KS3 Chemistry – Particles – Learning Objectives

	Beginning	Developing	Secure	Embedding	Extending	Excelling
Atomic Structure	Understand that all things around us are made from matter, comprised of tiny particles called atoms.	Know that all atoms are made of protons and neutrons (in the nucleus) and electrons (orbiting the nucleus).	Recognise that all chemical elements have different atom types, and describe differences between atoms of different elements	Use of atomic number and atomic mass to calculate numbers of protons, neutrons and electrons in an atom	Show an understanding of the concept of isotopes.	Calculate relative molecular masses.
States Of Matter	Name the three states of matter – solid, liquid and gas.	Draw / describe the arrangement of particles for each state of matter.	Discuss and compare the properties of each state of matter.	Describe the behaviour of particles in each state of matter, in terms of the energy they possess.		-
Changing State	Describe the changes of state between solid and liquid, and between liquid and gas.	Define 'melting point' and 'boiling point'. Correctly use the terms 'sublimation' and 'deposition'	Describe the energy transfers that take place during each change of state. Explain the differences between evaporating and boiling. Give examples of substances that undergo sublimation.		-	-
Kinetic Theory	-	-	For each state of matter, and for each change of state, describe how the particles in the substance behave, in terms of energy. Describe 'Brownian motion'.			-
Thermal Expansion	Recall that most objects get larger when heated.	Describe some experiments that show thermal expansion. Recall that water expands when it freezes.	Use particle theory to explain why objects expand when heated, and contract when cooled. Explain the observations made during demonstrations of thermal expansion (eg. bimetal strip, liquid thermometer)		Scientifically discuss specific examples where thermal expansion may be useful or a hindrance.	-
Diffusion	Define diffusion, in simple terms.	Give some real-world examples of diffusion.	Use particle theory to explain what happens during diffusion. Suggest some variables that affect the rate of diffusion. Describe and explain demonstrations that show diffusion.		Explain the variables that affect the rate of diffusion of particles.	-
Density	Show an understanding of the term 'density'.	Qualitatively discuss situations involving floating and sinking, in terms of the densities of the substances involved.	With assistance, calculate density, and give the units. Describe experiments to find the density of regular and irregular objects.	Complete complex density calculations without assistance (including changing the subject of the formula, converting units and calculating volume separately).		Calculate the densities of mixtures (eg. alloys, composites) from the densities of the constituents of the mixture.
Particle Pressure	-	Recall that air pressure is caused by air particles hitting things.	Describe and explain some demonstrations / examples used to demonstrate that liquids and gases exert a pressure.		Use particle theory to explain why the volume of a gas changes as its temperature and pressure are varied.	Basic application of Boyle's Law and Charles' Law.

** Objectives covering more than one grade are assessed based on the level of scientific detail and language used by the learner.*