Alcester Academy Curriculum Planning: Key Stage 3 (Year 7)

Department: Science Year Group: 7							
Term	Topic/Subject	Assessment Objectives	Knowledge acquisition	Skill building *Intent*	Wider reading to include numeracy and SMSC	SEND & PP Identify where access and learning is supported	Final assessment task and title
Autumn	Introduction to science	Understand the basic rules of a lab Be able to work safely	Identify hazard warning labels Identify standard equipment Students will finish this topic with an ability to identify hazard symbols that are present, not only in a lab, but in everyday household products.	Light and use a Bunsen burner Recognise equipment and use it correctly Convert standard units To be able measure amounts of substance using a variety of equipment	Writing out a detailed method on how to safely light and use a Bunsen burner. Counting and measuring Reading scales Students will develop their ability to work both collaboratively and individually. Students will be able to recognise and use pieces of scientific equipment necessary for the next stages in their learning.	TA support in lessons and additional support in Bunsen lesson by Tech Use of HW club	The Bunsen burner assessment, measuring assessment
Autumn	Particles And changing state	the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure changes of state in	Describe the differences in properties between the three states of matter in structure, movement and energy Describe what causes pressure and the affect	Carrying out practical activities in a safe and accurate manner. Draw accurate scientific diagrams to represent SLG	Diffusion assessment. Plotting graphs of substances changing states. Use boiling point and melting point data to identify the state of a substance		Diffusion assessment. End of topic test Lab

		terms of the particle model. diffusion in terms of the particle model energy changes on changes of state (qualitative) exothermic and endothermic chemical reactions (qualitative).	that changing volume and temperature has on pressure. Describe how diffusion occurs and describe how some factors influence diffusion. Identify the changes of state Describe and explain different changes of state in terms of energy.	Be able to draw particle diagrams of solids, liquid and gases.	Students will develop their ability to work both collaboratively and individually.		introduction and particle theory
Autumn	Cells	cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts the similarities and differences between plant and animal cells the role of diffusion in the movement of materials in and between cells the structural adaptations of some unicellular organisms	Be able to identify the different parts of a microscope. Understand the names and roles of different sub cellular structures within an animal and plant cell. Compare types of cell Be able to describe the adaptations and organelles of the unicellular organisms euglena and amoeba. Describe the organisation from cells to organ systems. To describe what is meant by diffusion and describe how this occurs in using a leaf and lungs as examples.	Use a microscope Prepare an onion cell slide Comparing types of cells Draw accurate scientific diagrams Be able to safely and effectively use a microscope and prepare a slide.	Microscope through the ages reading assessment. Potential links to wider reading on cancerous cells. Robert Hooke reading comprehension. Calculating magnification Converting between units of measurement Students will be able to recognise and use pieces of scientific equipment necessary for the next stages in their learning. Students will develop their ability to work both collaboratively and individually.		Microscope through the ages reading assessment.

		the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.	To describe the roles of particular specialised animal and plant cells.				
Autumn	Structures and function of body systems	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. the structure and functions of the gas exchange system in humans, including adaptations to function the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple	Define and state examples of tissues, organs and organ systems. Explain the hierarchy of organisation in a multicellular organism. Describe the structure of the gas exchange system. Describe how parts of the gas exchange system are adapted to their function. Describe the processes of inhaling and exhaling. Describe how a bell jar can be used to model what happens during breathing. Describe the structure of the skeleton. Describe the functions of the skeletal system. Describe the role of the joints in movement. Describe how antagonistic muscles cause movement.	Explain how to measure lung volume. Carry out building skeleton and joints Investigate loading of joints	Wider reading around organ transplants and treatment of paralysis etc (linked to Paralympics) Numeracy around number of injuries and surgeries Reading comprehension on replacement joints		Reading assessment microscopes across the ages. Cells and body systems test

		measurements of lung volume					
Spring	Sound	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.	Describe the different types of wave, transverse and longitudinal, and their features. Describe what happens when waves hit a barrier and superpose. Describe how sound is produced and travels. Explain why the speed of sound is different in different materials. Contrast the speed of sound and the speed of light. Describe the link between loudness and amplitude, frequency and pitch. State the range of human hearing and describe how it differs from the range of hearing in animals. Describe how the ear works and how your hearing can be damaged. Describe what ultrasound is and some of its uses. Describe what ultrasound is and some of its uses.	Measure the speed of sound. Draw and label wave diagrams. Interpret wave diagrams and recognise how an oscilloscope can be used to show sound. Conversion of units	Measurement and calculation of speed of sound. Conversion of units Interpreting graphs showing hearing ranges Reading comprehension about stethoscope Wider reading around hearing loss and treatment Use of ultrasound in medicine and sonar. Use of echolocation to identify bat species. Safe levels of sound and hearing problems caused by loud music leading to safety regulations.	Students are ability set by groups after intro unit Syllabus is pared down for lowest set and KS2 resources used where needed Use of skill building tasks throughout units Use of experienced staff to teach lower sets Sets regularly reviewed to allow for progress within subject Ongoing TA support Continued use of HW club for support Revision guides provided to PP	Ear structure assessment – identify parts of the ear, describe how sound are heard and how hearing loss can occur. End of term test

Spring	Light	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.	Identify materials as opaque, transparent and translucent Identify objects as luminous and non-luminous Describe what happens when light interacts with materials. State the speed of light. Explain how images are formed in a plane mirror. Use the law of reflection Explain the difference between specular reflection and diffuse scattering. Describe and explain what happens when light is refracted. Describe what happens when light travels through a lens. Describe how the eye works. Describe how a simple camera forms an image. Explain what happens when light passes through a prism. Describe how primary colours add to make secondary colours.	Using appropriate equipment to produce ray diagrams and measure angles of incidence, reflection and refraction Using formula	Measurement of angles Using simple formula Reading comprehension laser light Wider reading around sight issues and treatment Safely working with others Appreciation of visual problems, colour blindness and their impact on individuals Explaining natural phenomena such as rainbows		Literacy – lighthouses Sound and light test.

			Explain how filters and coloured materials subtract light.				
Spring	Elements and compounds	chemical reactions as the rearrangement of atoms representing chemical reactions using formulae and using equations combustion, thermal decomposition, oxidation and displacement reactions a simple (Dalton) atomic model differences between atoms, elements and compounds chemical symbols and formulae for elements and compounds conservation of mass changes of state and chemical reactions.	Be able to state what an atom, element and compound are. Recognise key chemical symbols of elements and find them using a periodic table. Compare the properties of different elements. Explain why a compound has different properties to the elements in it. Write word equations to show reactions Be able to write the chemical names for some simple compounds. Write and interpret chemical formulae.	Use a periodic table for basic information on element names and symbols. Observe and record properties of substances. Carry out a scientific enquiry to test predictions safely then compare properties of magnesium and magnesium oxide (iron, sulphur and iron sulphide)	Using scientific terminology Appreciation of scale/size (atoms) Chemical formula relative number (proportion and ratios) Reading comprehension on lego models (Collins) Safely working with others Fundamental knowledge for all chemistry modules Understanding of historical context of science and universal language used for symbols		Burning magnesium in air – explanation of observations of the reaction, applying knowledge of elements and compounds and the particle model.
Spring	Separation Techniques	the concept of a pure substance mixtures, including dissolving simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography	Describe particle arrangements in mixtures. Explain how to identify pure substances. Describe solutions using key words. Use the particle model to explain dissolving.	Select appropriate separation techniques for different mixtures Plan an investigation to compare solubility with temperature, considering variables Label a diagram of apparatus used for	Use data to predict how much solute is dissolved in a solution or the mass of a solution. Draw suitable graphs Reading comprehension Ghandi and the salt act		Write a method describing how to separate salt from a mixture of rock salt.

		the identification of pure substances	Explain what a saturated solution is. Explain the meaning of solubility. Explain how filtration works. Describe how to filter a mixture and how the filtrate and residue are found Explain how to use evaporation to separate mixtures. Explain how distillation works. Explain how chromatography separates mixtures. Analyse chromatograms to identify substances in mixtures. Explain how a chromatogram can be used to identify a suspect's pen.	filtration to show where the filtrate and residue are found Analyse chromatograms to identify substances in mixtures.			Elements, mixtures and compound and separation technique test/
Spring	Forces	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	Identify forces and use force arrows to show the direction Identify forces as balanced or unbalanced and resolve resultant forces	Draw force diagrams and show forces as arrows Justified arguments eg speed limits Carry out Hooke's law practical, record results and draw graph	Convert units Carry out calculations of forces Wider reading around the issues of forces, speeds and accidents Reading comprehension on speed cameras		Springs assessment

		moment as the turning effect of a force 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 changed force-extension linear relation; Hooke's Law as a special case non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity. speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time)	Describe forces in action such as objects floating in real life context Describe Hooke's law and what happens Collect data for speed calculations and calculated speed giving units				
Spring	Space	gravity force, weight = mass x gravitational	Be able to identify the objects within the	Carry out simple calculations and begin	Carry out order of magnitude calculations		Space and forces test

		field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) our Sun as a star, other stars in our galaxy, other galaxies the seasons and the Earth's tilt, day length at different times of year, in different hemispheres the light year as a unit of astronomical distance.	universe and their relative sizes Describe the role of gravity in the universe and apply w = m x g Describe and explain why we get seasons, years etc and the relationship with size. Orbit and position	to understand the relationships Begin to discuss the limitations of science and how ideas change over time	Discuss the changing ideas of the universe – historical perspectives such as Galileo Wider reading / viewing around exploration of space including recent missions, ISS etc		
Summer	Reproduction	reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta reproduction in plants,	Identify the changes that happen at puberty Describe the main structures in the male and female reproductive systems. Describe the function of the main structures in the male and female reproductive systems. Describe the structure and function of gametes. Describe the processes of fertilisation.	Extract information from text to describe structures and functions of the key parts of the reproductive systems in a table. Use appropriate techniques to dissect a flower into its main parts.	Timeline to order stages of the menstrual cycle. Order of magnitude when looking at foetal growth Discussion of adolescence and puberty and the changes that happen. Healthy body image and idea of everyone being different Many of ideas below are often raised by students in questions…. Ideas of gender Methods of contraception.		Describe the journey of a sperm cell from production in the testes to fertilising an egg cell.

		including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms	Identify how twins are formed Describe what happens during gestation. Describe what happens during birth. State what the menstrual cycle is. Describe the main stages in the menstrual cycle. Identify the main structures of a flower. Describe the process of pollination. Describe the differences between wind-pollinated and insect-pollinated plants. Describe the process of fertilisation in plants. Describe how seeds and fruits are formed. State the ways seeds can be dispersed. Describe how a seed is adapted to its method of dispersal		Healthy relationships and the legality of sexual intercourse . What is IVF Premature birth and complications of birth including still births Types of cancer eg cervical		
Summer	Acids and Alkalis	defining acids and alkalis in terms of neutralisation reactions the pH scale for measuring	Be able to identify substances as acid or alkali and link to key properties	Carry out testing of acids and alkalis and record results Carry out neutralisation – write a method for this	Using scientific terminology Fundamental knowledge for all chemistry modules Understanding of historical context of science and		Risk assessmen t and variables End of year test

		acidity/alkalinity; and indicators reactions of acids with metals to produce a salt plus hydrogen reactions of acids with alkalis to produce a salt plus water	Describe the pH scale and place substances in the correct places Describe what neutralisation is and how this is achieved Understand the limitations of indicators	Write word and symbol equations	universal language used for symbols Wider reading around every day use of acids and alkalis		

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