species the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. | DNA Gene Chromosome Inheritance Sperm Egg Hereditary Natural selection Darwin SpeciesExtinction Evolution Variation Continuous Discontinuous Gene bank Reproduction Genotype  | recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  |  | Magnets and electromagnets  | Some materials are magnetic whilst others are not, magnets cause a force of attraction or repulsion.The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences.Two ‘like’ magnetic poles repel and two ‘unlike’ magnetic poles attract.Predict how an object made of a magnetic material will behave if placed in or rolled through a magnetic field.Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction.Field lines flow from the north-seeking pole to the south-seeking pole.Predict the pattern of field lines and the force around two magnets placed near each other.Use the idea of field lines to show how the direction or strength of the field around a magnet varies.You can make an electromagnet by wrapping a wire around an iron bar.An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid.The magnetic field of an electromagnet decreases in strength with distance.Use a diagram to explain how an electromagnet can be made and how to change its strength.You can make an electromagnet by wrapping a wire around an iron bar.An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid.The magnetic field of an electromagnet decreases in strength with distance.Use a diagram to explain how an electromagnet can be made and how to change its strength.Explain the choice of electromagnets or permanent magnets for a device in terms of their properties. Suggest how bells, circuit breakers and loudspeakers work from diagrams |  magnetic poles, attraction and repulsion magnetic fields by plotting with compass, representation by field linesEarth’s magnetism, compass and navigation the magnetic effect of a current, electromagnets, D.C. motors (principles only) | Magnet Electromagnet Pole Magnetic field CompassCurrent Attraction Repulsion  | notice that some forces need contact between two objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  |  | Atoms, elements, and compounds  | Draw and explain the structure of the atom. Recall the charges and masses of protons, neutrons and electrons. Use the periodic table to find the numbers of protons, neutrons, and electrons in an atomDraw and write the electronic structure for atoms. Identify patterns in the periodic table Describe the difference between atoms, elements and compounds. Describe the properties of elements and how they compare to compounds containing the element. Describe how you can tell if a chemical reaction is happening. Construct word equations for chemical reactions. Name chemical compounds based on the elements in the compound Use chemical formula to write symbol equations. Balance symbol equationsDescribe the law of the conservation of mass. | a simple (Dalton) atomic modeldifferences between atoms, elements and compounds chemical symbols and formulae for elements and compounds conservation of mass changes of state and chemical reactionschemical reactions as the rearrangement of atoms representing chemical reactions using formulae and using equations | Atom Element Compound Proton Neutron Electron Nucleus Conservation Period Group  | Substances are made of particles. Knowledge of some compounds and formula e.g. water and carbon dioxide  | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  |  | Microbes  | Different types of microbes and diseases that can be transmitted by microbes. How disease can be treated and prevented, how the body defends against microbes and disease. Describe how Vaccines work and how antibiotic resistance arises. Health related diseases, including the consequences of vitamin C deficiency. Describe how microbes e.g yeast can be useful in everyday life.  | the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases | Yeast Fungi Bacteria Vitamin Deficiency Microbe Vaccine While blood cell Antibody Antigen Immune system Immune Disease  | recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function | Content knowledge is assessed in the end of unit assessment.Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 10** | 1 | Organisation | Principles of organisation in living organismsThe human digestive system (including structure, importance of enzymes, food tests and factors affecting enzymes)The Heart and blood vessels (structure and function)Use of dissection equipment to dissect a heartBlood (structure and function)Coronary heart disease (what it is and how it can be treated)Other non-communicable health issues and their effects of lifestyleCancer (types and treatment)Plant tissues, organs and systems (including leaf structure, xylem and phloem tissue, roots and the transport of water and sugars around the plant) | Cell Biology (Point 3,4 & 6)Transport systems (Points 1&2)Health, disease and development of medicines (point 3 & 8) | HaemoglobinPhagocytosisGas exchangeDiaphragmTracheaStentXylemPhloemTranspiration | KS3 recall of organs and organ systems from digestion, muscles and cells. Understanding of the organisation of organismsKS3 recall of non-communicable diseases from microbes topic | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Atomic Structure & PT | Atoms, elements and compoundsMixturesDevelopment of the model of the atomRelative electrical charges of subatomic particlesSize and mass of atomsRelative atomic massElectronic structureThe Periodic table and its developmentMetals, Non-metals, Group 0,1&7Properties of transition metals (Separate chemistry) | Atomic structure and the Periodic table (point 1,2,3,4,5,6 & 7) | MendeleevAlkali MetalsNoble Gases | KS3 recall of periodic table formation, structure of atoms from atoms, elements and compounds topicKnowledge of parts of an atom | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Bonding | Chemical bondsIonic bonding and compoundsCovalent bondingMetallic bondingThe three states of matter and state symbolsProperties of ionic compoundsProperties of small molecules and PolymersGiant covalent moleculesProperties of metals and alloys – including conductionStructures and bonding of carbon (diamond, graphite, graphene and fullerenes)Sizes of particles and their properties (Separate chemistry)Uses of nanoparticles (Separate chemistry) | Structure, bonding and the properties of matter (point 1,2,3,4 & 5) | IonicCovalentMetallicPolymerSublimationDepositionGrapheneFullerenes | KS3 recall of atomic structureUnderstanding of electrons and structure of the periodic tableKS3 recall of the states of matter | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
| **Year 10** | 2 | Electricity | Circuit symbol diagramsElectrical charge and currentCurrent, resistance and potential differenceResistorsSeries and parallel circuitsDirect and alternating potential differenceMains electricity PowerEnergy transfers in appliancesNational grid | Electricity (point 1,2,3,4,5 & 6)Energy (point 2)Magnetism and electromagnetism (point 3) | SeriesParallelResistorVariable ResistorThermistorOhmic resistorTransformer | KS3 recall of electricity topicKnowledge of circuit symbols, basic series and parallel circuitsUnderstanding of voltage and current | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Atomic Structure | The structure of an atomMass number, atomic number and isotopesThe development of the model of the atomRadioactive decay and nuclear radiationNuclear equationsHalf-lives and the random nature of radioactive decayRadioactive contaminationNuclear fission (Separate physics)Nuclear fusion (Separate physics)Background radiation (Separate physics)Different half-lives of radioactive isotopes (Separate physics)Uses of nuclear radiation (Separate physics) | Atomic structure (point 1,2,3,4,5,6 & 7) | GammaBeta AlphaNeutronProtonElectronElectromagnetic WaveFission (Triple)Fusion (Triple)Half LifeDecay | KS3 recall of atomic structure. KS4 recall of parts of an atom (neutrons, protons and electrons) | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Infection & Response | Communicable diseasesViral diseasesBacterial diseasesFungal diseasesProtist diseasesHuman defence systemsVaccinationAntibiotics and painkillersDiscovery and development of drugsProducing monoclonal antibodies (Separate biology)Uses of monoclonal antibodies (Separate biology)Detection and identification of plant diseases (Separate biology)Plant defence responses (Separate biology) | Health, diseases and the development of medicines (points 1,2,4,5,6 & 7) | ProtistSalmonellaGonorrhoeaMalariaVectorVaccinationMonoclonalAntibodiesAntigensAntibiotics | KS3 recall from microbes topic and cellsUnderstanding of difference between animal cell and bacterial cellKnowing the difference between bacteria, virus and fungusKS4 recall from Organisation to understand the difference between communicable and non-communicable diseaseRecall structure of blood and specifically function of WBC | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Quantitative | Conservation of mass and balanced chemical equationsRelative formula massMass changes when a reactant or product is a gasChemical measurementsMolesAmounts of substances in equationsUsing moles to balance equationsLimiting reactantsConcentration of solutionsPercentage yield (Separate chemistry)Atom economy (Separate chemistry)Using concentration of solutions in mol/dm3 (Separate chemistry)Uses of amount of substances in relation to volumes of gases (Separate chemistry)  | Chemical analysis (point 3 & 4)Chemical changes (point 1 & 2) | MolesReactantsProductsAtomic numberConcentration | KS3 recall of atomic structure and specifically atomic massKS4 recall of periodic table and difference between atomic mass and atomic number | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Bioenergetics | Photosynthetic reactionRate of photosynthesisUses of glucose from photosynthesisAerobic and anaerobic respirationResponse to exerciseMetabolism | Cell biology (point 1 & 5)Photosynthesis (point 1,2 & 3) | PhotosynthesisRespirationAerobicAnaerobicMetabolism | KS3 recall of respiration Knowledge of what animals need to for respiration. Also what products are madeAbility to link this to photosynthesisRecall of plant and animal cell structure | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
| **Year 10**  | 3 | Chemical changes | Metal oxidesThe reactivity seriesExtraction of metals and reductionOxidation and reduction in terms of electronsReactions of acids with metalsNeutralisation of acids and salt productionSoluble saltsThe pH scale and neutralisationStrong and weak acidsThe process of electrolysisElectrolysis of molten ionic compoundsUsing electrolysis to extract metalsElectrolysis of aqueous solutionsRepresentation of reactions at electrodes as half equationsTransitions (Separate chemistry) | Chemical changes (point 1,2,3,4,5,6 & 7) | ExothermicEndothermicNeutralisationElectrolysisAnodeCathode | KS3 recall of chemical reactions Knowledge that there are reactants and productsRecall of difference between acid and alkali | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Particle model of matter | Density of materialsChanges of stateInternal energyTemperature changes in a system and specific heat capacityChanges of state and specific latent heatParticle motion in gasesPressure in gases (Separate physics)Increasing the pressure of a gas (Separate physics) | Structure, bonding and the properties of matter (point 1) | CapacityVaporisationCondensationPressure (triple) | KS3 recall of states of matterDifference between solid, liquid and gasUnderstanding of different particle arrangementsAbility to link to KS4 energy topic | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Energy changes | Energy transfer during exothermic and endothermic reactionsReaction profilesThe energy change of reactionsCells and batteries (Separate chemistry)Fuel cells (Separate chemistry) | Energy changes in chemistry (point 1 &2) | ExothermicEndothermicActivation energy | KS3 recall to energy topic. An understanding of thermal energy and kinetic energyRecall states of matter and how they change | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
| **Year 11** | 1 | Homeostasis | HomeostasisThe human nervous systemThe humane endocrine systemControl of blood glucose concentrationHormones in human reproductionContraceptionThe use of hormones to treat fertilityFeedback systemsThe brain (Separate biology)The eye (Separate biology)Control of body temperature (Separate biology)Maintaining water and nitrogen balance in the body (Separate biology)Plant hormone control and coordination (Separate biology)Use of plant hormones (Separate biology) | Transport systems (point 1)Coordination and control (point 1,2,3,4,5 & 6) |  | KS3 recall of cells, reproduction and digestive systemRecall of specialised cells (nerve, sperm and egg)Recognition of the reproductive organs and the process of reproductionPSHE recall of contraception | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Rates of reaction | Calculating rates of reactionsFactors which affect the rates of chemical reactionsCollision theory and activation energyCatalystsReversible reactionsEnergy changes and reversible reactionsEquilibriumThe effect of changing conditions on equilibriumThe effect of changing concentrationThe effect of temperature changes on equilibriumThe effect of pressure changes on equilibrium | Structure, bonding and the properties of matter (point 1)Rate and extent of chemical change (point 1 & 2) |  | KS3 recall of reactions, acids and alkalisKS4 recall of chemical changes, formulas and particle modelRecall of kinetic energy in particles and what are products and reactants | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Electromagnets | Poles of a magnetMagnetic fieldsElectromagnetismFlemings left hand ruleElectric motorsLoudspeakers (Separate physics)Induced potential (Separate physics)Uses of the generator effect (Separate physics)Microphones (Separate physics)Transformer (Separate physics) | Magnetism and electromagnetism (point 1 & 2) |  | KS3 recall of magnets and magnetism. Recall of magnetic poles, forces of attraction and their applications  | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Waves | Transverse and longitudinal wavesProperties of wavesTypes of electromagnetic wavesProperties of electromagnetic wavesUses and application of electromagnetic wavesLenses (Separate physics)Visible light (Separate physics)Emission and absorption of infrared radiation (Separate physics)Perfect black bodies and radiation (Separate physics)Reflection of waves (Separate physics)Sound waves (Separate physics)Waves for detection and exploration (Separate physics) | Wave motion (point 1,2,3,4,5 & 6) |  | KS3 recall of waves and their different typesKnowledge of light and how it reflects and refractsDifferent uses of waves | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
| **Year 11** | 2 | Inheritance | Sexual and Asexual reproductionMeiosisDNA and the genomeGenetic inheritanceInherited disordersSex determinationVariationEvolutionSelective breedingGenetic engineeringEvidence for evolutionFossilsExtinctionResistant bacteriaClassification of living organismsAdvantages and disadvantages of sexual and asexual reproduction (Separate biology)DNA structure (Separate biology)Cloning (Separate biology)Theory of evolution (Separate biology)Speciation (Separate biology)The understanding of genetics (Separate biology) | Evolution, inheritance and variation (point 1,2,3,4,5,6,7,8,9,10, 11 & 12) |  | KS3 recall of inheritance and reproductionKnowledge of genes and how they get inheritedUnderstanding of some genetic diseasesRecall of Darwin and the theory of evolution | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Organic Chemistry | Crude oil, hydrocarbons and alkanesFractional distillation and petrochemicalsProperties of hydrocarbonsCracking and alkenesStructure and formulae of alkenes (Separate chemistry)Reactions of alkenes (Separate chemistry)Alcohols (Separate chemistry)Carboxylic acids (Separate chemistry)Addition polymerisation (Separate chemistry)Condensation polymerisation (Separate chemistry)Amino acids (Separate chemistry)DNA and other naturally occurring polymers (Separate chemistry) | Chemical and allied industries (point 3 & 4)Earth and atmospheric science (point 4) |  | No clear KS3 recall. KS4 recall from atoms topicUnderstanding of chemical formulas and methods of separation | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Forces | Scalar and vector quantitiesContact and non-contact forcesGravityResultant forcesWork done and energy transferForces and elasticityDescribing motion along a lineDistance and displacementSpeedVelocityThe distance-time relationshipAccelerationNewton’s first lawNewton’s second lawNewton’s third lawStopping distanceReaction timeFactors affecting braking distanceMomentum is a property of moving objectsConservation of momentumChanges in momentum (Separate physics)Moments, levers and gears (Separate physics)Pressure in a fluid (Separate physics)Atmospheric pressure (Separate physics) | Forces (point 1,2,3 &4)Forces and motion (point 1,2,3,4 & 5) |  | KS3 recall of forcesKnowledge of some simple forces and the ways they interactUnderstanding of speed, distance and time | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Using resources | Using the Earth’s resources and sustainable developmentPotable waterWaste water treatmentAlternative methods of extracting metalsLife cycle assessmentsWays of reducing the use of resourcesCorrosion and its prevention (Separate chemistry)Alloys as useful materials (Separate chemistry)Ceramics, polymers and composites (Separate chemistry)The haber process (Separate chemistry)Production and uses of NPK fertilisers (Separate chemistry) | Chemical and allied industries (point 1,2,3 & 5)Earth and atmospheric science (point 5) |  | KS3 recall is linked to Earth’s atmosphere topic and geology. Recall of earth’s structure and knowledge of the water cycleKS4 recall of particle model of matter and, organic chemistry and chemical formulas to help with understanding of different materials | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Chemical analysis | Pure substancesFormulationsChromatographyTest for hydrogenTest for oxygenTest of chlorineTest for carbon dioxideFlame tests (Separate chemistry)Metal hydroxides (Separate chemistry)Carbonates (Separate chemistry)Halides (Separate chemistry)Sulfates (Separate chemistry)Instrumental methods (Separate chemistry)Flame emission spectroscopy (Separate chemistry) | Chemical analysis (point 1,2,3 & 4) |  | KS3 recall from atoms, elements and compounds and also the periodic table. Ability to recall different elements and know which ones are the common gasesKS4 recall of the periodic table and knowledge of difference between gas and solid. Understanding of chemical reactions and how elements react when exposed to heat | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
| **Year 11** | 3 | Ecology | CommunitiesAbiotic factorsBiotic factorsAdaptationsLevels of organisationHow materials are cycledBiodiversityWaste managementLand useDeforestationGlobal warmingMaintaining biodiversityDecomposition (Separate biology)Impact of environmental change (Separate biology)Trophic levels (Separate biology)Pyramids of biomass (Separate biology)Transfer of biomass (Separate biology)Food production factors affecting food security (Separate biology)Farming techniques (Separate biology)Sustainable fisheries (Separate biology)Role of biotechnology (Separate biology) | Ecosystems (point 1,2,3,4,5,6,7 & 8) |  | KS3 recall of independence topic and earths atmosphere. Build on previous learning of simple food chains and understanding of the difference between predator and preyLink to KS4 earths atmosphere topic to understand the importance of forests with regards to global warming | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Earth’s Atmosphere | The proportion of different gases in the atmosphereThe Earth’s early atmosphereHow oxygen increasedHow carbon dioxide decreasedGreenhouse gasesHuman activities which contribute to an increase in greenhouse gases in the atmosphereGlobal climate changeThe carbon footprint and its reductionAtmospheric pollutants from fuelsProperties and effects of atmospheric pollutants | Earth and atmospheric science (point 1,2,3 & 4) |  | KS3 recall is linked to Earth’s atmosphere topic and geology. Recall of earth’s structureKS4 recall of ecology topic to understand climate change and develop knowledge | Content knowledge is assessed in the end of unit assessment.Live marking throughout lessons with retrieval questions built into every lesson6 mark question available per topic (minimum of one completed per half term) |
|  |  | Space (Separate Physics) | Our solar systemThe life cycle of a starOrbital motion, natural and artificial satellitesRed shift | Space Physics (point 1) |  | KS3 recall of space topicDevelop understanding of the solar system and difference between stars and planets |  |
| **Year 12** | 1 | BiologyChemistryPhysics |  |  |  |  |  |
| **Year 12** | 2 | BiologyChemistryPhysics |  |  |  |  |  |
| **Year 12** | 3 | BiologyChemistryPhysics |  |  |  |  |  |
| **Year 13** | 1 | BiologyChemistryPhysics |  |  |  |  |  |
| **Year 13** | 2 | BiologyChemistryPhysics |  |  |  |  |  |
| **Year 13** | 3 | BiologyChemistryPhysics |  |  |  |  |  |