West Kirby Grammar School

Curriculum Map – Year 9 - Physics (2024-25)

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Topic name	Term	Skills developed	Link to NC subject content	Prior learning	Next link in curriculum
9.1 Energy	Autumn	MS 1a, c a expressions in decimal form c Use ratios, fractions and percentages MS 3b, c b Change the subject of an equation c Substitute numerical values into algebraic equations using appropriate units for physical quantities WS 1.2 – use a variety of models to develop scientific explanations.	KS3: • Comparing energy values of different foods (from labels) (kJ) • Comparing power ratings of appliances in watts (W, kW) • Simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged • Changes in systems energy as a quantity that can be quantified and calculated; • Comparing amounts of energy transferred (J, kJ, kW hour) • Other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. • Energy changes and transfers: product of force and displacement unchanged. Extension: • Energy Stores and systems • Conservation and dissipation of energy • Energy changes and transfers: product of force and displacement unchanged • Work done equation, W=Fs • Power, P=E/t=W/t	Energy is not studied specifically at KS2, but the students were introduced to the effects of energy in other topics, Plants and animals: describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food Light and sound: recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that sounds get fainter as the distance from the sound source increases. States of matter: observe that some materials change state when they are heated or cooled.	KS4 GCSE Physics 4.1 Energy 4.5.2 Work done and energy transfer

			• Efficiency		
9.2 Matter	Autumn	MS 3b, c b Change the subject of an equation c Substitute numerical values into algebraic equations using appropriate units for physical quantities WS 1.2 – use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.	KS3: • conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving • similarities and differences, including density differences, between solids, liquids and gases • Brownian motion in gases • the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition • atoms and molecules as particles • changes with temperature in motion and spacing of particles • internal energy stored in materials • Pressure in fluids • atmospheric pressure, decreases with increase of height as weight of air above decreases with height • pressure in liquids, increasing with depth; upthrust effects, floating and sinking • pressure measured by ratio of force over area – acting normal to any surface Extension: • Particle model of matter • Changes of state and the particle model	KS1 Everyday materials (properties and uses), rocks KS2 States of matter (solids, liquids and gases- their properties and changes of state).	KS4 GCSE Physics 4.3 Particle model of matter

			• Internal energy and energy transfer (Not the equations for SHC and latent heat). • Particle model and pressure (Only qualitatively) • Density = m/V • Pressure, P=F/A		
9.3 Forces and Motion	Spring	MS 1a, c a Recognise and use expressions in decimal form c Use ratios, fractions and percentages MS 3b, c b Change the subject of an equation c Substitute numerical values into algebraic equations using appropriate units for physical quantities WS 1.2 – use a variety of models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.	KS3: • (speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) • The representation of a journey on a distance-time graph) • Relative motion: trains and cars passing one another. • Forces measured in newtons • Forces: associated with deforming objects; stretching and squashing – springs; Hooke's Law as a special case • Work done and energy changes on deformation • Measurements of stretch or compression as force is changed • Force-extension linear relation; Hooke's Law as a special case • Moment as the turning effect of a force • Simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged • Forces being needed to cause objects to stop or start moving, or to change their	KS1 Forces and magnets Compare how things move on different surfaces (friction), contact and non-contact forces KS2 Forces • The force of gravity acting between the Earth and the falling object. • The effects of air resistance, water resistance and friction, that act between moving surfaces, • Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	KS4 GCSE Physics 4.5 Forces

			speed or direction of motion (qualitative only) • Change depending on direction of force and its size Extension: • Speed and speed-time graphs • Forces and their interactions (1D vectors) • Work done and energy transfer • Forces and Elasticity (Not elastic potential energy) • Distance = speed x time, s=vt • Weight,W=mg • Hooke's Law F= ke • Work done, W= Fs		
9.4 Electricity and magnetism	Spring	MS 1a, b, c, a Recognise and use expressions in decimal form b Recognise and use expressions in standard form c Use ratios, fractions and percentages MS 3b, c b Change the subject of an equation c Substitute numerical values into algebraic equations using appropriate units for physical quantities	KS3: • Potential difference, measured in volts • Battery and bulb ratings • Resistance, measured in ohms, as the ratio of potential difference (p.d.) to current • Differences in resistance between conducting and insulating components (quantitative). • Electric current, measured in amperes, in circuits • Series and parallel circuits, currents add where branches meet and current as flow of charge. • Magnetic poles, attraction and repulsion	KS1 Forces and magnets • Observe how magnets attract or repel each other • Describe magnets as having 2 poles • Predict whether 2 magnets will attract or repel each other, depending on which poles are facing KS2 Electricity	KS4 GCSE Physics 4.2 Electricity 4.7 Magnetism and electro-magnetism

		WS 1.2 – use a variety of modelsto solve problems, make predictions and to develop scientific explanations and understanding.	• Magnetic fields by plotting with compass, representation by field lines • Earth's magnetism, compass and navigation • The magnetic effect of a current, electromagnets, D.C. motors (principles only). Extension: • Current, potential difference and resistance (but not IV characteristics) • Series and parallel circuits • Charge, current, time, Q=It • Potential difference and energy, E=QV • Resistance, R=V/I • Permanent and induced magnetism, magnetic forces and fields • Electromagnetism • Electric motors (qualitatively)	• Series circuits, insulators and conductors, safety, circuit symbols	