Investigation 1: Separating Mixtures What are the states of matter? What is the composition of matter? What are mixtures/ solutions?	**Part 1** How can mixtures be separated? **Making and Separating Mixtures** Solids and water are mixed and separated with screens and filters. Students find that the solution of salt and water can't be filtered.	**Part 2** How can a solution be separated? **Separating a Salt Solution** Students make another salt solution. They compare the mass of the mixture with the mass of its parts. Students evaporate the solution to separate its parts.	**Part 3** What is the shape and pattern of a salt crystal? **Observing Crystals** Students observe the crystals left after the water from the salt solution has evaporated. Review the states of matter. What happened to the water? Do all solids have a specific shape?	**Part 4** How can you separate a dry mixture of gravel, diatomaceous earth, and salt? **Separating a Dry Mixture** Students are given a dry mixture and need to plan and carry out a procedure to separate the parts of the mixture using filtration and evaporation.
Investigation 2: Reaching Saturation What is solubility? How can solubility be used to identify unknown chemicals? How can the shape of a solid be used to identify an unknown chemical?	**Part 1** Is there a limit to the amount of salt that can be dissolved in 50ml of water? **Salt Saturation** Students make a saturated salt solution. They discover the amount of salt	**Part 2** Is there a limit to the amount of citric acid that can be dissolved in 50ml of water? **Citric Acid Saturation** Students make a saturated citric acid solution. They discover the	**Part 3** Can an unknown chemical be identified by its saturation point? **Saturation Puzzle** Students receive an unknown (Epsom salts), saturate 50ml of water, and using	**Part 4** Can the shape of their crystals identify chemicals? **Comparing the Crystals** Students examine the crystals left by evaporating the 3 saturated solutions an compare their shapes.

	needed to saturate the water using the property of mass.	amount of citric acid needed to saturate the water using the property of mass. They compare this amount of citric acid to the amount of salt needed to saturate the salt solution.	the property of mass, determine the saturation point. They identify the substance by comparing their results to a table of known saturation points.	

Investigation 3: Concentration How are saturation and concentration related? What is the difference between dilute and concentrated? How does the ratio of solute to solvent affect concentration? What is a variable?	**Part 1** What happens to a soft-drink solution when the ratio of water and powder is changed? **Soft Drink Recipes** Students compare different recipes of soft-drink solution and develop concepts about concentration and its relationship to the ratio of solute to solvent.	**Part 2** How can the concentration of two different salt solutions be determined? **Salt Concentration** Students make two solutions of salt and water, and use mass to determine their relative concentrations.	**Part 3** How can the concentration of three mystery solutions be determined? **Mystery Solutions** Students are given three mystery solutions and then plan and carry out an experiment to determine the concentration of each solution by comparing the masses of each.	No Part 4

Investigation 4 **Fizz Quiz** What are the properties of a chemical reaction? How do you know a reaction has taken place? Can the products of a chemical reaction be separated? What is the conservation of matter?	**Part 1** What happens when a solution is made with water and two different solutes? How do you know when a chemical reaction has taken place? **Chemical Reactions** Students mix calcium chloride, baking soda and citric acid with water and observe changes.	**Part 2** Can the products of a chemical reaction be separated? Is liquid filtered out of a solution? **Reaction Products** Students use filtering and evaporation as in previous investigations to separate and study the products of the chemical reactions.	**Part 3** What might happen if you conduct a gas producing reaction in a closed bag? **Reaction in a Zip Bag** Using parts of both Investigations 1 and 2, students create a reaction in a closed bag in order to observe the gas more critically.	**Part 4** How do you design your own investigation using the scientific process? **Choosing Your Own Investigations** Students review the past investigations and design their own investigation to further explore concepts they have learned in the unit.