



## Scheme of Work

## SUBJECT - PHYSICS






## YEAR - 8

	Light	Fluids	Energy transfer	Earth and Space	Forces and motion	Force fields and electromagnets
Key concepts	Revisits work from KS2 on light, which is then extended to consider how light travels and what happens when it meets an object.	Changes of state, and then goes on to look at fluids and some of their effects, including pressure, floating and sinking, and drag.	Energy transfers by heating.	This unit builds on work from KS2 on the Solar System and looks at the Earth, including the seasons and the Earth's magnetic field and gravity. It also looks at the Solar System and what is beyond the Solar System.	Forces and their effects, energy stores and transfers. Calculations of speed and relative speed, and representing journeys on distance–time graphs. Simple machines (levers, ramps and pulleys).	Revising magnetic and gravitational fields. Introduce static electricity and the idea of an electric field. Current electricity is extended to look at resistance calculations and at some uses of electromagnets.
Themes	Stage, film and illusions	Exploring extremes	The home	Exploring the Solar System (observations and the use of models as well as via astronauts and space probes).	Moving things	Mission to Mars
Challenge	Outcomes, questioning, tasks and worksheets in all lessons. Regular progress checks.	Outcomes, questioning, tasks and worksheets in all lessons. Regular progress checks.	Outcomes, questioning, tasks and worksheets in all lessons. Regular progress checks.	Outcomes, questioning, tasks and worksheets in all lessons. Regular progress checks.	Outcomes, questioning, tasks and worksheets in all lessons. Regular progress checks.	Outcomes, questioning, tasks and worksheets in all lessons. Regular progress checks.
Support						
Literacy focus	Preparing effective presentations.	Use of prepositional phrases	Using language appropriate to the audience.	Presenting arguments.	Identify features of writing produced for different purposes and audiences.	Use cohesive devices to make text clearer and easier to read.
Numeracy focus	Measuring angles.	Apply mathematical concepts and calculate results.	Substituting values in simple formulae and solving resulting equations.	Ratios, fractions, fractions to decimals. Substituting values into simple formulae and solving resulting equations. Drawing line graphs and scatter graphs, and using these to draw conclusions.	Draw and interpret distance–time graphs. Calculate average (mean) speed from a distance– time graph.	Substitute into formulae and solve equations. Change the subject of a simple formula.
Cross-curricular links	Drama – lighting. ICT – graphics. Art – colour.	D&T –designing moving objects. History – Polar exploration.	D&T– impact of building design. Geography – survival in different environments.	Geography, PE – use of map and compass for navigation.	History – development of technology D&T – use of levers, design of 'mousetrap cars'; mechanisms	D&T – evaluate new and emerging technologies.
SMSC & MBV						
ASSESSMENTS						
Out of school learning						



Fluids				
Lesson	Key concepts	Learning outcomes	Differentiation	Resource
1a	The particle model – Expands on the year 7 particle model, extending it to look at why materials expand or contract with temperature changes	B1: Describe the properties of different states of matter B2: Explain the properties in terms of the particle model B3: Explain why materials expand and contract when the temperature changes	Outcomes, questioning, tasks and worksheets in all lessons.	
1b	Density and volume – How can we find the density of an object? Calculating density, mass and volume.	B1: Calculate the volume of cuboid shaped objects. B2: Calculate the density of cuboid shaped objects. B3: Calculate the density of irregular shaped objects.		
2	Changing state - uses the particle model to explain why the temperature of a substance remains constant during a state change.	B1: Describe each of the changes of state. B2: Illustrate the cooling of wax on a graph. B3: Analyse the graph and highlight key points.		
3	Floating and sinking – introduces upthrust alongside floating and sinking.	B1: State what is meant by upthrust B2: Explain why some objects float B3: Recall the factors that affect the amount of upthrust and use ideas about density in your explanations		
4a	Pressure – introduces pressure and calculating pressure.	B1: Describe what pressure is. B2: Investigate pressure on the body. B3: Calculate pressure using equation.		
4b	Pressure in fluids - looks at the causes of pressure in fluids, and why pressure changes with depth (for water) or height (for air).	B1: Describe how fluid pressure changes with depth and height B2: Describe how gas pressure can be increased B3: Explain some effects of pressure in different situations using the particle model		
5	Drag - its causes and how it can be increased or reduced.	B1: Describe what drag is B2: Explain how drag is caused B3: Analyse methods of overcoming drag		



Light				
Lesson	Key concepts	Learning outcomes	Differentiation	Resource
1	Light on the move - revises KS2 work on light and shadows and looks at how light travels and how we see things that are not light sources.	B1: Compare light and sound waves B2: Describe what happens to light when it hits different surfaces B3: Describe how to demonstrate that light travels in straight lines	Outcomes, questioning, tasks and worksheets in all lessons.	 8Ja-Seeing-things-RAP.pptx
2	Reflection - the use of conventions in ray diagrams and how to do ray tracing. The main content spread looks at specular and diffuse reflection and how images are for	<b>B1:</b> Define specular reflection and diffuse reflection <b>B2:</b> Describe how mirrors and rough surfaces reflect light <b>B3:</b> Describe how an image is formed in a mirror using a ray diagram		 8Jb-Reflection-RAP.pptx
3	Refraction - how light refracts, linking to the properties of lenses.	B1: Recall some uses of lenses B2: Describe how light changes direction at the interface of two different substances B3: Use a model to explain how lenses work		 8Jc-Refraction-RAP.pptx
4	Cameras and eyes – how they work and encouraging students to compare the two	B1: Recall the parts of cameras and eyes B2: State the functions of the parts of a camera and eyes. B3: Describe some ways in which the energy transferred by light leads to chemical or electrical effects		 8Jd-Cameras-and-eyes-RAP.pptx
5	Colour - looks at the dispersion of light to give a spectrum and explains why coloured objects appear coloured and why their appearance can change when viewed in coloured light.	B1: Know the colours in a spectrum B2: Describe how to make a spectrum B3: Explain why coloured objects appear coloured		 8Je-Colour-RAP.pptx



Energy transfer				
Lesson	Key concepts	Learning outcomes	Differentiation	Resource
1	Transferring energy - considers the difference between internal (thermal) energy and temperature, and looks at the factors that affect the amount of energy stored in a heated substance. It also looks at why evaporation has a cooling effect on the remaining liquid. Looks at conduction, convection and radiation.	<p>B1: Explain how internal energy and temperature are different.</p> <ul style="list-style-type: none"> <li>- Identify energy transfer from an infrared image</li> </ul> <p>B2: Describe how energy is transferred by radiation, conduction and convection and Identify the direction in which energy will be transferred</p> <p>B3: Use the particle model to explain energy transfers in matter to include explaining what happens to particles when a liquid evaporates</p>	Outcomes, questioning, tasks and worksheets in all lessons.	
2	Controlling energy - looks at ways of controlling energy transfers, including the best colours for emitting and absorbing infrared radiation. Introduces power	<p><b>B1:</b> Define radiation, conduction and convection</p> <p><b>B2:</b> Recall ways of reducing energy transfer</p> <p>B3: Use the particle model to explain energy transfers in matter</p> <ul style="list-style-type: none"> <li>- Explain ways of reducing energy transfer by radiation, convection, conduction and evaporation</li> </ul>		
3	Power and efficiency - introduces the idea of power. The equation for calculating efficiency is introduced.	<p>B1: Describe what power and efficiency mean</p> <p>B2: Calculate efficiencies</p> <p>B3: Interpret Sankey diagrams</p>		
4	Paying for energy - describes how energy is paid for and introduces the kilowatt-hour as a unit of energy. The idea of payback time is explained.	<p>B1: Explain how power companies charge for energy used</p> <p>B2: Describe what a payback time tells you</p> <p>B3: Work out payback times</p>		

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Forces and motion				
Lesson	Key concepts	Learning outcomes	Differentiation	Resource
1	Speed - introduces the formula relating speed, distance and time, and shows how journeys can be represented on a distance–time graph. Look at how simple formulae can be rearranged and how to calculate the gradient of a line on a graph.	B1: Describe the meanings of speed and mean (average) speed B2: Use the formula relating to speed, distance and time B3: Represent simple journeys on a distance-time graph	Outcomes, questioning, tasks and worksheets in all lessons.	
2	Turning forces - looks at levers and their uses. The page introduces the ideas of moments and of things being balanced when the moments are the same in each direction.	B1: Describe how a simple lever can multiply forces or distances B2: Identify the load, effort and pivot/fulcrum on a diagram of a lever B3: Describe the factors that affect the size of a moment <ul style="list-style-type: none"> <li>- Explain why something will balance if the moments are equal and opposite</li> </ul>		
3	More machines - introduces ramps and pulleys as further examples of simple machines, and looks at the idea that an increase in force also results in the increase in the distance moved by the effort force. This is quantified by introducing the formula relating work, force and distance.	B1: Identify some simple machines B2: Describe how simple machines can magnify forces B3: Describe the factors that affect the total work done		



Force fields and electromagnets				
Lesson	Key concepts	Learning outcomes	Differentiation	Resource
1	Current electricity - revises work from Unit 7J on current in series and parallel circuits.	B1: Explain how switches can be used to control different parts of a circuit B2: Recall how current behaves in series and parallel circuits B3: Describe how voltage behaves in series and parallel circuits	Outcomes, questioning, tasks and worksheets in all lessons.	
2	Resistance - builds on the qualitative work on resistance in Unit 7J and introduces the formula relating voltage, current and resistance. Also beginning to look at decimal places and significant figures.	<b>B1:</b> Know the units for measuring current, voltage and resistance <b>B2:</b> Describe some factors that affect resistance <b>B3:</b> Use the formula relating to voltage, current and resistance		
3	Electromagnets - looks at electromagnets and their use in relays and simple motors	B1: Describe an electromagnet and its magnetic field B2: Describe how the strength of an electromagnet can be changed B3: Describe some applications of electromagnets		



Earth and Space				
Lesson	Key concepts	Learning outcomes	Differentiation	Resource
1	Seasons - looks at the seasons and their causes.	<ul style="list-style-type: none"> <li>• Know that the seasons are a result of the tilt on the Earth's axis</li> <li>• Use the tilt of the Earth's axis to explain changes in the seasons</li> <li>• Use a model to explain the pattern of light and dark at the Earth's poles</li> </ul>	Outcomes, questioning, tasks and worksheets in all lessons.	
2	Magnetic Earth - describes the magnetic fields of bar magnets and of the Earth.	<ul style="list-style-type: none"> <li>• Explain how to arrange magnets so they attract or repel each other</li> <li>• Describe the Earth's magnetic field and how it affects compasses</li> <li>• Describe how to find the shape of a magnetic field</li> </ul>		
3	Gravity in space - describes how to calculate weight from mass and gravitational field strength, and looks at the role of gravity in space.	<ul style="list-style-type: none"> <li>• Calculate weight</li> <li>• Recall the factors that affect the strength of gravity</li> <li>• Describe how gravity affects objects in space</li> </ul>		
4	Beyond the Solar System - looks at stars and galaxies, and the distances involved when studying space.	<ul style="list-style-type: none"> <li>• Describe stars, galaxies and constellations</li> <li>• Describe the Milky Way</li> <li>• Explain what a light year is</li> </ul>		