

Progression map: Physics



On our progression maps “→” indicates conceptual knowledge that a unit builds upon. This should be checked and consolidated before and during the teaching of new content. “+” indicates conceptual knowledge that is developed during the topic. To aid the development of students scheme we have organised our progression mapping around our five “big questions” for chemistry.

Unit	What is matter?	Why do things move and change?	How does energy and information spread?	What is electricity and magnetism?	Where are we in space?
Year 7					
P1: Force and energy		<p>(KS2, Y2) → Effects of “pushing, pulling or twisting” on solid objects</p> <p>(KS2, Y3) → Magnetic forces can attract or repel objects at a distance</p> <p>(KS2, Y3) → Gravity causes a non-contact force making things fall</p> <p>(KS2, Y5) → Resistive forces or friction slow down moving objects</p>			
		<p>+ A force is exerted on one object by another and is represented by an arrow.</p> <p>+ The forces on an object at “equilibrium” are balanced</p> <p>+ unbalanced forces cause a change in motion</p> <p>+ Friction causes objects to slow</p> <p>+ lubricants reduce friction</p> <p>+ “energy” can be stored in 8 different ways and transferred between stores</p> <p>+ Energy can be used to analyse how much a system can change</p>			
P2: Sound and light	<p>C1→ The particle model of matter</p> <p>C1→ Arrangement of particles in solids, liquids and gases</p>		<p>(KS2, Y4) → Sounds are produced by vibrating objects</p> <p>P2 → Vibrations travel to our ears through a medium. Volume is related to the size of vibrations and decreases with distance</p> <p>(KS2, Y6) → Light travels in straight lines. Opaque objects cause shadows. We see objects as light reflects into our eyes</p>		
	+ A vacuum contains no particles		<p>+ Sounds are vibrations that travel through the particles in a medium</p> <p>+ sound and light transfer energy and information</p> <p>+ Both radiate out and become more spread out with distance</p> <p>+ How light scatters off objects and enters the eye</p> <p>+ Why we see in colour.</p>		

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P3: Heating and cooling	<p>C1, P2→ The particle model of matter.</p> <p>C1, P2→ Arrangement of particles in solids, liquids and gases.</p>	<p>P1 → That energy can be stored “thermally” and transferred by “heating.”</p>			
	<p>+ Kinetic particle model of temperature (how fast particles are moving)</p> <p>+ How particle model explains thermal expansion</p> <p>+ How hotter objects heat cooler objects when particles collide.</p> <p>+ How energy is transferred by conduction in metallic and non-metallic solids</p> <p>+ How the amount of energy “stored thermally” is related to the number of particles AND how fast they are moving</p>				

Year 8

P4: Where are we in space		<p>P1 → That a force is exerted on one object by another and can be represented by arrows</p> <p>P1 → unbalanced forces cause a change in motion</p> <p>P1 → Energy can be stored and transferred</p>	<p>KS2, P2 → Light radiates out from a source and becomes more spread out with distance</p> <p>KS2, P2 → We see non-luminous objects because light scatters off objects and enters the eye</p>		<p>(KS2, Y5)→ Names and motion of planets around sun. Motion of moon around the Earth</p> <p>(KS2, Y5)→ Earth, moon and sun are spheres</p> <p>(KS2, Y5)→ What causes night and day and the apparent motion of the sun across the sky</p>
		<p>+ Gravity exerts a pulling force towards the centre of an object and is dependent on mass</p>	<p>+ Sun is a nuclear store of energy which transfers energy by radiation to the Earth</p>		<p>+ Gravity causes the orbits of the planets around the sun</p> <p>+ how seasons are caused by the Earth's tilt</p> <p>+ the solar system is part of much larger galaxy in an even larger universe</p>

Unit	What is matter?	Why do things move and change?	How does energy and information spread?	What is electricity and magnetism?	Where are we in space?
P5: moving by force		<p>P1 → Unbalanced forces cause a change in motion</p> <p>P1 → The forces on an object at “equilibrium” are balanced</p> <p>P1 → How friction causes objects to slow and how its effect can be reduced</p>			
		<ul style="list-style-type: none"> + Speed is a measurement made of both distance and time and calculated using $speed = \frac{distance}{time}$ + Physicists can measure both instantaneous and average speed + An objects motion can be represented on a distance time graph + Acceleration measures how quickly an objects speed is changing + Drag in fluids is caused by particle collisions + How we observe the motion of other objects depends on our own motion 			
P6 How do we make images			<p>(KS2, Y6), P2 → Light travels in straight lines. Opaque objects cause shadows</p> <p>P2 → We see objects as light reflects into our eyes</p> <p>P2 → Ray model of light</p> <p>P2 → How light scatters off opaque and enters the eye allowing us to see</p>		
			<ul style="list-style-type: none"> + How the ray mode of light explains why a pin hole camera produces “upside down” images + The law of reflection + scientifically accurate ray diagrams of reflection + Why mirrors produce images of objects + Using ray diagrams of refraction to explain how it effects the information we receive from light + Use of ray diagrams to show how a lens focuses light 		

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P7: more on forces	<p>C1, P2, P3 → The particle model of matter</p>	<p>P4 → Gravity exerts a pulling force towards the centre of an object and is dependent on mass P1 → The normal contact force needed to support an objects is equal to its weight P1 → Balanced forces can produce a change in shape (KS2, Y6) → levers can increase the effect of a force</p>			
	<p>+ Mass is a measure of the “amount” of matter in a material. Units: Kg</p>	<p>+ Weight is a measurement made of both gravitational strength and mass. It is calculated using $\text{Weight} = \text{mass} \times \text{gravity}$ + Why a surface produces a normal contact force + How two forces can extend an elastic object. (extension proportional to force) + The turning effect of a force is equal to force x distance from pivot</p>			