Year 9 Curriculum Overview: Physics

Rationale:

During Year 9 we aim to build on the knowledge and understanding of Physics gained during Key Stage 3, revisiting knowledge acquired and developing it into Key Stage 4 by starting with units which have a strong overlap with material covered in Years 7 and 8. This follows the philosophy of a '5 Year Key Stage 4' inherent in the current Programme of Study and National Curriculum for KS3 and 4 Science. (In other words, both the knowledge and skills directly gained at KS3 and those developed further during KS4 are tested during the GCSE exams taken at the end of Year 11).

At Key Stage 4 we follow the AQA Scheme of Learning, in common with Biology and Chemistry.

Students begin Year 9 by studying Energy, a straightforward yet essential topic with plenty of application to both day to day life and prior knowledge from KS3, as well as interesting practical work and opportunities to work scientifically. It is followed by Forces. Throughout the course, the scientific process is taught, with many opportunities to safely plan, risk assess, investigate, record, conclude and evaluate practical investigations, together with the relevant maths skills, and key subject-specific vocabulary that will enable students to be scientifically literate.

Reading in the Curriculum: The Sciences offer many opportunities to develop and extend students' literacy skills. Across the Physics curriculum students will explore new scientific vocabulary and will have the chance to deduce and perfect their own definitions of scientific keywords. Each unit includes a glossary which students will complete and learn during the unit. Literacy also appears in the investigations aspect of our curriculum as students must be able to read methods carefully in order to generate valid results. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format. Students also have access to dictionaries. There are also literacy activities where students must read samples of texts in order to extract the necessary information to answer questions. Students will also review and connect information within topics, so knowledge organisers are provided for each topic.

Connected Learning: Topics in the Sciences do not stand alone. Each topic connects to prior knowledge from primary school, other topics learnt or still to be learnt at this school both in the Sciences and in other subjects and also in the outside world. In KS4 a lot of the content directly builds upon their knowledge gained in KS3 Science. The Curriculum Plan has also been developed to coincide with content and skills learned in Mathematics and Design & Technology. This enables students to apply their knowledge across subjects and appreciate that Physics is not a standalone subject, rather it has applications across everyday life. Connected knowledge is discussed in class, starting with the Context Summary which is shared with students at the start of each topic.

Diversity: Science belongs to everyone, regardless of background, and people from all walks of life contribute to its development and reap its benefits. This is reflected in the examples used in lessons and the Scientists whose work we consider.
The school is particularly committed to promoting diversity in Physics. We will explore the input of physicists across a range of backgrounds to show that science is inclusive. The department is in partnership with the Institute of Physics to promote physics to girls and encourage them to consider physics-based careers. To do this we are adapting our language and approaches to activities to be more inclusive, and plan to run workshops and school trips.

1. *In the following Overview, the lesson numbers are approximate and will vary depending on the number of weeks in each term.*
2. *All in italic are for separate sciences only*
3. **All in bold are for higher tier only**

Term /	Outline	Assessment	Home Learning	Resources	Knowledge/Skills End Points	Literacy

Length of Unit						
Year 9 Autumn Term 1 Energy 6 lessons (8 including assessment and responding to feedback lessons)	<u>Energy Term 1</u> Students learn about what Energy is, types of energy stores and how they transfer from one to the other. Students also have the opportunity to use their practical skills in planning and measuring using different pieces of equipment as well as using maths skills with the equations. (N.B. Specific Heat Capacity is to be taught in Chapter 3 only)	Assessment – 'There are 3 summative Science tests through the year, please see the poster in the Science tab of the Y9 Blog for details. There are also a number of formative tests throughout the unit'.	'In the Sciences, Educake quizzes, based on current and previous topics, are set every Monday to be done by the following Monday in a Biology – Chemistry – Physics rotation. Further information is available in the Y9 Blog'.	SoL on science shared area, including powerpoints, details of practical investigations and associated risk assessments, worksheets, revision resources, homework booklet and test. Physics Student Book	<u>Knowledge</u> • What different types of energy stores there are. • Measuring energy transfers • Connecting energy and power • How we monitor and control the transfer of energy <u>Skills</u> • Measuring force, distance to determine work done • Measuring force, distance and time to determine personal power • Handling data in different ways • Significant figures	• Vocabulary and keywords defined and written in own words. • Literacy activities that require and develop reading skills P1 Energy Glossary
Year 9 Autumn Term 2 Energy 6 lessons (8 including assessment and responding to feedback lessons)	<u>Energy Term 2</u> Students learn about how thermal energy is transferred. *Students have the opportunity to hone their practical skills through RP 1.9 Unwanted energy transfers*	Assessment – 'There are 3 summative Science tests through the year, please see the poster in the Science tab of the Y9 Blog for details. There are also a number of formative tests throughout the unit'.	'In the Sciences, Educake quizzes, based on current and previous topics, are set every Monday to be done by the following Monday in a Biology – Chemistry – Physics rotation. Further information is available in the Y9 Blog'.	SoL on science shared area, including powerpoints, details of practical investigations and associated risk assessments, worksheets, revision resources, homework booklet and test. Physics Student Book	<u>Knowledge</u> • Know how thermal energy is transferred • Link thermal energy transfer to energy loss in homes • Understand the importance of thermal insulation • *Planning a required practical to reduce unwanted energy transfers* <u>Skills</u> • Measuring temperature change using a thermometer • Handling data in different ways • Graph skills • Significant figures	• Vocabulary and keywords defined and written in own words. • Literacy activities that require and develop reading skills • P1 Energy Glossary

Year 9 Spring Term 1/ Forces 6 lessons (8 including assessment and responding to feedback lessons)	Forces Term 3 Students learn about the key concepts of motion such as defining speed and acceleration Students also cover basic aspects of forces which links into KS3.	Assessment – 'There are 3 summative Science tests through the year, please see the poster in the Science tab of the Y9 Blog for details. There are also a number of formative tests throughout the unit'.	'In the Sciences, Educake quizzes, based on current and previous topics, are set every Monday to be done by the following Monday in a Biology – Chemistry – Physics rotation. Further information is available in the Y9 Blog'.	SoL on science shared area, including powerpoints, details of practical investigations and associated risk assessments, worksheets, revision resources, homework booklet and test. Physics Student Book	Knowledge • Defining vectors and scalars • Explaining speed and acceleration • Interpreting distance-time graphs and velocity-time graphs Skills • Calculate speed • Calculate acceleration • Using graphs to calculate speed and acceleration from gradients	• Vocabulary and keywords defined and written in own words. • Literacy activities that require and develop reading skills • P5 Forces Glossary
Year 9 Spring Term 2 Forces 6 lessons (8 including assessment and responding to feedback lessons)	Forces Term 4 Students learn about the properties of forces and how they relate to everyday life. Students are exposed to making inferences about forces based on experiments which develops a secure understanding of abstract ideas.	Assessment – 'There are 3 summative Science tests through the year, please see the poster in the Science tab of the Y9 Blog for details. There are also a number of formative tests throughout the unit'.	'In the Sciences, Educake quizzes, based on current and previous topics, are set every Monday to be done by the following Monday in a Biology – Chemistry – Physics rotation. Further information is available in the Y9 Blog'.	SoL on science shared area, including powerpoints, details of practical investigations and associated risk assessments, worksheets, revision resources, homework booklet and test. Physics Student Book	Knowledge • Understanding of different types of forces • The observable effects of forces • Distinguishing between contact and non-contact forces • To understand the concept of resultant forces Skills • Experimenting on paper helicopters to determine the effect of forces on the velocity of the falling helicopter • Interpreting velocity-time graphs to explain the behaviour of forces acting on a skydiver and a cyclist	• Vocabulary and keywords defined and written in own words. • Literacy activities that require and develop reading skills • P5 Forces Glossary

Year 9 Summer term 1 Forces 6 lessons (8 including assessment and responding to feedback lessons)	<u>Forces</u> Students learn about momentum and the idea that momentum is conserved in collisions. Students also have hands-on experience in relating changes in momentum to the size of impact forces by experimenting with dropping eggs to making car safety features.	Assessment – 'There are 3 summative Science tests through the year, please see the poster in the Science tab of the Y9 Blog for details. There are also a number of formative tests throughout the unit'.	'In the Sciences, Educake quizzes, based on current and previous topics, are set every Monday to be done by the following Monday in a Biology – Chemistry – Physics rotation. Further information is available in the Y9 Blog'.	SoL on science shared area, including powerpoints, details of practical investigations and associated risk assessments, worksheets, revision resources, homework booklet and test. Physics Student Book	<u>Knowledge</u> ● To understand momentum and the Principle of conservation of momentum ● Linking forces to the rate of change of momentum <u>Skills</u> ● Applying the Law of conservation of momentum formula ● To experimentally prove the Principle of conservation of momentum ● To develop a hypothesis and test it by seeing which material will reduce the size of the impact force exerted on a dropped egg ● To model car safety by using trollies built with different types of materials for crumple zones and to test which would be effective in reducing the size of impact forces	● Vocabulary and keywords defined and written in own words. ● Literacy activities that require and develop reading skills ● P5 Forces Glossary
Year 9 Summer term 2 Consolidating Energy and Forces 6 lessons (8 including assessment and	<u>Energy and Forces Term 6</u> Students revisit ideas about independent variables, dependent variables and control. Students revisit planning experiments and execute them to acquire results.	Assessment – 'There are 3 summative Science tests through the year, please see the poster in the Science tab of the Y9 Blog for details. There are also a	'In the Sciences, Educake quizzes, based on current and previous topics, are set every Monday to be done by the following Monday in a Biology	SoL on science shared area, including powerpoints, details of practical investigations and associated risk assessments, worksheets, revision resources, homework booklet and test. Physics Student Book	<u>Knowledge</u> ● To identify variables in an experiment ● To plan and execute experiments ● To understand systematic errors, random errors and parallax errors <u>Skills</u> ● To collect data	● Vocabulary and keywords defined and written in own words. ● Literacy activities that require and develop reading skills ● P5 Forces Glossary

responding to feedback lessons)		number of formative tests throughout the unit'.	– Chemistry – Physics rotation. Further information is available in the Y9 Blog'.		• To calculate averages • To plot graphs	