



**YEAR 10 2023-2024 SPR 2**  
**'An ambitious curriculum that meets the needs of all'**  
**Medium Term Planning - Topic: Space**



Curriculum Intent	In addition to working further on objectives from Years 7-9, pupils will be taught, following National Curriculum guidelines, the following this topic:
Skills/Assessment Objective Links	<ul style="list-style-type: none"><li>• The main features of the solar system.</li><li>• Star formation and life-cycle.</li><li>• Orbits for manmade and natural objects.</li><li>• Theories and evidence for the creation and eventual death of the universe.</li></ul>
Spiritual, moral, social, and cultural development	<p><b>SMSC:</b> In the space topics students start to contemplate their place in the universe. This is often a challenging experience as they being to understand the vastness of the universe both in physical space and time. This gives raise to many spiritual and moral considerations about the origins of the universe itself, the development of life in the universe, the fragility of life on Earth and the meaning of life on our small but beautiful planet.</p> <p><b>PSHE/British Values:</b> Space exploration has been a devise topic since we first looked to escape our terrestrial bonds. Society is split between the costs vs benefits of exploring space with some considering the significant challenges still facing humans on Earth to be a priority and others pointing to how the technological advances necessitated by exploring our solar system can help solve these problems at home. The legalities and laws governing space continue to be a challenge for governments and private companies together with the ethical considerations of how to make space travel inclusive. In the space topic students explore these issues to develop their thinking and enable them to join the ongoing debate as we continue to expand our society beyond Earth.</p> <p><b>Skills Builder:</b> Use and interpretation of models. Analysis and evaluation skills. Interpretation and use of standard form and suffixes to represent very small and very large numbers. Independent research skills. Discussion and debating skills. Appreciating competing views and opinions. Understanding the scientific model.</p>
Numeracy	<p><b>Arithmetic and numerical computation:</b> Recognise and use expressions in decimal form. Recognise and use expressions in standard form. Use ratios, fractions and percentages. Make estimates of the results of simple calculations.</p> <p><b>Handling data:</b> Use an appropriate number of significant figures. Find arithmetic means. Construct and interpret frequency tables and diagrams, bar charts and histograms. Understand the terms mean, mode and median. Use a scatter diagram to identify a correlation between two variables. Make order of magnitude calculations.</p> <p><b>Algebra:</b> Understand and use the symbols: =, &lt;, &lt;&lt;, &gt;&gt;, &gt;, <math>\propto</math>, ~. Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Solve simple algebraic equations.</p> <p><b>Graphs:</b> Translate information between graphical and numeric form. Understand that <math>y = mx + c</math> represents a linear relationship. Plot two variables from experimental or other data. Determine the slope and intercept of a linear graph. Draw and use the slope of a tangent to a curve as a measure of rate of change. Understand the physical significance of area between a curve and the x-axis and measure it by counting squares as appropriate.</p> <p><b>Geometry and trigonometry:</b> Use angular measures in degrees. Visualise and represent 2D and 3D forms including two dimensional representations of 3D Objects. Calculate areas of triangles and rectangles, surface areas and volumes of cubes.</p>

<b>Literacy</b>	<p><b>Vocabulary Tier 2:</b> Universe, galaxy, solar system, star, planet, exo-planet, moon, comet, meteor, orbit, satellite, expansion, black hole, big bang.</p> <p><b>Vocabulary Tier 3:</b> Redshift, protostar, nebula, red giant, supernova, white dwarf.</p> <p><b>Reading:</b> Students are given the opportunity to develop their skills in specified tasks that develop disciplinary literacy. Throughout the GCSE Physics and Combined Science course they develop their understanding of the requirements of exam questions and the key terminology in questions. In addition, they read practical methodology and translate this to actions in laboratory tasks.</p> <p><b>Writing:</b> Students construct answers independently and through class teaching. Their answers range from single word answers to the planning and writing of 6-mark “extended writing” tasks that require linking of multiple concepts from a topic. These often develop students ability to construct written evaluations of contrasting situations, where the use of comparative connectives are required.</p> <p><b>Oracy:</b> Students are regularly given the opportunity to practice their scientific vocabulary in class discussion, through choral response and in giving instruction to others during practical activities.</p>
<b>Becoming future ready</b>	<p><b>Careers/Employability:</b> Aerospace including engineering, human resources, asset management, communications, management, supply chain, quality control, PR, policy, legal, governance, astrophysics, energy resources earth science.</p>
<b>Adaptation</b>	<p>Throughout this topic, quality first teaching will provide differentiation:</p>
<b>QFT/SEND Provision</b>	<p><b>By product:</b> Assessments have opportunities for students to achieve all grades, with structured questions and opportunities for development of extended writing for all abilities.</p> <p><b>By resource:</b> PowerPoints, worksheets and booklets are differentiated as appropriate and produced in conjunction with class teachers for students who would benefit from additional scaffolding of resources in order to achieve their potential.</p> <p><b>By Intervention:</b> by providing different levels of supervision and support, including the specific deployment of teaching assistants within lessons. Structured intervention is planned and delivered based on summative assessment results.</p> <p><b>By Progressive Questioning:</b> exploring pupils’ understanding through interactive dialogue.</p> <p><b>By Grouping:</b> according to prior attainment, gender, social preference.</p> <p><b>By Task:</b> Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range.</p> <p><b>By Offering Optional Activities:</b> In class or as homework, to extend learning.</p> <p>This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.</p>
<b>Implementation Curriculum Delivery</b>	<p>To be able to:</p> <ul style="list-style-type: none"> <li>• P.8.1.1.a - I can list the types of body that make up the solar system, and describe our solar system as part of a galaxy.</li> <li>• P.8.1.1.b. - I can explain that stars are formed by gas and dust being drawn together by gravity causing fusion reactions which lead to an equilibrium between the gravitational collapse of a star and the expansion of a star due to fusion energy.</li> <li>• P.8.1.2.a. - I can describe the life cycle of a star the size of the Sun, and of a star which is much more massive than the Sun.</li> <li>• P.8.1.2.b. -- I can explain how fusion processes lead to the formation of new elements, and how supernovas have allowed heavy elements to appear in later solar systems.</li> <li>• P.8.1.3.a (HT) - I can explain that, for circular orbits, the force of gravity leads to a constantly changing velocity but unchanged speed.</li> <li>• P.8.1.3.b (HT) - I can explain that, for a stable orbit, the radius must change if the speed changes.</li> <li>• P.8.2.1.a. - I can explain, qualitatively, the red-shift of light from galaxies that are receding, and how this red-shift changes with distance from Earth</li> <li>• P.8.2.1.b. - I can explain why the change of each galaxy’s speed with distance is evidence of an expanding universe</li> </ul>
<b>Learning Outcomes (Knowledge)</b>	
<b>Current learning to be developed in the future within:</b>	<p>A-Level Physics if chosen.</p>

Assessment	Refer to assessment maps for formative and summative assessment opportunities.
Impact	Attainment and Progress – Refer to assessment results / data review documentation.