CP12: **Particle Model** (Paper 2)
CP13: **Forces and Matter** (Paper 2)

Lesson	Objectives Tracker Sheet	Date covered	I know this well	I need to do more work on this
CP12a Particles and density	P14.1 Use a simple kinetic theory model to explain the different states of matter (solids, liquids and gases) in terms of the movement and arrangement of particles.			
	P14.2 Recall and use the equation: density (kilograms per cubic metre, kg/m3) = mass (kilograms, kg) / volume (cubic metres, m3). $\rho = m/V$			
	P14.4 Explain the differences in density between the different states of matter in terms of the arrangements of the atoms or molecules.			
	P14.5 Describe that when substances melt, freeze, evaporate, boil, condense or sublimate mass is conserved and that these physical changes differ from some chemical changes because the material recovers its original properties if the change is reversed			
CP12a Investigating densities – Core Practical	P14.3 Investigate the densities of solids and liquids.			
CP12b Energy and changes of state	P14.6 Explain how heating a system will change the energy stored within the system and raise its temperature or produce changes of state.			
	P14.7 Define the terms specific heat capacity and specific latent heat and explain the differences between them.			
	P14.10 Explain ways of reducing unwanted energy transfer through thermal insulation.			
CP12c Energy calculations	P14.8 Use the equation: change in thermal energy (joule, J) = mass (kilogram, kg) × specific heat capacity (joule per kilogram degree Celsius, J/kg °C) × change in temperature (degree Celsius, °C) $\Delta Q = m \times c \times \Delta\theta$			
	P14.9 Use the equation: thermal energy for a change of state (joule, J) = mass (kilogram, kg) × specific latent heat (joule per kilogram, J/kg) $Q = m \times L$			
CP12c Investigating water – Core Practical	P14.11 Core Practical: Investigate the properties of water by determining the specific heat capacity of water and obtaining a temperature-time graph for melting ice.			

CP12d Gas temperature and pressure	P14.12 Explain the pressure of a gas in terms of the motion of its particles.			
	P14.13 Explain the effect of changing the temperature of a gas on the speed of its particles and hence on the pressure produced by a fixed mass of gas at constant volume (qualitative only).			
	P14.14 Describe the term absolute zero, −273°C, in terms of the lack of movement of particles.			
	P14.15 Convert between the Kelvin and Celsius scales.			
CP13a Bending and stretching	P15.1 Explain, using springs and other elastic objects, that stretching, bending or compressing an object requires more than one force.			
	P15.2 Describe the difference between elastic and inelastic distortion.			
	P15.5 Describe the difference between linear and non-linear relationships between force and extension.			
CP13b Extension and energy transfers	P15.3 Recall and use the equation for linear elastic distortion including calculating the spring constant: force exerted on a spring (newton, N) = spring constant (newton per metre, N/m) × extension (metres, m) $F = k \times x$			
	P15.4 Use the equation to calculate the work done in stretching a spring: energy transferred in stretching (joule, J) = 0.5 × spring constant (newton per metre, N/m) × (extension (metres, m))2 $E = ½ \times k \times x2$			
CP13b Investigating springs – Core Practical	P15.6 Investigate the extension and work done when applying forces to a spring			