

AQA GCSE (9-1) Physics Combined Three Year Scheme of Work

This 3-Year Scheme of Work offers a flexible approach for KS4. It is based on a physics lesson a week. Lessons are designed to be flexible and can be used for 40-60 minute sessions. Lessons are scheduled to finish in the second term of Year 11 to allow time for revision and GCSE examinations in the summer term.								
Year	Term	Week	Lesson number	Lesson title	Lesson objectives	AQA specification reference	Lesson resources (on CD ROM)	Collins Connect resources
Chapter 1: Energy								
Year 9	Term 1	1/2	1.1	Potential energy	<ul style="list-style-type: none"> Consider what happens when a spring is stretched. Describe what is meant by gravitational potential energy. Calculate the energy stored by an object raised above ground level. 	4.1.1.1 4.1.1.2	Worksheet 1.1; Practical sheet 1.1; Technician's notes 1.1	Quick starter Homework worksheet Homework quiz
Year 9	Term 1	1/2	1.2	Investigating kinetic energy	<ul style="list-style-type: none"> Describe how the kinetic energy store of an object changes as its speed changes Calculate kinetic energy. Consider how energy is transferred. 	4.1.1.1 4.1.1.2	Worksheet 1.2; Practical sheet 1.2.1 and 1.2.2; Technician's notes 1.2	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 1	3/4	1.3	Work done and energy transfer	<ul style="list-style-type: none"> Understand what is meant by work done. Explain the relationship between work done and force applied. Identify the transfers between energy stores when work is done against friction. 	4.1.1.1 4.5.2	Worksheet 1.3; Practical sheet 1.3.1 and 1.3.2; Technician's notes 1.3	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 1	3/4	1.4	Understanding power	<ul style="list-style-type: none"> Define power. Compare the rate of energy transfer by various machines and electrical appliances. Calculate power. 	4.1.1.4	Worksheet 1.4; Practical sheet 1.4.1 and 1.4.2; Technician's notes 1.4.1 and 1.4.2	Quick starter Homework worksheet Homework quiz
Year 9	Term 1	5/6	1.5	Specific heat capacity	<ul style="list-style-type: none"> Understand how things heat up. Find out about heating water. Find out about specific heat capacity. 	4.1.1.3	Worksheet 1.5; Practical sheet 1.5; Technician's notes 1.5	Quick starter Homework worksheet Homework quiz
Year 9	Term 1	5/6	1.6	Required practical: Investigating specific heat capacity	<ul style="list-style-type: none"> Use theories to develop a hypothesis. Evaluate a method and suggest improvements. Perform calculations to support conclusions. 	4.1.1.3 Prac 1 Investigating specific heat capacity	Worksheet 1.6; Practical sheet 1.6; Technician's notes 1.6	Quick starter Homework worksheet Homework quiz

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Year	Term	Week	Lesson number	Lesson title	Lesson objectives	AQA specification reference	Lesson resources (on CD ROM)	Collins Connect resources
Year 9	Term 1	7/8	1.7	Dissipation of energy	<ul style="list-style-type: none"> Explain ways of reducing unwanted energy transfer. Describe what affects the rate of cooling of a building. Understand that energy is dissipated. 	4.1.2.1	Worksheet 1.7; Practical sheet 1.7.1, 1.7.2 and 1.7.3; Technician's notes 1.7	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 1	7/8	1.8	Energy efficiency	<ul style="list-style-type: none"> Explain what is meant by energy efficiency. Calculate the efficiency of energy transfers. Find out about conservation of energy. 	4.1.2.2	Worksheet 1.8; Practical sheet 1.8.1, 1.8.2, 1.8.3, 1.8.4 and 1.8.5; Technician's notes 1.8.1 and 1.8.2	Quick starter Homework worksheet Homework quiz
Year 9	Term 1	9/10	1.9	Required practical: Investigating ways of reducing the unwanted energy transfers in a system	<ul style="list-style-type: none"> Use scientific ideas to make predictions Analyse data to identify trends. Evaluating an experimental procedure. 	4.1.2.1 Prac 2 Investigate the effectiveness of different materials as thermal insulators	Worksheet 1.9; Practical sheet 1.9; Technician's notes 1.9	Quick starter Homework worksheet Homework quiz
Year 9	Term 1	9/10	1.10	Using energy resources	<ul style="list-style-type: none"> Describe the main energy sources available for use on Earth. Distinguish between renewable and non-renewable sources. Explain the ways in which the energy resources are used. 	4.1.3	Worksheet 1.10; Practical sheet 1.10; Technician's notes 1.10	Quick starter Homework worksheet Homework quiz
Year 9	Term 1	11/12	1.11	Global energy supplies	<ul style="list-style-type: none"> Analyse global trends in energy use. Understand what the issues are when using energy resources. 	4.1.3	Worksheet 1.11; Practical sheet 1.11; Technician's notes 1.11	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 1	11/12	1.12	Key Concept: Energy transfer	<ul style="list-style-type: none"> To be able to recognise objects with energy To be able to recognise the different 	4.1	Worksheet 1.12; Practical sheet 1.12.1 and 1.12.2; Technician's notes 1.12.1 and	Quick starter Homework worksheet Homework quiz

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Year	Term	Week	Lesson number	Lesson title	Lesson objectives	AQA specification reference	Lesson resources (on CD ROM)	Collins Connect resources
					types of energy • To be able to describe energy transfers • To be able to use and describe the law of conservation of energy		1.12.2	Slideshow
Year 9	Term 2	13/14	1.13	Maths skills: Calculations using significant figures	• Substitute numerical values into equations and use appropriate units. • Change the subject of an equation. • Give an answer to an appropriate number of significant figures	4.1	Worksheet 1.13	Quick starter Homework worksheet Homework quiz
Year 9	Term 2	13/14	1.14	Maths skills: Handling data	• Recognise the difference between mean, mode and median. • Explain the use of tables and frequency tables. • Explain when to use scatter diagrams, bar charts and histograms.	4.1.1.1 4.1.3	Worksheet 1.14	Quick starter Homework worksheet Homework quiz
Year 9	Term 2	13/14	Assessments		End of chapter test Student Book End of chapter test Collins Connect			
Chapter 2: Electricity								
			2.1	Static electricity	• Describe how insulating materials can become charged. • Know that there are two kinds of electric charge. • Explain these observations in terms of electron transfer.	4.2.5.1	Worksheet 2.1	Quick starter Homework worksheet Homework quiz
			2.2	Electric fields	• Explain what an electric field is. • Draw an electric field pattern for a charged sphere. • Use the idea of an electric field to explain electrostatic attraction and sparking.	4.2.5.2	Worksheets 2.2.1, 2.2.2 and 2.2.3	Quick starter Homework worksheet Homework quiz
Year 9	Term 2	15/16	2.3	Electric current	• Know circuit symbols. • Recall that current is a rate of flow of	4.2.1.1 4.2.1.2	Worksheets 2.3.1, 2.3.2 and 2.3.3	Quick starter Homework worksheet

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					<p>electric charge.</p> <ul style="list-style-type: none"> Recall that current (I) depends on resistance (R) and potential difference (V) Explain how an electric current passes round a circuit. 	4.2.1.3		Homework quiz
Year 9	Term 2	15/16	2.4	Series and parallel circuits	<ul style="list-style-type: none"> Recognise series and parallel circuits. Describe the changes in the current and potential difference in series and parallel circuits. 	4.2.2	Worksheets 2.4.1, 2.4.2 and 2.4.3	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 2	17/18	2.5	Investigating circuits	<ul style="list-style-type: none"> Use series circuits to test components and make measurements. Carry out calculations on series circuits. 	4.2.2	Worksheets 2.5.1, 2.5.2 and 2.5.3; Practical sheet 2.1; Technician's notes 2.1	Quick starter Homework worksheet Homework quiz
Year 9	Term 2	17/18	2.6	Circuit components	<ul style="list-style-type: none"> Set up a circuit to investigate resistance. Investigate the changing resistance of a filament lamp. Compare the properties of a resistor and filament lamp. 	4.2.1.4	Practical sheet 2.6; Technician's notes 2.6	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 2	19/20	2.7	Required practical: Investigate, using circuit diagrams to construct circuits, the I–V characteristics of a filament lamp, a diode and a resistor at constant temperature	<ul style="list-style-type: none"> understand how an experiment can be designed to test an idea evaluate how an experimental procedure can yield more accurate data interpret and explain graphs using scientific ideas. 	4.2.1.3 Prac 3 Investigate factors affecting resistance	Worksheet 2.7; Practical sheets 2.7.1, 2.7.2 and 2.7.3; Technician's notes 2.7	Quick starter Homework worksheet Homework quiz
Year 9	Term 2	19/20	2.8	Required practical: Use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits, including the length of a wire at constant temperature and combinations of	<ul style="list-style-type: none"> Use a circuit to determine resistance Gather valid data to use in calculations Apply the circuit to determine the resistance of combinations of components 	4.2.1.4 Prac 4 Investigate the I–V characteristics of circuit elements	Worksheet 2.8; Practical sheet 2.8; Technician's notes 2.8	Quick starter Homework worksheet Homework quiz

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				resistors in series and parallel				
Year 9	Term 2	21/22	2.9	Control circuits	<ul style="list-style-type: none"> Use a thermistor and light-dependent resistor (LDR). Investigate the properties of thermistors, LDRs and diodes. 	4.2.1.4	Worksheet 2.9; Practical sheet 2.9; Technician's notes 2.9	Quick starter Homework worksheet Homework quiz
Year 9	Term 2	21/22	2.10	Electricity in the home	<ul style="list-style-type: none"> Recall that the domestic supply in the UK is a.c. at 50 Hz and about 230 V. Describe the main features of live, neutral and earth wires. 	4.2.3.1 4.2.3.2	Worksheets 2.10.1, 2.10.2 and 2.10.3	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 2	23/24	2.11	Transmitting electricity	<ul style="list-style-type: none"> Describe how electricity is transmitted using the National Grid. Explain why electrical power is transmitted at high potential differences. Understand the role of transformers. 	4.2.4.3	Worksheet 2.11	Quick starter Homework worksheet Homework quiz
Year 9	Term 2	23/24	2.12	Power and energy transfers	<ul style="list-style-type: none"> Describe the energy transfers in different domestic appliances. Describe power as a rate of energy transfer. Calculate the energy transferred. 	4.2.4.2	Worksheets 2.12.1, 2.12.2 and 2.12.3; Practical sheet 2.12; Technician's notes 2.12	Quick starter Homework worksheet Homework quiz
Year 9	Term 3	25/26	2.13	Calculating power	<ul style="list-style-type: none"> Calculate power. Use power equations to solve problems. Consider power ratings and changes in stored energy. 	4.2.4.1 4.1.1.1 4.1.1.2 4.1.1.3	Worksheets 2.13.1, 2.13.2 and 2.13.3; Practical sheet 2.13; Technician's notes 2.13	Quick starter Homework worksheet Homework quiz
Year 9	Term 3	25/26	2.14	Key concept: What's the difference between potential difference and current?	<ul style="list-style-type: none"> Understand and be able to apply the concepts of current and potential difference. Use these concepts to explain various situations. 	4.2.1	Worksheet 2.14; Practical sheet 2.14.1, 2.14.2 and 2.14.3; Technician's notes 2.14	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 3	27/28	2.15	Maths skills: Using formulae and understanding graphs	<ul style="list-style-type: none"> Recognise how algebraic equations define the relationships between variables. Solve simple algebraic equations by substituting numerical values. Describe relationships expressed in graphical form. 	4.2	Worksheet 2.15.1, 2.15.2	Quick starter Homework worksheet Homework quiz
Year	Term	27/28	Assessments		End of chapter test Student Book			

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9	3				End of chapter test Collins Connect End of teaching block test Collins Connect			
Chapter 3: Particle model of matter								
Year 9	Term 3	29/30	3.1	Density	<ul style="list-style-type: none"> Use the particle model to explain the different states of matter and differences in density. Calculate density. 	4.3.1.1	Worksheet 3.1; Practical sheet 3.1; Technician's notes 3.1	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 3	29/30	3.2	Required practical: To investigate the densities of regular and irregular solid objects and liquids	<ul style="list-style-type: none"> Interpret observations and data. Use spatial models to solve problems. Plan experiments and devise procedures. Use an appropriate number of significant figures in measurements and calculations. 	4.3.1.1 Prac 5 Determine the densities of regular and irregular solid objects	Worksheet 3.2; Practical sheet 3.2; Technician's notes 3.2	Quick starter Homework worksheet Homework quiz
Year 9	Term 3	31/32	3.3	Changes of state	<ul style="list-style-type: none"> Describe how, when substances change state, mass is conserved. Describe energy transfer in changes of state. Explain changes of state in terms of particles. 	4.3.1.3	Worksheet 3.3; Practical sheet 3.3; Technician's notes 3.3	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 3	31/32	3.4	Internal energy	<ul style="list-style-type: none"> Describe the particle model of matter. Understand what is meant by the internal energy of a system. Describe the effect of heating on the energy stored within a system. 	4.3.2.1	Worksheet 3.4; Practical sheet 3.4.1, 3.4.2, 3.4.3, 3.4.4, 3.4.5, 3.4.6; Technician's notes 3.4	Quick starter Homework worksheet Homework quiz
Year 9	Term 3	33/34	3.5	Specific heat capacity	<ul style="list-style-type: none"> Describe the effect of increasing the temperature of a system in terms of particles. State the factors that are affected by an increase in temperature of a substance. Explain specific heat capacity. 	4.3.2.2	Worksheet 3.5; Practical sheet 3.5; Technician's notes 3.5	Quick starter Homework worksheet Homework quiz Slideshow
Year 9	Term 3	33/34	3.6	Latent heat	<ul style="list-style-type: none"> Explain what is meant by latent heat. Describe that when a change of state occurs it changes the energy stored but not the temperature. Perform calculations involving specific latent heat. 	4.3.2.3	Worksheet 3.6; Practical sheet 3.6; Technician's notes 3.6	Quick starter Homework worksheet Homework quiz Slideshow

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Year 9	Term 3	35/36	3.7	Particle motion in gases	<ul style="list-style-type: none"> Relate the temperature of a gas to the average kinetic energy of the particles. Explain how a gas has a pressure. Explain that changing the temperature of a gas held at constant volume changes its pressure. 	4.3.3.1	Worksheet 3.7; Practical sheet 3.7; Technician's notes 3.7	Quick starter Homework worksheet Homework quiz	
			3.8	Increasing the pressure of a gas	<ul style="list-style-type: none"> Describe the relationship between the pressure and volume of a gas at constant temperature. Calculate the change in the pressure or volume of a gas held at constant temperature when either the pressure or volume is increased or decreased. Explain how doing work on a gas can increase its temperature. 	4.3.3.2 4.3.3.3	Worksheet 3.8; Practical sheet 3.8; Technician's notes 3.8	Quick starter Homework worksheet Homework quiz Slideshow	
Year 9	Term 3	35/36	3.9	Key concept: Particle model and changes of state	<ul style="list-style-type: none"> Use the particle model to explain states of matter. Use ideas about energy and bonds to explain changes of state. Explain the relationship between temperature and energy. 	4.3	Worksheet 3.9; Practical sheet 3.9; Technician's notes 3.9	Quick starter Homework worksheet Homework quiz	
Year 9	Term 3	37/38	3.10	Maths skills: Drawing and interpreting graphs	<ul style="list-style-type: none"> Draw a graph of temperature against time. Interpret a graph of temperature against time. 	4.3.2.3	Worksheet 3.10; Practical sheet 3.10; Technician's notes 3.10	Quick starter Homework worksheet Homework quiz	
Year 10	Term 1	37/38	Assessment		End of chapter test Student Book End of chapter test Collins Connect				
Chapter 4: Atomic Structure									
Year 10	Term 1	39/40	4.1	Atomic Structure	<ul style="list-style-type: none"> Describe the structure of the atom. Use symbols to represent particles. Describe ionisation. 	4.4.1.1 4.4.1.2	Worksheets 4.1.1, 4.1.2 and 4.1.3	Quick starter Homework worksheet Homework quiz	
Year 10	Term 1	39/40	4.2	Radioactive decay	<ul style="list-style-type: none"> Describe radioactive decay. Describe the types of nuclear radiation. Understand the processes of alpha decay and beta decay. 	4.4.2.1	Worksheets 4.2.1, 4.2.2 and 4.2.3	Quick starter Homework worksheet Homework quiz Slideshow	

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Year 10	Term 1	41/42	4.3	Background radiation	<ul style="list-style-type: none"> Recall sources of background radiation. Describe how different types of radiation have different ionising power. 	4.4.2.1 4.4.3.1	Worksheets 4.3.1, 4.3.2 and 4.3.3	Quick starter Homework worksheet Homework quiz
Year 10	Term 1	41/42	4.4	Nuclear equations	<ul style="list-style-type: none"> Understand nuclear equations. Write balanced nuclear equations. 	4.4.2.2	Worksheets 4.4.1, 4.4.2 and 4.4.3	Quick starter Homework worksheet Homework quiz
Year 10	Term 1	43/44	4.5	Radioactive half-life	<ul style="list-style-type: none"> Explain what is meant by radioactive half-life. Calculate half-life. Choose the best radioisotope for a task. 	4.4.2.3 4.4.2.1 (best sources of radiation) 4.4.3.2	Worksheets 4.5.1, 4.5.2 and 4.5.3; Practical sheet 4.5; Technician's notes 4.5	Quick starter Homework worksheet Homework quiz
Year 10	Term 1	43/44	4.6	Hazards and uses of radiation	<ul style="list-style-type: none"> Describe radioactive contamination. Give examples of how radioactive tracers can be used. 	4.4.2.4	Worksheets 4.6.1, 4.6.2 and 4.6.3	Quick starter Homework worksheet Homework quiz
Year 10	Term 1	45/46	4.7	Irradiation	<ul style="list-style-type: none"> Explain what is meant by irradiation. Understand the distinction between contamination and irradiation. Appreciate the importance of communication between scientists. 	4.4.2.4	Worksheets 4.7.1, 4.7.2 and 4.7.3	Quick starter Homework worksheet Homework quiz
Year 10	Term 1	45/46	4.8	Uses of radiation in medicine	<ul style="list-style-type: none"> Compare gamma rays and X-rays. Describe some uses of nuclear radiation for medical diagnosis and therapy. 	4.4.3.3	Worksheets 4.8.1, 4.8.2, 4.8.3 and 4.8.4	Quick starter Homework worksheet Homework quiz
			4.9	Using nuclear radiation	<ul style="list-style-type: none"> Explore the risks and benefits of using nuclear radiation. Describe how internal organs can be explored. Understand how nuclear radiation can control or destroy unwanted tissue. 	4.4.3.3	Worksheet 4.9.1, 4.9.2 and 4.9.3	Quick starter Homework worksheet Homework quiz Slideshow
			4.10	Nuclear fission	<ul style="list-style-type: none"> Describe nuclear fission. Explain how a chain reaction occurs. Explain how fission is used. 	4.4.4.1	Worksheet 4.10.1, 4.10.2 and 4.10.3	Quick starter Homework worksheet Homework quiz
			4.11	Nuclear fusion	<ul style="list-style-type: none"> Explain nuclear fusion. Describe the conditions needed for 	4.4.4.2	Worksheet 4.11.1	Quick starter Homework worksheet

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					fusion. <ul style="list-style-type: none"> Describe how nuclear fusion may be an attractive energy source. 			Homework quiz Slideshow	
Year 10	Term 1	47/48	4.12	Key concept: Developing ideas for the structure of the atom	<ul style="list-style-type: none"> Understand how ideas about the structure of the atom have changed. How evidence is used to test and improve models. 	4.4.1.3	Worksheet 4.12.1, 4.12.2, 4.12.3 and 4.12.4	Quick starter Homework worksheet Homework quiz Slideshow	
Year 10	Term 1	47/48	4.13	Maths skills: Using ratios and proportional reasoning	<ul style="list-style-type: none"> Calculate radioactive half-life from a curve of best fit. Calculate the net decline in radioactivity. 	4.4.2.3	Worksheet 4.13.1, 4.13.2	Quick starter Homework worksheet Homework quiz Slideshow	
Year 10	Term 2	49/50	Assessments		End of chapter test Student Book End of chapter test Collins Connect End of teaching block test Collins Connect				
Chapter 5: Forces									
Year 10	Term 2	49/50	5.1	Forces	<ul style="list-style-type: none"> Describe a force. Recognise the difference between contact and non-contact forces. State examples of scalar and vector quantities. 	4.5.1.1 4.5.1.2 4.5.6.1.3	Worksheet 5.1.1, 5.1.2 and 5.1.3	Quick starter Homework worksheet Homework quiz	
Year 10	Term 2	51/52	5.2	Speed	<ul style="list-style-type: none"> Calculate speed using distance travelled divided by time taken. Calculate speed from a distance–time graph. Measure the gradient of a distance–time graph at any point. 	4.5.6.1.1 4.5.6.1.2 4.5.6.1.4	Worksheet 5.2.1, 5.2.2 and 5.2.3; Practical sheet 5.2; Technician's notes 5.2	Quick starter Homework worksheet Homework quiz Slideshow	
Year 10	Term 2	51/52	5.3	Acceleration	<ul style="list-style-type: none"> Describe acceleration. Calculate acceleration. Explain motion in a circle. 	4.5.6.1.3 4.5.6.1.5	Worksheets 5.3.1, 5.3.2 and 5.3.3	Quick starter Homework worksheet Homework quiz	
Year 10	Term 2	53/54	5.4	Velocity–time graphs	<ul style="list-style-type: none"> Draw velocity–time graphs. Calculate acceleration using a velocity–time graph. Calculate displacement using a velocity–time graph. 	4.5.6.1.1 4.5.6.1.3 4.5.6.1.5	Worksheets 5.4.1, 5.4.2 and 5.4.3; Practical sheet 5.4; Technician's notes 5.4	Quick starter Homework worksheet Homework quiz Slideshow	
Year 10	Term 2	53/54	5.5	Calculations of motion	<ul style="list-style-type: none"> Describe uniform motion. Use an equation for uniform motion. Apply this equation to vertical motion. 	4.5.6.1.5	Worksheet 5.5.1, 5.5.2, 5.5.3, 5.5.4, 5.5.5 and 5.5.6	Quick starter Homework worksheet Homework quiz	
Year 10	Term 2	55/56	5.6	Heavy or massive?	<ul style="list-style-type: none"> Identify the correct units for mass and 	4.5.1.3	Worksheet 5.6.1	Quick starter	

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10	2				<p>weight.</p> <ul style="list-style-type: none"> • Explain the difference between mass and weight. • Understand how weight is an effect of gravitational fields. 			Homework worksheet Homework quiz	
Year 10	Term 2	55/56	5.7	Forces and motion	<ul style="list-style-type: none"> • Understand what a force does. • Explain what happens to an object if all the forces acting on it cancel each other out. • Analyse how this applies to everyday situations. 	4.5.6.1.5 4.5.6.2.1	Worksheet 5.7.1, 5.7.2 and 5.7.3; Practical sheet 5.7; Technician's notes 5.7	Quick starter Homework worksheet Homework quiz	
Year 10	Term 2	57/58	5.8	Resultant forces	<ul style="list-style-type: none"> • Calculate the resultant of a number of forces. • Draw free-body diagrams to find resultant forces. • Understand that a force can be resolved into two components acting at right angles to each other. 	4.5.1.3 (centre of mass) 4.5.1.4	Worksheets 5.8.1, 5.8.2 and 5.8.3	Quick starter Homework worksheet Homework quiz	
Year 10	Term 2	57/58	5.9	Forces and acceleration	<ul style="list-style-type: none"> • Explain what happens to the motion of an object when the resultant force is not zero. • Analyse situations in which a non-zero resultant force is acting. • Explain what inertia is. 	4.5.6.2.1 (inertia) 4.5.6.2.2	Practical sheets 5.9.1, 5.9.2 and 5.9.3; Technician's notes 5.9	Quick starter Homework worksheet Homework quiz	
Year 10	Term 2	59/60	5.10	Required practical: Investigating the acceleration of an object	<ul style="list-style-type: none"> • Plan an investigation to explore an idea. • Analysing results to identify patterns and draw conclusions. • Compare results with scientific theory. 	4.5.6.2.2 Prac 7	Investigate the effect of varying force or mass on acceleration	Worksheets 5.10.1, 5.10.2 and 5.10.3	Quick starter Homework worksheet Homework quiz
Year 10	Term 2	59/60	5.11	Newton's third law	<ul style="list-style-type: none"> • Identify force pairs. • Understand and be able to apply Newton's third law. 	4.5.6.2.3		Worksheets 5.11.1, 5.11.2 and 5.11.3	Quick starter Homework worksheet Homework quiz
Year 10	Term 3	61/62	5.12	Momentum	<ul style="list-style-type: none"> • Explain what is meant by momentum. • Apply ideas about rate of change of momentum to safety features in cars. • Use momentum calculations to predict what happens in a collision. 	4.5.7.1 4.5.7.2 4.5.7.3		Worksheets 5.12.1, 5.12.2 and 5.12.3	Quick starter Homework worksheet Homework quiz

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Year 10	Term 3	61/62	5.13	Keeping safe on the road	<ul style="list-style-type: none"> • Explain the factors that affect stopping distance. • Explain the dangers caused by large deceleration. • Estimate the forces involved in the deceleration of a road vehicle. • Apply the idea of rate of change of momentum to explain safety features. 	4.5.6.3.1 4.5.6.3.2 4.5.6.3.3 4.5.6.3.4	Worksheets 5.13.1, 5.13.2 and 5.13.3	Quick starter Homework worksheet Homework quiz
			5.14	Moments	<ul style="list-style-type: none"> • Describe the turning effect of a force about a pivot. • Explain and use the principle of moments. • Explain what is meant by the centre of mass of an object. 	4.5.1.3 (centre of mass) 4.5.4	Worksheets 5.14.1, 5.14.2 and 5.14.3; Practical sheet 5.14; Technician's notes 5.14	Quick starter Homework worksheet Homework quiz Slideshow
			5.15	Levers and gears	<ul style="list-style-type: none"> • Describe how levers and gears can be used to transmit the rotational effect of a force. • Explain how levers and gears transmit forces. 	4.5.4	Worksheets 5.15.1, 5.15.2 and 5.15.3	Quick starter Homework worksheet Homework quiz
			5.16	Pressure in a fluid	<ul style="list-style-type: none"> • Explain how pressure acts in a fluid. • Calculate pressure at different depths in a liquid. • Explain what causes upthrust. 	4.5.5.1.1 4.5.5.1.2	Worksheets 5.16.1, 5.16.2 and 5.16.3; Practical sheet 5.16; Technician's notes 5.16	Quick starter Homework worksheet Homework quiz
			5.17	Atmospheric pressure	<ul style="list-style-type: none"> • Show that the atmosphere exerts a pressure. • Explain variations in atmospheric pressure with height. • Describe a simple model of the Earth's atmosphere and atmospheric pressure. 	4.5.5.2	Worksheets 5.17.1, 5.17.2 and 5.17.3	Quick starter Homework worksheet Homework quiz
Year 10	Term 3	63/64	5.18	Forces and energy in springs	<ul style="list-style-type: none"> • Explain why you need two forces to stretch a spring. • Describe the difference between elastic and inelastic deformation. • Calculate extension, compression and elastic potential energy. 	4.5.3	Worksheets 5.18.1, 5.18.2 and 5.18.3; Practical sheet 5.18; Technician's notes 5.18	Quick starter Homework worksheet Homework quiz Slideshow
Year 10	Term 3	63/64	5.19	Required practical: Investigate the	<ul style="list-style-type: none"> • Interpret readings to show patterns 	4.5.3 Prac 6	Worksheets 5.19.1, 5.19.2 and 5.19.3	Quick starter Homework worksheet

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				relationship between force and the extension of a spring	<ul style="list-style-type: none"> and trends. Interpret graphs to form conclusions. Apply the equation for a straight line to the graph. 	Investigate the relationship between force and extension for a spring		Homework quiz
Year 10	Term 3	65/66	5.20	Key concept: Forces and acceleration		4.5	Worksheets 5.20.1, 5.20.2 and 5.20.3	Quick starter Homework worksheet Homework quiz Slideshow
Year 10	Term 3	65/66	5.21	Making estimates of calculations	<ul style="list-style-type: none"> Estimate the results of simple calculations. Round numbers to make an estimate. Calculate order of magnitude. 	4.5	Worksheets 5.21.1, 5.21.2	Quick starter Homework worksheet Homework quiz
Year 10	Term 3	67/68	Assessments		End of chapter test Student Book End of chapter test Collins Connect			
Chapter 6: Waves and light								
Year 10	Term 3	67/68	6.1	Describing waves	<ul style="list-style-type: none"> Describe wave motion. Define wavelength and frequency. Apply the relationship between wavelength, frequency and wave velocity. 	4.6.1.2	Worksheets 6.6.1, 6.6.2, 6.6.3, 6.6.4, 6.6.5 and 6.6.6	Quick starter Homework worksheet Homework quiz
Year 10	Term 3	69/70	6.2	Transverse and longitudinal waves	<ul style="list-style-type: none"> Compare the motion of transverse and longitudinal waves. Explain why water waves are transverse waves. Explain why sound waves are longitudinal waves. 	4.6.1.1 4.6.1.2	Worksheets 6.2.1, 6.2.2 and 6.2.3; PowerPoint presentation	Quick starter Homework worksheet Homework quiz
Year 10	Term 3	69/70	6.3	Key concept: Transferring energy or information by waves	<ul style="list-style-type: none"> To understand that all waves have common properties To understand how waves can be used to carry information To understand various applications of energy transfer by different types of electromagnetic waves 	4.6	Worksheets 6.3.1, 6.3.2 and 6.3.3	Quick starter Homework worksheet Homework quiz
Year 10	Term 3	71/72	6.4	Measuring wave speeds	<ul style="list-style-type: none"> Explain how the speed of sound in air can be measured. Explain how the speed of water ripples can be measured. Describe the use of echo sounding. 	4.6.1.2 4.6.1.5 (echo sounding)	Worksheets 6.4.1, 6.4.2, 6.4.3; Practical sheet 6.4; Technician's notes 6.4	Quick starter Homework worksheet Homework quiz Slideshow

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Year 10	Term 3	71/72	6.5	Required practical: Measuring the wavelength, frequency and speed of waves in a ripple tank and waves in a solid	<ul style="list-style-type: none"> Develop techniques for making observations of waves. Select suitable apparatus to measure frequency and wavelength. Use data to answer questions. 	4.6.1.2 Prac 8 Measuring the wavelength, frequency and speed of waves in a ripple tank and waves in a solid	Worksheets 6.5.1, 6.5.2 and 6.5.3	Quick starter Homework worksheet Homework quiz
Year 11	Term 1	73/74	6.6	Reflection and refraction of waves	<ul style="list-style-type: none"> Describe reflection, transmission and absorption of waves. Construct ray diagrams to illustrate reflection. Construct ray diagrams to illustrate refraction. 	4.6.1.3	Worksheets 6.6.1, 6.6.2 and 6.6.3; Practical sheets 6.6.1, 6.6.2 and 6.6.3; Technician's notes 6.6.1, 6.6.2 and 6.6.3	Quick starter Homework worksheet Homework quiz
			6.7	Required practical: Investigate the reflection of light by different types of surface and the refraction of light by different substances	<ul style="list-style-type: none"> Make and record observations of how light is reflected and transmitted at different surfaces. Measure angles and discuss the method, apparatus and uncertainty in measurements. Draw conclusions from experimental results. 	4.6.1.3 Prac 9 Investigate the reflection of light by different types of surface and the refraction of light by different substances	Worksheets 6.7.1 and 6.7.2; Practical sheets 6.7.1, 6.7.2, 6.7.3 and 6.7.4; Technician's notes 6.7	Quick starter Homework worksheet Homework quiz Slideshow 1 Slideshow 2
			6.8	Sound waves	<ul style="list-style-type: none"> Describe how we hear sound and state the range of frequencies we can hear. Explain that sound travels faster in a denser medium. Explain about reflection, absorption and transmission of sound. 	4.6.1.4	Worksheets 6.8.1, 6.8.2 and 6.8.3	Quick starter Homework worksheet Homework quiz
			6.9	Exploring ultrasound	<ul style="list-style-type: none"> Explain what ultrasound is. Describe how ultrasound is used in industry to investigate or detect hidden or buried objects. Explain how ultrasound is used in medicine. 	4.6.1.5	Worksheets 6.9.1, 6.9.2 and 6.9.3	Quick starter Homework worksheet Homework quiz Slideshow
			6.10	Seismic waves	<ul style="list-style-type: none"> Describe how earthquakes are detected. 	4.6.1.5	Worksheets 6.10.1, 6.10.2, 6.10.3	Quick starter Homework worksheet

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					<ul style="list-style-type: none"> Describe the properties of P waves and S waves. Explain how the properties of seismic waves allow us to investigate the inside of the Earth. 			Homework quiz
Year 11	Term 1	73/74	6.11	The electromagnetic spectrum	<ul style="list-style-type: none"> Recall the similarities and differences between transverse and longitudinal waves. Recognise that electromagnetic waves are transverse waves. Describe the main groupings and wavelength ranges of the electromagnetic spectrum. 	4.6.2.1	Worksheets 6.11.1, 6.11.2 and 6.11.3	Quick starter Homework worksheet Homework quiz
Year 11	Term 1	75/76	6.12	Reflection, refraction and wave fronts	<ul style="list-style-type: none"> Explain reflection and refraction and how these may vary with wavelength. Construct ray diagrams to illustrate refraction. Use wave front diagrams to explain refraction in terms of the difference in velocity of the waves in different substances. 	4.6.1.3 4.6.2.2	Worksheets 6.12.1, 6.12.2, 6.12.3; Practical sheet 6.12.1; Technician's notes 6.12.1	Quick starter Homework worksheet Homework quiz
Year 11	Term 1	75/76	6.13	Gamma rays and X-rays	<ul style="list-style-type: none"> List the properties of gamma rays and X-rays. Compare gamma rays and X-rays. 	4.6.2.1 4.6.2.2 4.6.2.3 4.6.2.4	Worksheets 6.13.1, 6.14.2 and 6.13.3	Quick starter Homework worksheet Homework quiz
Year 11	Term 1	77/78	6.14	Ultraviolet and infrared radiation	<ul style="list-style-type: none"> Describe the properties of ultraviolet and infrared radiation. Describe some uses and hazards of ultraviolet radiation. Describe some uses of infrared radiation. 	4.6.2.1 4.6.2.2 4.6.2.3 4.6.2.4	Worksheet 6.14; Practical sheet 6.14; Technician's notes 6.14	Quick starter Homework worksheet Homework quiz Slideshow
Year 11	Term 1	77/78	6.15	Required practical: Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface	<ul style="list-style-type: none"> Explain reasons for the equipment used to carry out an investigation. Explain the rationale for carrying out an investigation. Apply ideas from an investigation to a range of practical contexts. 	4.6.2.2 Prac 10	Investigate how the amount of infrared radiation absorbed or radiated by a surface depends	Worksheet 6.15; Practical sheet 6.15; Technician's notes 6.15 Quick starter Homework worksheet Homework quiz Slideshow

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						on the nature of that surface		
Year 11	Term 1	79/80	6.16	Microwaves	<ul style="list-style-type: none"> List some properties of microwaves. Describe how microwaves are used for communications. 	4.6.2.1 4.6.2.2 4.6.2.4	Worksheet 6.16	Quick starter Homework worksheet Homework quiz
Year 11	Term 1	79/80	6.17	Radio and microwave communication	<ul style="list-style-type: none"> Describe how radio waves are used for television and radio communications. Describe how microwaves are used in satellite communications. Describe the reflection and refraction of radio waves. 	4.6.2.1 4.6.2.2 4.6.2.3 4.6.2.4	Worksheets 6.17.1, 6.17.2 and 6.17.3	Quick starter Homework worksheet Homework quiz
			6.18	Colour	<ul style="list-style-type: none"> Describe what happens when light of different wavelengths lands on an object. Explain what determines the colour of an opaque object. Explain the effect of coloured filters. 	4.6.2.1 4.6.2.6	Worksheets 6.18.1, 6.18.2 and 6.18.3	Quick starter Homework worksheet Homework quiz
			6.19	Lenses	<ul style="list-style-type: none"> Understand what a lens does. Draw ray diagrams to show the formation of images by lenses. Describe the difference between a real and a virtual image. 	4.6.2.5	Worksheets 6.19.1, 6.19.2 and 6.19.3; Technician's notes 6.19	Quick starter Homework worksheet Homework quiz Slideshow
			6.20	Images and magnification	<ul style="list-style-type: none"> Draw ray diagrams to show the formation of real and virtual images by lenses. Calculate the magnification of an image. 	4.6.2.5	Worksheets 6.20.1, 6.20.2 and 6.20.3; Technician's notes 6.20	Quick starter Homework worksheet Homework quiz
			6.21	Emission and absorption of infrared radiation	<ul style="list-style-type: none"> Realise that all bodies emit and absorb infrared radiation. Compare emission and absorption of radiation from different surfaces. Define a perfect black body. Explain that the intensity and distribution of wavelengths of any emission depend on the temperature of the body. 	4.6.3.1 4.6.3.2	Worksheets 6.21.1, 6.21.2 and 6.21.3; Practical sheet 6.21; Technician's notes 6.21	Quick starter Homework worksheet Homework quiz
			6.22	Temperature of the Earth	<ul style="list-style-type: none"> Describe how the atmosphere absorbs radiation in a way that varies with 	4.6.3.2	Worksheets 6.22.1, 6.22.2, 6.22.3 and 6.22.4	Quick starter Homework worksheet

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					<p>wavelength.</p> <ul style="list-style-type: none"> List the factors affecting the temperature of the Earth. Explain how the temperature of an object is related to the radiation absorbed and radiation emitted. 			Homework quiz Slideshow	
Year 11	Term 1	81/82	6.23	Maths skills: Using and rearranging equations	<ul style="list-style-type: none"> Select and apply the equations $T = 1/f$ and $v = f\lambda$ Substitute numerical values into equations using appropriate units. Change the subject of an equation. 	4.6.1.2	Worksheet 6.23	Quick starter Homework worksheet Homework quiz	
Year 11	Term 1	81/82	Assessments		End of chapter test Student Book End of chapter test Collins Connect End of teaching block test Collins Connect				
Chapter 7: Electromagnetism									
Year 11	Term 1	83/84	7.1	Magnetism and magnetic forces	<ul style="list-style-type: none"> Explain what is meant by the poles of a magnet. Plot the magnetic field around a bar magnet. Describe magnetic materials and induced magnetism. 	4.7.1.1 4.7.1.2	Worksheet 7.1; Practical sheet 7.1; Technician's notes 7.1; PowerPoint presentation	Quick starter Homework worksheet Homework quiz	
Year 11	Term 1	83/84	7.2	Compasses and magnetic fields	<ul style="list-style-type: none"> Describe the Earth's magnetic field. Describe the magnetic effect of a current. 	4.7.1.2 4.7.2.1	Worksheet 7.2; Practical sheet 7.2; Technician's notes 7.2; PowerPoint presentation	Quick starter Homework worksheet Homework quiz Slideshow	
Year 11	Term 1	85/86	7.3	The magnetic effect of a solenoid	<ul style="list-style-type: none"> Draw the magnetic field around a conducting wire and a solenoid. Describe the force on a wire in a magnetic field. 	4.7.2.1 4.7.2.2	Worksheets 7.3.1 and 7.3.2; Practical sheet 7.3; Technician's notes 7.3; PowerPoint presentation;	Quick starter Homework worksheet Homework quiz Slideshow	
Year 11	Term 1	87/88	7.4	Electromagnets in action	<ul style="list-style-type: none"> Describe simple uses of electromagnets. Explain how an electric bell works. Interpret diagrams of other devices that use electromagnets to explain how they work. 	4.7.2.1	Worksheets 7.4.1, 7.4.2 and 7.4.3; Practical sheet 7.4; Technician's notes 7.4; PowerPoint presentation	Quick starter Homework worksheet Homework quiz Slideshow	

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Year 11	Term 1	87/88	7.5	Calculating the force on a conductor	<ul style="list-style-type: none"> Explain the meaning of magnetic flux density, B. Calculate the force on a current-carrying conductor in a magnetic field. 	4.7.2.2	Worksheets 7.5.1 and 7.5.2; Technician's notes 7.5; PowerPoint presentation	Quick starter Homework worksheet Homework quiz Slideshow
Year 11	Term 1	89/90	7.6	Electric motors	<ul style="list-style-type: none"> List equipment that uses motors. Describe how motors work. Describe how to change the speed and direction of rotation of a motor. 	4.7.2.3	Worksheets 7.6.1 and 7.6.2; Practical sheet 7.6; Technician's notes 7.6; PowerPoint presentation	Quick starter Homework worksheet Homework quiz
			7.7	Loudspeakers	<ul style="list-style-type: none"> Describe how a moving-coil loudspeaker works. Compare loudspeakers and headphones. 	4.7.2.4	Worksheets 7.7.1 and 7.7.2; Technician's notes 7.7; PowerPoint presentation	Quick starter Homework worksheet Homework quiz
			7.8	The generator effect	<ul style="list-style-type: none"> Describe how a current is induced in a wire when it moves in a magnetic field. Identify the factors that affect the size and direction of the induced current or induced potential difference. 	4.7.3.1	Worksheet 7.8; Practical sheet 7.8; Technician's notes 7.8; PowerPoint presentation	Quick starter Homework worksheet Homework quiz
Year 11	Term 1	89/90	7.9	Key concept: The link between electricity and magnetism	<ul style="list-style-type: none"> Explore how electricity and magnetism are connected. 	4.7	Worksheets 7.9.1 and 7.9.2; Practical sheet 7.9.1, 7.9.2, 7.9.3 and 7.9.4; Technician's notes 7.9; PowerPoint presentation	Quick starter Homework worksheet Homework quiz Slideshow
			7.10	Using the generator effect	<ul style="list-style-type: none"> Explain how moving-coil microphones use the generator effect. Explain how a dynamo generates direct current and an alternator generates alternating current. For a dynamo and alternator, draw and interpret graphs of potential difference generated in the coil against time. 	4.7.3.2 4.7.3.3	Worksheets 7.10.1 and 7.10.2; Practical sheet 7.10; Technician's notes 7.10; PowerPoint presentation	Quick starter Homework worksheet Homework quiz
			7.11	Transformers	<ul style="list-style-type: none"> explain how a transformer both uses and produces alternating current explain the relationship between the 		Worksheet 7.11; Practical sheet 7.11; Technician's notes 7.11; PowerPoint presentation	Quick starter Homework worksheet Homework quiz

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					<ul style="list-style-type: none"> number of turns in the primary coil and the number in the secondary coil calculate the current that needs to be provided to produce a particular power output. 			
Year 11	Term 2	91/92	7.12	Maths skills: Rearranging equations	<ul style="list-style-type: none"> Change the subject of an equation. 	4.7.3.4 (see also Lesson 2.10)	Worksheets 7.12.1 and 7.12.2; PowerPoint presentation; cards for $F = BIL$, cards for transformers	Quick starter Homework worksheet Homework quiz
Year 11	Term 2	91/92	Assessments		End of chapter test Student Book End of chapter test Collins Connect			
Chapter 8: Space								
			8.1	The Solar System	<ul style="list-style-type: none"> Describe the orbits of planets and moons in the Solar System. Distinguish between planets, dwarf planets and moons. 	4.8.1.1 4.8.1.3	Worksheet 8.1; Practical sheet 8.1.1, 8.1.2 and 8.1.3; Technician's notes 8.1	Quick starter Homework worksheet Homework quiz Slideshow
			8.2	Orbits of planets, moons and artificial satellites	<ul style="list-style-type: none"> Compare the orbital motion of moons, artificial satellites and planets in the Solar System. Describe what keeps bodies in orbit around planets and stars. Explain how for circular orbits an object can have a changing velocity but unchanged speed. Explain why bodies must move at a particular speed to stay in orbit at a particular distance. 	4.8.1.3	Worksheet 8.2; Practical sheet 8.2.1 and 8.2.2; Technician's notes 8.2.1 and 8.2.2	Quick starter Homework worksheet Homework quiz Slideshow
			8.3	The Sun and other stars	<ul style="list-style-type: none"> Describe how the Sun and other stars formed. Describe the nuclear fusion reactions in the Sun. 	4.8.1.1	Worksheet 8.3; Practical sheet 8.3.1 and 8.3.2; Technician's notes 8.3.1 and 8.3.2	Quick starter Homework worksheet Homework quiz
			8.4	Main sequence of a star	<ul style="list-style-type: none"> Describe the main sequence stage of a star's life cycle. Identify the forces that are in equilibrium in a stable star. 	4.8.1.1 4.8.1.2	Worksheets 8.4.1 and 8.4.2; Practical sheet 8.4; Technician's notes 8.4	Quick starter Homework worksheet Homework quiz

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			8.5	Life cycles of stars	<ul style="list-style-type: none"> Describe the life cycles of a star like the Sun and a massive star. 	4.8.1.2	Worksheets 8.5.1 and 8.5.2; Practical sheets 8.5.1, 8.5.2, 8.5.3 and 8.5.4; Technician's notes 8.5	Quick starter Homework worksheet Homework quiz Slideshow
			8.6	How the elements are formed	<ul style="list-style-type: none"> Understand how new elements are produced by nuclear fusion inside a star. Recognise that the heavier elements are made in a supernova. 	4.8.1.2	Worksheets 8.6.1 and 8.6.2; Practical sheet 8.6; Technician's notes 8.6	Quick starter Homework worksheet Homework quiz Slideshow
			8.7	Red-shift	<ul style="list-style-type: none"> Describe red-shift. Describe evidence for the expanding Universe. 	4.8.2	Worksheet 8.7; Practical sheets 8.7.1, 8.7.2 and 8.7.3; Technician's notes 8.7.1, 8.7.2 and 8.7.3	Quick starter Homework worksheet Homework quiz
			8.8	Key concept: Gravity: the force that binds the Universe	<ul style="list-style-type: none"> Explain what is meant by gravity Describe the factors that affect the force of gravity Explain why gravity is so important in the development of the Universe 	4.8.1.3 4.5.1.3	Worksheet 8.8; Practical sheets 8.8.1 and 8.8.2; Technician's notes 8.8.1 and 8.8.2	Quick starter Homework worksheet Homework quiz Slideshow
			8.9	Maths skills: Using scale and standard form	<ul style="list-style-type: none"> Understand the scale of objects in the Universe. Use standard form. 	4.8	Worksheet 8.9	Quick starter Homework worksheet Homework quiz
			Assessments		End of chapter test Student Book End of chapter test Collins Connect End of teaching block test Collins Connect End of course test Collins Connect			

