

KS3 Chemistry – Solutions – Learning Objectives

	Beginning	Developing	Secure	Embedding	Extending	Excelling
Making Solutions	With the aid of an example, define the keywords relating to solutions (solute, solvent, solution, residue, etc).	Describe a saturated solution, and explain how a residue forms.	Describe, in terms of particles, what happens when a substance dissolves, with reference to conservation of mass. Describe the differences between a dilute solution and a concentrated solution. Explain how to make a solution more dilute or more concentrated.		-	-
Using Solvents	Name a number of different liquids that can be used as solvents.	Recognise, using examples, that not all substances will dissolve in all solvents, and that the solubility of a substance varies depending on the solvent.		Describe, with reference to an example (eg. paint), what happens to a solvent as it evaporates. Define the term 'volatile'.	-	-
Studying Solubility	Name a variable that affects the rate at which a solute dissolves in a solvent.	Describe how different variables affect the rate of dissolving, with reference to an example.	Explain, with reference to particles, why a given variable affects the rate of dissolving. Plan and perform an investigation to show the rate at which a solute dissolves is affected by a given variable, including selection of apparatus, method, identifying variables, risk assessment, data presentation and conclusion.			-
Solubility Curves	-	Use a solubility curve to identify the amount of solute that will dissolve at a given temperature (or vice versa).	Explain what is shown by a solubility curve. Complete an experiment to plot a solubility curve for a given solute and solvent.	Recall that solubility is often measured by the number of grams of solute that will dissolve in 100g of the solvent.	Solve more complex problems involving solubility curves (eg. different masses of solute/solvent, calculating the mass of solute that would crystallise out of a solution as it cools).	
Separating Solid/Liquid	Use a filter funnel to separate an insoluble solid from a liquid, identifying the filtrate and the residue.	Explain, in terms of particles, what happens when a mixture is filtered. Describe how a Büchner funnel works.	Describe what happens, in terms of particles, when a solvent evaporates; describe and explain a real-world application for separating a solid and a liquid. Separate a soluble solid from a solvent by evaporation and crystallisation; suggest ways to increase the size of the crystals formed.		Describe how to separate a mixture of solids that are soluble in different solvents.	-
Separating Two Liquids	Explain the difference between miscible and immiscible liquids, with reference to an example. Explain how to use a separating funnel.	Name the apparatus used for distillation, and explain what happens in each piece of apparatus during the distillation process. Explain why distillation relies upon the two liquids having different boiling points.			Explain the differences between distillation and fractional distillation, and discuss some examples of where fractional distillation is used (including differences between laboratory and industrial processes).	
Chromatography	Demonstrate how to create a chromatogram for a simple sample (such as ink).	Explain how the mixture separates due to each component having a different solubility in the solvent. Interpret chromatograms to compare similarities and differences between samples.		Recognise that using a different solvent will result in a different chromatogram. Identify the causes of faults in chromatography experiments, and suggest remedies to improve the chromatogram. Discuss some real-world applications of chromatography.		-

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