# Year 9 Physics Curriculum

| Unit | Core knowledge/skill development | Sequence | Assessment | Literacy, numeracy, PSHE, FBV, other links | Key areas of ACP and VAA development | Home learning and enrichment |
|---|---|---|---|---|---|---|
| Force Fields and Electromagnets | This topic starts by revising previous work on magnetic and gravitational fields, then introduces static electricity and the idea of an electric field. Work on current electricity is revised, and then extended to look at resistance calculations and at some uses of electromagnets. | 9Ja Mission to Mars<br>9Ja Force Fields<br>9Ja Cohesion in Writing<br>9Jb Static Electricity<br>9Jc Current Electricity<br>9Jd Resistance<br>9Jd Rounding Numbers<br>9Je Electromagnets<br>9Je Humans in Space | Starter questions<br><br>Exam-type questions<br><br>Hinge questions<br><br>Use of web-based applications to assess knowledge in lesson (e.g. Isaac Physics, Active Learn etc.)<br><br>There is a Working Scientifically opportunity looking at decimal places and significant figures.<br><br>End-of-topic tests. | Literacy: 9Ja Cohesion in Writing<br><br>Numeracy: 9Jd Rounding Numbers | Connection finding (linking) to use connections, to generalise the abstract concept of a field, ubiquitous in physics, and apply it to gravity, magnetism and charged objects.<br><br>Analysing electromagnets where the link between seemingly disparate magnetic and electric phenomena is made plain. | Homework typically set via online platforms such as Isaac Physics, Active Learn. Worksheets.<br><br>Exam preparation via exam / test papers. |
| Motion | This topic involves a certain amount of quantitative work and some maths skills will be practised. Vectors are discussed. Students will learn that other quantities besides force have magnitude and direction and are vector quantities and will compare these with | SP1a Vectors and Scalars<br>SP1b Distance/time Graphs<br>SP1c Acceleration<br>SP1d Velocity/time Graphs | Starter questions<br><br>Exam-type questions<br><br>Hinge questions<br><br>Use of web-based applications to assess knowledge in lesson (e.g. Isaac Physics, Educake, Active Learn | Literacy: key words, definitions, summary notes.<br><br>Numeracy: summary notes, equation practice, students are advised to practice | Risk-taking<br>Being brave enough to work in unfamiliar contexts such as differentiating between scalar and vector quantities<br><br>Complex and multi-step problem solving | Homework typically set via online platforms such as Tassomai, Isaac Physics, Active Learn.<br><br>Exam preparation via exam papers |

| Unit | Core knowledge/skill development | Sequence | Assessment | Literacy, numeracy, PSHE, FBV, other links | Key areas of ACP and VAA development | Home learning and enrichment |
|---|---|---|---|---|---|---|
| | quantities that only have magnitude, scalar quantities. Students use the equation average speed = total distance / total time, plot distance time graphs and determine speed from the gradient of a distance-time graph. Students will see examples of objects, like trolleys accelerating down slopes and learn to quantify acceleration as the rate of change of velocity. Students will learn the meaning of the symbols u and v and practice using two of the equations of motion $a=\frac{v-u}{}$ and $v^2-u^2=2 \times a \times x$. Students will plot and analyse velocity–time graphs to find acceleration and the total distance travelled. Students determine the speed of objects by various methods including the use of light gates. | | etc.)<br><br>End-of-topic tests.<br><br>End of year exam (PPE).<br><br>Mathematical skills will be assessed through examinations. The minimum level of mathematics in the foundation tier examination papers will be equivalent to Key Stage 3 mathematics. The minimum level of mathematics in the higher tier examination papers will be equivalent to foundation tier GCSE in Mathematics. | using the free 23 Equations app,<br><br>General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes)<br><br>Equations students are required to recall and apply (list a) and which they are required to select from a list and apply (list b). | to break down a task (e.g., graphs), decide on a suitable approach, and then act. For example interpreting an object's motion through a distance/time or velocity/time graph. | |

| Unit: | Core knowledge/skill development: | Sequence: | Assessment: | Literacy, numeracy, PSHE, FBV, other links | Key areas of ACP and VAA development: | Home learning and enrichment |
|---|---|---|---|---|---|---|
| Motion and Forces | Students will learn that an object remains stationary or moving uniformly in a straight line unless acted upon by a resultant force (Newton's first law). They will apply this when the resultant force is zero and there is no change in velocity and when the resultant force is not zero and the resultant force produces an acceleration F=m x a (Newton's second law). Students will recall and apply F=mx a to various situations when objects have a force applied. This is then applied to the special case when an object is in the Earth's gravitational field and the acceleration is g (10m/$s^2$). The weight of an object can then be determined using W =m x g. Mass is constant, but weight is measured with a spring balance and depends | SP2a Resultant Forces<br>SP2b Newton's First Lae<br>SP2c Mass and Weight<br>SP2d Newton's Second Law<br>SP2e Newton's Third Law<br>SP2f Momentum<br>SP2g Stopping Distances<br>SP2h Braking Distance and Energy<br>SP2i Crash Hazards | | | **Risk-taking**<br>Being brave enough to work in unfamiliar contexts such as applying Newton's Laws where the true nature of motion is generally masked by friction or air resistance on Earth.<br><br>**Complex and multi-step problem solving**<br>to break down a task (e.g., equations), decide on a suitable approach, and then act. For example appealing to the conservation of momentum to analyse the motion of bodies pre- and post- impact. | |

| Unit | Core knowledge/skill development | Sequence | Assessment | Literacy, numeracy, PSHE, FBV, other links | Key areas of ACP and VAA development | Home learning and enrichment |
|---|---|---|---|---|---|---|
| | on the gravitational field strength g. Objects interacting are studied and the forces at work (Newton's Third Law). Momentum is introduced as a conserved quantity, p = m x v. Force is described as the rate of change of momentum. Stopping distances of a vehicle including thinking distance and braking distance will also be studied. | | | | | |
| Conservation of Energy | Students will use equations to calculate gravitational potential energy and kinetic energy and be able to make graphical representation of energy transfers using energy diagrams, a Sankey diagrams should be covered.<br>Underpinning this is the concept of conservation of energy.<br>Students will use diagrams to understand the meaning of | SP3a Energy Stores and Transfers<br>SP3b Energy Efficiency<br>SP3c Keeping Warm<br>SP3d Stored Energies<br>SP3e Non-renewable Resources<br>SP3f Renewable Resources | | | **Connection finding (linking)** to use connections for example, the burning of fossil fuels and climate change, the increasing use of renewable resources<br><br>**Complex and multi-step problem solving** to break down a task (e.g., graphs), decide on a suitable approach, and then act. For example, interpreting graphs of non-renewable and renewable energy resources usage over time | |

| Unit | Core knowledge/skill development | Sequence | Assessment | Literacy, numeracy, PSHE, FBV, other links | Key areas of ACP and VAA development | Home learning and enrichment |
|---|---|---|---|---|---|---|
| | efficiency and be able to express this quantitatively. The idea of insulation to conserve heat is discussed along with thermal conductivity. Students will study the main energy sources to develop an understanding of present trends in the supply and usage of energy sources – both non-renewable and renewable. | | | | | |