CNCS

Year 9 Science (Chemistry & Physics & Biology)

Rationale: In Year 9, students will build on prior knowledge from Year 7 & 8. They develop and built on their key foundation concepts in Chemistry, Biology and Physics. Students will build upon the required practical learnt in the past years and develop upon on it – apply it to GCSE questions. Students will revisit and be introduced to a range of specific subject terminology, learning how to identify and discuss this appropriately. Furthermore, students will be given opportunities to develop their own personal responses to scientific problems and consider how to apply their knowledge to them.

A learner in Year 9 will know/ have studied:

- **In Year 7, *Chemistry***: C1: Atomic structure and the periodic table, C2: Bonding, structure and properties, C4: Chemical changes, C5: Energy changes; ***Physics***: P1: Energy, P2: Electricity, P3: Particle model of matter. **Biology:** B1: Cell Biology, B2 Organisation, B3 Infection and response, B4 Bioenergetics
- **In Year 8, *Chemistry***: C6:Rates of reaction, C7: Organic Chemistry, C8: Chemical Analysis, C9 Chemistry of the atmosphere, C10 Using resources; ***Physics:*** P5: Forces, P6: Waves, P7: Magnets and P8 Space Physics. **Biology:** B5 Homeostasis and response, B6 Inheritance and response, B7 Ecology
- They will know the required practical (RP) activities for each unit and how to carry them out.

A learner in Year 9 will be able to:

- Develop GCSE knowledge and practical skills in Chemistry, Biology and Physics topics.
- Work safety in lab and carry out investigations.
- Question, understand and apply the chemistry/ physics / biology knowledge to real life problems and scenarios.

Term	Outline	Assessment	Home Learning	Key Skills/ End Point
10.1.1	**P1 Energy** Students will be able to: - Describe energy transfers and energy stores - Calculate GPE, KE, EPE, SHC and power using equations. - Investigate the SHC of different materials - Explain useful and wasted energy - Investigate the effectiveness of different materials - Compare renewable and non-renewable resources. - Explain how the National Grid operates	**AUTUMN ASSESSMENT:** **Set 1 & 2 HA / Set 3 -5 LA** **Assessed on B2, C1, P1, B4 and P3 topics**	Set once per week via Educake	Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided. **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make

				judgements and draw conclusions; develop and improve experimental procedures. Students are able to recall key knowledge and apply this knowledge to exam questions from different areas.
10.1.2/2.1	**P2 Electricity** Students will investigate the fundamental property of electric charge and will analyse the principles behind modern circuits. Students will also discover the inner workings of the national grid and how electricity is distributed to homes and factories. • Identify problems with circuits • Draw common circuit symbols • Describe how common circuit components works • Recognise that potential difference depends upon • Describe how current can be affected by resistance • Investigate factors that affect resistance • Write up a practical method: • The length of a wire at constant temperature, use appropriate apparatus to measure and record length, current, potential difference and resistance. • Analyse results with appropriate calculations and graphs		Set once per week via Educake	Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided
10.2.2	**P3 Particle model** Student will be able to: - Investigate and calculate density of regular and irregular objects - Describe how changes of state affects internal energy - Recap SHC and define/calculate specific latent heat - Describe the gas particles in pressure Describe how the increasing the pressure of a gas (HT only)	**Pitstops:** **SPRING ASSESSMENT:** **Set 1 & 2 / Set 3 & 5** **Assessed on B1, C2 & P3**	Set once per week via Educake	Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided. **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.

				AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.
10.3.1	**P4 Atomic Structure** Student will be able to: - Investigate and calculate density of regular and irregular objects - Describe how changes of state affects internal energy - Recap SHC and define/calculate specific latent heat - Describe the gas particles in pressure Describe how the increasing the pressure of a gas (HT only)	**Pitstops** P4 Atomic Structure (HA & LA) **SUMMER ASSESSMENT:** **Set 1 & 2 / Set 3 -5** **Assessed on content throughout the whole year**	Set once per week via Educake	Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided. **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.

10.3.2 11.1.1	**<u>P5 Forces</u>** Students will analyse forces in a variety of machines and instruments. They will be able to describe how these machines are used in modern life. • Define the terms scalar and vector • Identify examples of scalar and vector quantities • Calculate distance vs displacement • Identify contact and non-contact forces • Understand that forces act in pairs Success criteria: • Define mass and weight • Explain why weight changes, but mass doesn't on different planets • Recall and apply the weight equation • Define the term resultant force • Calculate resultant forces in a straight line • Define the term work done • Recall and apply the work done equation and relevant units • Describe the effect of work being done to an object • Define stopping distance; • Explain how stopping distance is affected by thinking distance and braking distance in relation to forces; • Interpret distance versus speed graphs			Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided
11.1.2	**<u>P6 Waves</u>** Student will be able to: - Define the difference between transverse and longitudinal wave. - Calculate wave speed = wavelength x frequency - Investigate reflection and refraction to understand the properties of a wave - Investigate the ripple tank practical and apply the wave equation - State what sound waves are and how we hear sound. (HT only)	AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.	Weekly content recall and application questions set on Educake	**Skills:** • Recall of key knowledge through the use of low stakes testing. • Application of knowledge to unfamiliar contexts through exam question modelling. Interpretation of diagrams used to represent key processed. • Development of maths skills through converting units and

	- State what ultrasound and how is different from normal sound. (HT only) - State how seismic waves are generated and the difference between S and P waves (HT only) - Define electromagnetic waves and identifying how the wavelength/frequency differ Investigate how infrared radiation can be used to measure temperature differences			calculating rate of photosynthesis. • Describing and explaining of graphical data when investigating the effect of named factors on enzyme action, interpretation of data on diseases among the population and investigating the effect of named factors on rate of photosynthesis. • Development of evaluative skills: use of stem cells to treat medical conditions; advantages and disadvantages of treatments for CHD and advantages and disadvantages of monoclonal antibodies. • Development of practical skills during the RP activities; taking measurements, recording results, assessing risks. **End point:** • Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. • Students can interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. • Students are able to analyse information given to them, and apply their knowledge

				gained through the course to evaluate medical treatments.
11.2.1	**P7 Magnetism and electromagnetism** Student will be able to: • Describe how a magnet works and interact • Explain what a solenoid is and how they work • Describe how the magnetic effect of a current can be demonstrated and draw a magnetic field pattern • Apply Fleming's left-hand rule (HT only) • Explain what is the motor effect (HT only) • Describe the generator effect (HT only) Describe how a transformer works (HT only)	**3.1 & 3.2 Pit stops** These will reflect the needs of pupils based on gap analysis of mocks and the revision programme in place **3.2 End of term assessment** Pupils will sit external examinations in Biology **Skills tested:** AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. AO3: Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.	Exam practice booklets and content recall questions	Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts. Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided
11.2.1	**P8: Space** • Recall what our solar system is made up of, • Explain how, at the start of a star's life cycle, the dust and gas drawn together by gravity causes fusion reactions, • Explain that fusion reactions lead to an equilibrium between the gravitational collapse of a star and the expansion of a star due to fusion energy • Recognise a star has a life cycle, • Know the stages of the life cycle of different sized stars,	Visual Hexagon - space **PITSTOP 1:** Our solar system, The life cycle of a star, Orbital motion, natural and artificial satellites, Red-shift (physics only)	Exam practice booklets and content recall questions	Students are able to recall key knowledge and apply this knowledge to exam questions from different areas. Students will interpret and then describe and explain what graphs show with reference to the data collected for a range of contexts.

	• Explain how fusion processes lead to the formation of new elements. • Recall what forces keeps planets and satellites in a circular orbit, • Describe the similarities and distinctions between the planets, their moons, and artificial satellites, • Explain how gravity can lead to a change in velocity but not speed of a circular orbit, • Explain for a stable orbit, the radius must change if the speed changes • Recall the structure of waves, explain what red shift is, state what the Big Bang theory is, • Explain evidence of the expanding Universe, • Explain how red-shift provides evidence of the Big Bang theory, • Recall that there is still much about the Universe that isn't understood			Students are able to analyse information given to them, and apply their knowledge gained through the course to evaluate data provided