Curriculum Plans: Year ___7 Science___ (Subject)

	Topic	Knowledge: By the end of the unit students will know:	Skills: What skills will students have developed by the end of this unit?	Key terms: What new key terms and vocabulary will be learnt in this unit?	Summative Assessment: How will pupils be assessed in this unit?
	1 Working Scientifically	**1 Working Scientifically** How to carry out practicals in the laboratory safely How to make a risk assessment The meanings of hazard labels for chemicals used and how to mitigate the hazard to a safe level How to use general laboratory equipment safely and appropriately, including Bunsen burners in practicals How to identify variables in experiments and in described practicals How to record data and draw line graphs of data recorded How to analyse data Revision skills	**1 Working Scientifically** Recognising and planning to mitigate hazards in laboratory work Gain Bunsen Burner licence Recognition and correct use of variables in practicals and questions Asking Scientific questions An introduction to planning and carrying out scientific enquiries which include development of the following skills: Evaluating risks Selecting, drawing and naming appropriate scientific apparatus Labelling a diagram of a Bunsen burner Using specialised scientific apparatus, including Bunsen burners Making predictions, asking questions and developing a line of enquiry	**1 Working Scientifically** Risk Hazard Irritant Corrosive Flammable Explosive Bunsen Burner Tripod Gauze Heatproof mat Beaker Pipette Conical Flask Measuring cylinder Accurate Repeat Risk Assessment	**1 Working Scientifically** EOT test

Curriculum Plans: Year ___7 Science___ (Subject)

			Identifying variables Using data to draw conclusions Presenting reasoned explanations (in relation to prediction and hypothesis) Evaluating the reliability of methods and suggesting possible improvements		
	2 Cells	**2 Cells** I can explain what all living organisms are made of. I can explain what each part of the microscope does and how it is used. I can explain the similarities and differences between plant and animal cells. I can explain the functions of the components of a cell by linking them to life processes. I can describe examples of specialised animal cells, linking structure and function. I can describe examples of specialised plant cells, linking structure and function. I can explain which substances move into and out of cells. I can explain the process of diffusion.	**2 Cells** Unit conversion Correct use of optical microscope Preparation of microscope slides Application of stains to specimens Identification of cell organelles Identification of specialised cells Use of prefixes such as nano, micro, milli and conversions between units	**2 Cells** Cell Animal Plant Nucleus Cytoplasm Cell membrane Cell wall Chloroplast Microscope Magnification Specialised Diffusion Unicellular Specimen Organelle	**2 Cells** EOT test

		I can explain what a unicellular organism is and give detailed examples. I can describe the structure and function of an amoeba. I can describe the structure and function of a euglena.			
	3 Particles	**3 Particles** I can explain how a range of materials are made up of particles. I can evaluate particle models that explain why different materials have different properties. I can discuss the properties of a range of substances in their three states. I can use ideas about how fast particles are moving to explain the properties of a substance in its three states. I can explain why there is a period of constant temperature during melting and freezing. I can interpret melting point data to explain the particle movement of different substances at given temperatures.	**3 Particles** Production and interpretation of particle models Identification of states Measurement of temperature Identification of melting, boiling, freezing, condensation points Use of latent heat knowledge to explain experimental data Identify sublimation Identify condensation Identify evaporation Identify boiling Interpretation of diffusion data Use data to explain gas pressure Ask questions and develop a line of enquiry based on	**3 Particles** boiling boiling point change of state collide condense diffusion evaporate freezing gas liquid material melting melting point mixture particle property solid states of matter sublime substance latent heat	**3 Particles** EOT test

		I can use the particle model and latent heat to explain boiling. I can explain why different substances boil at different temperatures using particle diagrams and latent heat. I can explain what occurs during sublimation and condensation using particle models. I can explain, using particle models, the differences between evaporation and boiling. I can use particle diagrams to explain how diffusion occurs and the factors that affect it. I can describe why diffusion is faster at higher temperatures, using the concept of how fast particles are moving. I can use particle diagrams to explain how gas pressure is created. I can explain, using particle diagrams, what happens to gas pressure as the temperature increases.	observations of the real world, alongside prior knowledge and experience Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions Recall key terminology Interpreting and manipulating data concerning conservation of mass Make and record measurements for heating / cooling curves Begin to develop the skills required for identifying substances using the particle model Apply knowledge of particles to contextual examples including gas pressure Apply knowledge of diffusion to contextual examples		

Curriculum Plans: Year ___7 Science___ (Subject)

	4 Forces	**4 Forces** I can explain the difference between contact and non-contact forces. I can explain which pairs of forces are acting on an object. I can explain how forces deform objects in a range of situations. I can explain how solid surfaces provide a support force, using scientific terminology and bonding. I can apply Hooke's Law to make quantitative predictions with unfamiliar materials. I can explain the effect of drag forces and friction in terms of forces. I can explain why drag forces and friction slow things down in terms of forces. I can apply the effects of forces at a distance to different fields. I can explain how the effect of gravity changes moving away from Earth. I can explain the difference between balances and unbalances forces. I can describe a range of situations that are in equilibrium.	**4 Forces** Identification of different forces Use knowledge of forces to explain data collected Use of Hooke's Law Make predictions using scientific knowledge and understanding Present observations and data using appropriate methods, including tables and graphs Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate Present observations and data using appropriate methods, including tables and graphs Present observations and data using appropriate methods, including tables and graphs Use arrows to represent forces in diagrams	**4 Forces** air resistance balanced compress contact force deform drag force driving force elastic limit electrostatic force equilibrium extension field friction gravity Hooke's Law interaction pair kilogram (kg) lubrication magnetic force mass newton (N) newton meter non-contact force pull push reaction resistive forces streamlined tension unbalanced water resistance	**4 Forces** EOT test

		I can explain why the speed or direction of motion of objects can change using force arrows.	Identify forces diagrams as representing balanced and unbalanced forces Add forces in one dimension to determine resultant force Explain why an object is in equilibrium (e.g., weight held by a stretch spring or supported by a surface) Plan & carry out investigation of how friction varies for different surfaces This will include: Identifying variables Presenting observations using a bar chart Use key experimental words e.g., systematic error Apply mathematical concepts and calculate results. Represent a journey on a distance-time graph Interpret a distance-time graph Take experimental measurements that demonstrate forces changing motion Explain how air and water resistance affect an object's motion	weight	

Curriculum Plans: Year ___7 Science___ (Subject)

			Use of key experimental words: Repeatability, reproducibility random error		
	5 Body Systems	**5 Body Systems** I can explain how the different tissues in an organ, and the different organs in an organ system function together. I can explain in detail the hierarchy of organisation in a multicellular organism. I can describe the gas exchange system as an organ system, linking the organs. I can explain how the adaptations of the parts of the gas exchange system help them perform their function. I can explain how the actions of the ribcage and diaphragm lead to inhaling and exhaling. I can explain the similarities and differences between the bell jar and the breathing system. I can explain in detail how to measure lung volumes.	**5 Body Systems** Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements	**5 Body Systems** alveolus antagonistic muscles bone cartilage condense diaphragm (breathing) exhale gas exchange inhale joint ligament lungs multicellular organism newton organ organ system respiration respiratory system ribcage skeleton tendon	**5 Body Systems** EOT test

		I can explain the relationship between the bones and joints in the skeleton. I can explain the link between structure and functions in the skeletal system. I can explain how the parts of a joint allow it to function. I can explain the relationship between the forces required to move different masses. I can explain how the muscle groups interact with other tissues to cause movement. I can explain why it is necessary to have both muscles in an antagonistic pair to cause motion.		tissue	

Curriculum Plans: Year __7 Science__ (Subject)

	6 Elements compounds, mixtures	**6 Elements compounds, mixtures** I can explain why certain elements are used for given roles, in terms of the properties of the elements. I can compare the properties and uses of different elements. I can link the behaviour of atoms within substances to why elements, but not lone atoms, exhibit properties. I can use information given to draw conclusions about how the properties of atoms contribute to the properties of elements. I can differentiate elements from compounds when given names and properties. I can use particle diagrams to explain why a compound has different properties to the elements in it. I can calculate the percentage of a given element within a compound. I can use data provided to calculate formula masses for compounds.	**6 Elements compounds, mixtures** Present observations and data using appropriate methods, including tables and graphs Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature Recall key terminology Make and record measurements for different solutions Developing their own line of enquiry Using a wider range of more complex laboratory apparatus when carrying out experiments and paying attention to health and safety Making and recording accurate observations	**6 Elements compounds, mixtures** atom chemical formula chemical symbol compound element molecule Periodic Table	**6 Elements compounds, mixtures** EOT test

Curriculum Plans: Year ___7 Science___ (Subject)

	8 Waves sound	**8 Waves sound** Compare wave properties Explain how reflection of a wave occurs Explain one effect of superposition of waves Explain supersonic travel Describe sound transfer Compare time taken for sound and light to travel the same distance Compare and contrast waves of different loudness/frequency Explain how animals hear the same sounds differently Explain how parts of the ear work Explain how hearing damage happens Compare and contrast the ear and the microphone Explain ultrasound analysis Explain uses of ultrasound	**8 Waves sound** Compare the speed of sound in air, water and solids Explain what an echo is Identify materials that absorb sound well Measure frequency using 'simple harmonic motion' Apply mathematical concepts & calculate results Use of key experimental words: Precision, Accuracy Construct suitable results table	**8 Waves sound** amplifier amplify amplitude audible range auditory canal auditory nerve cochlea compression crest decibel diaphragm ear eardrum echo energy hertz incident wave infrasound inner ear kilohertz longitudinal loudness medium microphone middle ear oscillation oscilloscope ossicles outer ear oval window pinna	**8 Waves sound** EOT test

				pitch rarefaction receiver reflected wave reflection reverberation sound speed of light speed of sound superpose transmitter transverse trough ultrasound vacuum vibration vocal cords	

Curriculum Plans: Year ___7 Science___ (Subject)

	9 Waves light	**9 Waves light** I can predict how light will interact with different materials. I can calculate the distance travelled by light in a light-year. I can draw a ray diagram showing how an image is formed in a plane mirror. I can apply the concept of specular reflection and diffuse scattering to models and other examples. I can predict the path of light using a model of light refraction. I can explain what happens when light travels through a lens. I can explain how the eye forms an image. I can compare a simple camera with the eye.	**9 Waves light** Complete own risk assessment. Demonstrate experimentally that for a plane mirror, angle of reflection = angle of reflection Use ray diagrams to explain the reflection of light in a mirror Demonstrate experimentally that light can change direction when it passes from one material into another Use of a protractor. Recognise how a convex lens can focus light using refraction Use ray diagrams to explain the pinhole camera Compare the ray diagram of a pinhole camera and the human eye Compare the ray diagram of a convex lens and focussing by the human eye Explain why some objects appear coloured in white light using ideas of absorption and diffuse reflection	**9 Waves light** absorb angle of incidence angle of reflection brain charge-coupled device (CCD) continuous converging convex cornea diffuse reflection dispersion emit endoscope eye filter focal point focus frequency image incident ray inverted iris law of reflection lens light-time luminous medium non-luminous normal opaque	**9 Waves light** EOT test

				optic nerve photoreceptors pinhole camera pixel plane primary colour prism pupil real (image) reflect reflected ray refraction retina secondary colour source spectrum specular reflection tertiary colour translucent transmit transparent vacuum virtual wave	

Curriculum Plans: Year ___7 Science___ (Subject)

	10 Reproduction	**10 Reproduction** I can explain the difference between adolescence and puberty. I can explain the main changes that take place during puberty. I can explain how different parts of the male and female reproductive systems work together to achieve certain functions. I can explain the adaptations of some of the main structures that help them function. I can compare the male and female gametes. I can explain the sequence of fertilisation and implantation. I can describe accurately the sequence of events during gestation. I can explain in detail how contractions bring about birth. I can explain the role of the menstrual cycle in reproduction. I can describe the stages of the menstrual cycle as a timed sequence of events.	**10 Reproduction** Recall key terminology Accurate labelling of diagrams Evaluate risk	**10 Reproduction** adolescence cervix cilia condom ejaculation embryo fertilisation foetus Amniotic sac gametes implantation menstrual cycle ovary oviduct ovulation penis period placenta puberty scrotum semen sexual intercourse sperm cell sperm duct testes umbilical cord urethra uterus vagina zygote	**10 Reproduction** EOT test

Curriculum Plans: Year ___7 Science___ (Subject)

	12 Space	**12 Space** I can use the speed of light to describe distances between astronomical objects. I can describe the structure of the Universe in detail, in order of size and of distance away from the Earth. I can explain how the properties and features of planets are linked to their place in the Solar System. I can compare features of different objects in the Solar System. I can predict the effect of the Earth's tilt on temperature and day-length. I can predict how seasons would be different if there was no tilt. I can predict phases of the Moon at a given time. I can explain how total eclipses are linked to phases of the Moon. I can explain why it is possible to see an eclipse on some of the planets in the Solar System but not others.	**12 Space** Use the equation: weight = mass x gravitational field strength. Apply mathematical concepts and calculate results Calculate weight on different planets using the formula: weight = mass x gravitational field strength Use a light year as a unit of astronomical distance Explain how the Earth's tilt causes seasons Explain why seasons are different in the northern and southern hemispheres Describe how day length varies at different times of year	**12 Space** artificial satellite asteroid astronomer axis comet constellation day dwarf planet ellipse exoplanets galaxy gas giant gravity lunar eclipse meteor meteorite Milky Way Moon natural satellite orbit partial eclipse phases planet season solar eclipse Solar System star terrestrial total eclipse Universe year	**12 Space** EOT test

Curriculum Plans: Year ___7 Science___ (Subject)

					All topics 1,2,3,4,5,6,8,9,10 & 12 could be tested in **EOY exam** in June