Long Term Plan: Year 8

ARCHBISHOP SENTAMU ACADEMY
Church of England

"Science is simply the word we use to describe a method of organising our curiosity."

The programme for years 7 – 11 has staff teaching a single class, with rotating topics/subjects. There is varied order of topics for classes to allow for the rotation of practical equipment. Students will complete a biology, chemistry and then physics topic followed by an assessment. This process will then repeat again.
Staff are to use the **Curriculum Road Map** in the Science Drive to ensure that they rotate at the appropriate times.

Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
One	Scientific Skills	Introduction to practical work at ASA Short series of lessons to embed the requirements of the practical aspects of our programmes Complete the GL Assessment	Naming & drawing equipment Introduction to health & safety in the laboratory Writing Methods Recording Observations Bunsen Burner Licence	Names of equipment Students attempting to draw in 3D	Students will have used very basic equipment at KS2	All our course programmes depend upon this knowledge	Introduction of variables & values Accuracy & validity of results
SMSC & British Values	Working cooperatively Working safely in a laboratory setting						
Cultural Capital	Scientist throughout history						
Career Link	Any science based career will utilise these skills						

Two	Forces 2	Contact forces Investigate factors that affect the size of frictional or drag forces Pressure Investigate how pressure from your foot onto the ground varies with different footwear	Drawing and labelling forces Carrying out practical work Recording and interpreting results Drawing graphs and using these to generate conclusions Calculations for resultant forces and pressure	Students need to have a grasp of density to understand why objects float or sink – not because they are heavier or lighter	Basic forces will have been covered at KS2. This unit leads directly on from the Forces 1 topic covered in Y7	This information leads into the forces unit studied at GCSE	Effect of drag forces on moving objects Use of turning forces as leavers Pressure at depth under water Pressure used in hydraulics
SMSC & British Values	Working collaboratively Use of drag forces in sports and vehicles						
Cultural Capital	Variety of shoes from around the world & how they are designed for specific uses – include skis, snowshoes, shoes from history (e.g. China and the controversial historic foot binding)						
Career Link	This is a fundamental physics concept that links to many STEM career opportunities						
Three	Matter 2	Periodic Table Sort elements using chemical data and relate this to their position in the periodic table Elements Compare the properties of elements with the properties of compounds formed from them	Use data to identify patterns/trends Accurately record observations from demonstrations and draw conclusions from these Use symbols to represent elements and use these to generate basic equations that represent a chemical reaction Draw accurate particle diagrams to represent elements, mixture and compounds Be able to compare and contrast – with justification	Element is the simplest particle	Students should know examples of solids, liquids and gases from KS2 and should be able to explain these in terms of particle location This unit leads directly on from the matter 1 topic covered in Y7	This information leads into atomic structure and periodic table unit studied at GCSE	Use provided data on elements to establish patterns & anomalies Describe and explain the properties of ceramics and composites

SMSC & British Values	Opportunity to look at the British manufacturing industry Environmental impact of obtaining raw materials and processing materials						
Cultural Capital	Investigate/research the design and use of nanoparticles, biodegradable plastics, thermochromic materials, alloys etc						
Career Link	This is a fundamental chemistry concept that links to many STEM career opportunities						
Four	Organisms 2	Breathing Investigate a claim linking height to lung volume Digestion Evaluate how well a model represents the key features of the digestive system	Draw and label accurate scientific diagrams Generate a model lung and use it to support an explanation on pressure changes Investigate how food is processed as it passes through the digestive system Use of data to analyse healthy diets	Gas exchange and respiration are the same thing	At KS2 students will have learnt about the human body and the basics of keeping it healthy This unit leads directly on from the organisms 1 topic covered in Y7	This information leads into the organisation unit studied at GCSE	Predict how an issue with the gas exchange system could affect other processes in the body Design a diet for a person with a specific requirement How is gut health linked to mental health?
SMSC & British Values	Impact on health of smoking, asthma & exercise What constitutes a healthy diet and how much is a portion of each food type? Challenge – can you eat 30 (or more) different types of plant material in a week?						
Cultural Capital	Which is worse – smoking cigarettes or vaping? Why everyone should switch to a vegan or vegetarian diet -						
Career Link	This is a fundamental biology concept that links to many STEM career opportunities						
Five	Electromagnets	Magnetism	Carrying out practical work	Earth's magnetic field is fixed	Basic use of magnets	This information	Using diagrams,

	2	Explore the magnetic field pattern around different types of magnets Electromagnets Investigate ways of varying the strength of an electromagnet	Recording and interpreting results Making predictions Drawing accurate scientific diagrams	Only materials containing iron are magnetic The concept of a magnet generating a force is an abstract idea that some will find difficult to grasp	and magnetic fields will have been covered at KS2. This unit leads directly on from the Electromagnetic 1 topic covered in Y7	leads into the magnetism unit studied at GCSE	explain how bells & loudspeakers work Predict magnetic field lines and forces around magnets when 2 magnets interact
SMSC & British Values	Importance of the Earth's magnetic field to the safety of people						
Cultural Capital	Historical development of the use of magnets						
Career Link	This is a fundamental physics concept that links to many STEM career opportunities						
Six	Waves 2	Wave effects Relate the impact of different types of waves on living cells to the frequency and energy of the wave Wave properties Use the wave model to explain observations of the reflection, absorption and transmission of waves	Research skills Ability to summarise information Carry out practical work and deduce conclusions from this	Students may understand water waves but will have the view that light only travels in straight lines Waves move matter/particles – since the wave is moving	Basic light and sound will have been covered at KS2. This unit leads directly on from the waves 1 topic covered in Y7	This information leads into the waves unit studied at GCSE	Suggest how sound waves can be used for cleaning Investigate what happens when 2 wave forms combine Compare & contrast the properties of light and sound waves
SMSC & British Values	Working collaboratively on practical work and research tasks						
Cultura	Impact of tsunamis and earthquakes on human life and the places that they live and work						

I Capital	Medical uses of ultrasound						
Career Link	This is a fundamental physics concept that links to many STEM career opportunities						
Severn	Ecosystems 2	Respiration Use data from investigating fermentation with yeast to explore respiration Photosynthesis Use laboratory tests on variegated leaves to show that chlorophyll is essential for photosynthesis	Analyse data to produce valid conclusions Produce accurately labelled diagrams to show complex scientific processes Carry out practical work and deduce conclusions from this	Breathing and respiration are the same thing Plants take in food from their roots	At KS2 students will have looked at breathing They should have a basic understanding of the structure of a flowers and leaves This unit leads directly on from the Ecosystems 1 topic covered in Y7	This information leads into the Ecology unit studied at GCSE	Describe the similarities and differences between aerobic and anaerobic respiration Investigate how the time of day affects the movement of oxygen and carbon dioxide through the stomata
SMSC & British Values	Look at the impact of sport on MH & W						
Cultural Capital	Investigate how different animals obtain the oxygen that they require for respiration Polio is on the rise, how might this impact a person's ability to carry out respiration? Research how the fermentation of sugar is used as a fuel source for countries that do not have a ready access to oil						
Career Link	This is a fundamental biology concept that links to many STEM career opportunities						
Eight	Energy 2	Work Explain how an electric motor raising a weight, is doing work Heating & Cooling Investigate how to prevent heat loss by conduction,	Practical work on pulleys and levers Recording and interpreting results Carrying out calculations using the formula for work done Practical work on conduction, convection & radiation	Thermal energy is lost from a system when something is heated When a material expands the particles get bigger	Basic use of energy will have been covered at KS2 along with the concepts of renewable & non-renewable energy This unit leads directly on from the	This information leads into the Energy unit studied at GCSE	Converting values into standard units ahead of carrying out calculations Explain how gears work Compare the efficiency of different

		convection, and radiation	Produce and interpret graphical evidence to support conclusions		Energy 1 topic covered in Y7		methods of heating materials
SMSC & British Values	Use of insulation to reduce energy loss and bills						
Cultural Capital	Historic use of pulleys/levers in the shipping industry. Link to history for information about trebuchet and the use of catapults						
Career Link	This is a fundamental physics concept that links to many STEM career opportunities						
Nine	Reactions 2	Chemical Energy Investigate a phenomenon that relies on an exothermic or endothermic reaction Types of reaction Investigate changes in mass for chemical and physical processes	Carry out practical work and deduce conclusions from observed results Use diagrams to support explanations of the energy changes occurring during the change of state of a material		Basic use of energy will have been covered at KS2 along with the concepts of renewable & non-renewable energy This unit leads directly on from the reactions 1 topic covered in Y7 and also links to the energy 1 topic, also covered in Y7	This information leads into the chemical changes unit studied at GCSE	Design a hand warmer/cool pack based on knowledge from this unit Balance symbol equations Discuss the pros/cons of fuels
SMSC & British Values	Advantage and disadvantages of different fuel use – based on where a person lives Collaboration during practical work						
Cultural Capital	Investigate how plants use endothermic reactions to produce glucose Research the attempts to harness the power of the Sun and provide the world with the energy needed to meet it's growing demand Link to history with the changing use of fuels over time, chemicals for warfare						
Career Link	This is a fundamental chemistry concept that links to many STEM career opportunities						

Ten	Genes 2	Evolution Review the evidence for theories about how a particular species went extinct Inheritance Model the inheritance of a species trait and explore the variation in the offspring produced	Analyse data to produce valid conclusions Draw suitable bar charts and graphs to map out changing species numbers V environmental/predator changes Research unusual adaptations to environment that have arisen through mutation of genes Draw accurate diagrams to demonstrate how genes are inherited				Evaluate ways of preserving plant or animal material for future generations Suggest benefits to knowing all the genes in the Human genome
SMSC & British Values	Consider the ethical issues surrounding genetic manipulation Arguments for & against genetic modification						
Cultural Capital	Research the work of Franklin, Watson & Crick Investigate current scientists who are working to prevent species from becoming extinct (e.g Jane Goodall) Darwin & HMS Beagle						
Career Link	This is a fundamental biology concept that links to many STEM career opportunities						
Eleven	Earth 2	Climate Investigate the contribution that natural and human chemical processes make to our carbon dioxide emissions Earth's resources Predict the method used for extracting a metal based on it's position in the reactivity series	Create summary diagrams to show what is happening to our atmosphere Plan and carry out an investigation. Produce a valid conclusion from the observations. Use reactivity data to justify the use of a metal and reasons why recycling (or finding alternative materials) is important	Global warming is only caused by carbon dioxide Global warming is only a man-made issue Fossil fuels will last forever as things are always dying and getting buried	Students will have learnt about rocks, the Earth and the Universe at KS2. They have previously studied the Earth 1 topic in Y7 and reactions 2 topic in Y8	This information leads into the atmosphere and using resources units studied in GCSE Science	Compare the impact of natural V man-made global warming Suggest ways in which waste products could be reduced – particularly from industrial processes
SMSC	Environmental impact of manufacturing processes						

& British Values	How much waste/litter do we as a school generate per year? How can we reduce this?
Cultural Capital	Impact of humans on planet Earth – 8 billion & rising…… The need to reduce, reuse & recycle is everyone's problem
Career Link	This is a fundamental that links to many STEM career opportunities