CURRICULUM PLAN

PHYSICS – KS3

BRAMHALL HIGH SCHOOL

Curriculum Intent

It is our intention as Science Department to provide all children, regardless of their prior learning, background, or special needs, with a broad and balanced science curriculum. We aim to promote positive attitudes to science as an interesting and enjoyable subject. To develop pupils` awareness of how science impacts on their everyday life.

Pupils are encouraged to develop their practical skills, to work collaboratively and to query and evaluate scientific evidence.

We aim to cultivate an environment conducive to learning. We encourage and value our pupils' opinions, ideas, and contributions. Similarly, we expect pupils to strive for excellence and respect the contributions of other adults and their peers. Our intention is for pupils to enjoy their learning, to be resilient, make progress and achieve at an appropriate level.

Academic Year: 2025-2026

Review Date: September 2025

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YEAR 7

Term	Programme of Learning	Links to the National Curriculum / Specification / Additional	Assessments	What extra learning opportunities are planned?	Disciplinary Literacy
Term 1a	**7I Energy** - Energy stores & transfers - Generating electricity - Non-renewable resources - Environmental Issues - Renewable resources - Energy in food - Food requirements	Energy Changes & transfers Changes in systems Scientific attitudes Experimental Skills Analysis and Evaluation Units	7I End of topic test	Test variety of foods Demonstrate steam engines as power station Literacy and development of presentation skills	**Tier 1:** Energy, fuel, light, heat energy, sound. **Tier 2:** Energy transfer, energy resources, renewable, non-renewable, **Tier 3:** Joule (J), kilojoule (kJ), kinetic, nuclear, electricity, gravitational potential energy,
Term 1b	**7J Electricity** - Conductors - Insulators - Circuit symbols - Switches	Electricity Current electricity Analysis and Evaluation Measurement	CPR – Modelling electrical circuits	Investigation – "Do some conductors conduct better than others?" Use pHET - Circuit builder	**Tier 1:** Current, circuit, lamp, charge, switch, cells. **Tier 2:** Series, parallel, conductor, insulator, model. **Tier 3:** Ammeter, ampere.

Term 2a	**7J Electricity** - Series circuits - Parallel circuits - Voltage & resistance - Modelling electric current - Electrical dangers - Electrical safety	Electricity Current Electricity Experimental Skills Analysis and Evaluation Measurement	7J End of topic test	High voltage dangers video Demo Wire wool & fuses Investigate wire length and resistance	**Tier 1:** Current, circuit, lamp, charge, switch, cells. **Tier 2:** Series, parallel, conductor, insulator, model. **Tier 3:** Ammeter, ampere.
Term 2b	**7K Forces** - Types of forces - Density - Forces on elastic objects - Friction and its effects	Forces Balanced forces Forces & motion Particle model Experimental skills Measurement	CPR - Springs	Explore the link between density and the particle nature of matter. Using Focus software to model Hooke's Law	**Tier 1:** Force, area, depth. **Tier 2:** Density, altitude, fluid.

Term 3a	**7K Forces** - Pressure in solids - Balanced forces - Unbalanced forces **7L Sound** - Vibrations - Comparing sounds - Describing sound waves - Media and sound	Forces Pressure Balanced forces Waves Sound waves Analysis and Evaluation	7K End of unit test End of year 7 Exam	Maths skills on speed of sound How can we improve the practical results we obtain?	**Tier 1:** Wave, slinky, energy, light, sound, wavelength. **Tier 2:** Crest, trough, amplitude, parallel, perpendicular. **Tier 3:** Pressure, newton, pascal, atmospheric pressure. Transverse, longitudinal,
Term 3b	**7L Sound** - Speed of sound - Hearing range - Detecting sounds - Ultrasound and its uses - Transverse waves - Longitudinal waves	Waves Observed waves Sound waves Scientific attitudes Experimental skills Analysis and Evaluation Measurement	CPR - Sound 7L End of unit test	Extend to GCSE uses of ultrasound Interference of waves and the uses of this Why do we have a hearing range?	**Tier 1:** Wave, volume, speed, ultrasound, reflect, echo. **Tier 2:** Vibration, pitch, frequency, velocity. **Tier 3:** Amplitude, hertz, infrasound

YEAR 8

Term	Programme of Learning	Links to the National Curriculum / Specification / Additional	Assessments	What extra learning opportunities are planned?	Disciplinary Literacy
Term 1a	**8I Fluids** - Particle Model - Heating and cooling - Changing state - Density - Floating and sinking - Pressure in fluids - Drag and streamlining	Matter Physical changes Energy in matter Particle model Forces Pressure in fluids Experimental skills Analysis and Evaluation Measurement	CPR - Heating 8I End of unit test	Expansion & contraction Anomaly of water to link to freeze thaw Boat design competition for LA **Galileo** - invented the thermoscope on which the Galileo thermometer is based.	**Tier 1:** Particle, atom, molecule, solid, liquid, gas, melt, freeze, boil, temperature, volume. **Tier 2:** Evaporate, condense, density, compressible, incompressible. **Tier 3:** State, kinetic.
Term 1b	**8J Light** - Specular reflection - Diffuse reflection - Refraction - Convex Lenses - Camera and eyes - TIR	Waves Observed waves Light waves Scientific attitudes Experimental skills Analysis and Evaluation Measurement		Use PHET for modelling and speed data Lenses and inverted images Use LED and colours	**Tier 1:** Light, shadow, wave, ray. **Tier 2:** Transparent, opaque, translucent, beam, diffuse, specular, filter, absorption, transmission, reflection. **Tier 3:** Incident ray, reflected ray.

Term 2a	**8J Light** - Dispersion - Colour and surfaces - Colour and filters - Eyes and colour **8K Energy** - Heat & temperature - Conduction - Convection	Waves Observed waves Light waves Energy Physical changes Calculations Changes & transformations Scientific attitudes Experimental skills Analysis and Evaluation Measurement	8J End of unit test	Cones and rod cells and link to colour blindness Miner chimney, beach breezes, PHET prep for GCSE core practical skill development	**Tier 1:** Light, ray, reflection, mirror, camera, eye, image, real magnification, lens. **Tier 2:** Beam, inverted, virtual, converge, diverge. **Tier 3:** Incident ray, reflected ray, refracted ray, angle of incidence, angle of reflection, normal, refraction, focal point.
Term 2b	**8K Energy** - Conduction - Convection - Radiation - How Insulation works - Insulation at home - Sankey diagrams - Payback time	Energy Energy in matter Calculations Changes & transformations Scientific attitudes Experimental skills Analysis and Evaluation Measurement	CPR – Heat transfers	Thermal cameras and images Calculating energy supplied if given the output and efficiency as a percentage	**Tier 1:** Conduction, convection, radiation, heating, working, thermometer, temperature, insulation, vacuum, particle. **Tier 2:** Rate. **Tier 3:** Thermal conductivity.

Term 3a	**8K Energy** - Efficiency - Energy usage calcs - Paying for energy **8L Earth in space** - Parts of the Solar System - Day, night and years - Seasons	Energy Energy in matter Calculations Space Physics Scientific attitudes Experimental skills Analysis and Evaluation Measurement	8K End of unit test	Solar System extras	**Tier 1:** Earth, moon, model, orbit, planet, solar system, star, galaxy, gravity, sun, weight, milky way, Mercury, Venus, Mars, satellite. **Tier 2:** Artificial satellite, natural satellite. **Tier 3:** Gravitational field, gravitational field strength, andromeda, light year.
Term 3b	**8L Earth in space** - Magnetic Earth - Gravity - Mass and weight - Beyond the Solar System - Changing ideas	Space Physics Forces Scientific attitudes Experimental skills Analysis and Evaluation Measurement	8L End of Unit Test End of year 8 exams	Astronomy debate and question and answer sessions Solving space travel problems and how the solutions benefit our everyday life	**Tier 1:** Magnet, pole, north, south, compass, iron filings, magnetic, attract, force field, magnetic field. **Tier 2:** Repel. **Tier 3:** Field line, non-contact force, Earth's magnetism.

YEAR 9

Term	Programme of Learning	Links to the National Curriculum / Specification / Additional	Assessments	What extra learning opportunities are planned?	Disciplinary Literacy
Term 1a	**9J Force Fields and electromagnets** - Magnetic materials - Magnetic fields - Electromagnets - Investigating strength - Using electromagnets - Electric motors - Electric Fields - Static Electricity	Magnetism Static Electricity Scientific thinking Experimental skills Analysis and Evaluation Measurement	CPR Magnetism and fields 9J End of Unit test	Investigate the factors impacting the speed a motor rotates More able can link to a loudspeaker	**Tier 1:** Magnetic field, magnetism, electric motor, coil, current, coils, electromagnet, electric bell. **Tier 2:** Repel, motor effect. **Tier 3:** Relay.
Term 1b	**9I Forces and motion** - Moments - Moments in balance - Levers - Pulleys and work - Gears **9I Forces and Motion & CP1 / SP 1 Motion** - Vectors and scalars - Speed - Common Speeds	Forces Balanced Forces Forces & motion Scientific thinking Experimental skills Analysis and Evaluation Measurement	9I End of unit test	Multiple item equilibrium questions Work done	**Tier 1:** force, mass, distance, moment, pivot, pulley **Tier 2:** balanced, fulcrum **Tier 3:** equilibrium, conservation.

Term 2a	**9I Forces and Motion & CP1 / SP 1 Motion** - Distance/time graphs - Speed/time graphs - Acceleration **CP2 / SP2 Forces & Motion** - Resultant forces - Force diagrams - Newton's first law	Forces & motion Scientific thinking Experimental skills Analysis and Evaluation Measurement	P1 End of unit test End of Year 9 exams	Working out tangents on speed/time graphs Working out distance travelled in multi-step journeys	**Tier 1:** Distance, momentum, mass, distance, time, speed, energy, weight, average speed. **Tier 2:** Accelerate, acceleration, displacement, velocity. **Tier 3:** Vector, quantity, scalar, gradient.
Term 2b	**CP2 / SP2 Forces & Motion** - Mass and weight - Gravity - Newton's Second Law - Acc. Core practical	Forces Balanced Forces Forces & motion Scientific thinking Experimental skills Analysis and Evaluation Measurement	CPR –Core Practical	Introduce idea of friction compensated ramps Develop usage of light gates and datalogging software	**Tier 1:** mass, weight, force, gravity **Tier 2:** acceleration, ratio, friction, light gate **Tier 3:** independent, dependant, controlled, compensated

Term 3a	**CP2 / SP2 Forces & Motion** - Newton's third Law - Momentum - Momentum in collisions - Momentum and forces	Forces Balanced Forces Forces & motion Scientific thinking Experimental skills Analysis and Evaluation Measurement		Investigating "g" in class. Air track collisions for objects moving in different directions	**Tier 1:** force, mass, moment, collision **Tier 2:** equal, opposite, balanced, stationary **Tier 3:** impulse, conservation, momentum,
Term 3b	**CP2 / SP2 Forces & Motion** - Stopping distances - Car safety features **CP3/ SP3 Energy Conservation** - Energy stores - Energy transfers	Forces & motion Forces Energy Changes & transfers Changes in systems Scientific attitudes Experimental Skills Analysis and Evaluation	CPR- Crash hazards P2 End of unit test	Stopping distance on a bicycle Investigating air bags Car testing challenge	**Tier 1:** Elastic, nuclear energy, system. **Tier 2:** Dissipated, efficiency, lubrication, thermal energy, **Tier 3:** Atomic energy, chemical, potential, strain, gravitational potential, joule (J), kinetic, law of conservation of energy, Sankey