

Section 1-1 Matter and Its Changes

Complete the following table. Describe changes in properties that you might notice during each process and state whether the changes are **physical** or **chemical**.

Event	Observable changes	Type of change
Baking a cake		
Burning a log		
Freezing water		

Vocabulary

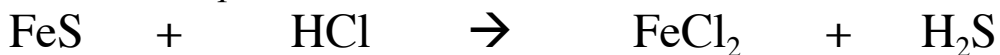
From the list below, choose the term that best completes each sentence.

atom molecule chemistry compound element
mixture precipitate solution chemical reaction

1. The smallest particle of an element is a(n) _____
1. A(n) _____ has different properties than the elements that compose it and is made of substances combined in a specific ratio.
1. Salt water is a type of well-mixed mixture called a(n) _____
1. A chemical change is also referred to as a(n) _____
1. A(n) _____ is a solid formed from a solution during a chemical reaction.
1. When combined substances keep their individual properties and do not change into a new substance the result is a _____
1. The combination of two or more atoms is called a(n) _____
1. A(n) _____ is the simplest type of substance and cannot be broken down into any other substances.
1. _____ is the study of the properties of matter and how matter changes.

Section 1-2 Describing Chemical Reactions

Balance the equations below.



1. State the principal of conservation of mass.

1. Use the principal of conservation of mass to explain why the equations above have to be balanced.

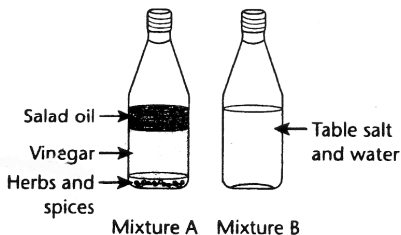
Vocabulary

Match each term with its definition by writing the letter of the correct definition in the right column on the line beside the term in the left column.

_____ 3. chemical equation	a. materials present after a reaction
_____ 4. chemical formula	b. indicates how many atoms of an element are in one molecule
_____ 5. coefficient	c. uses symbols to show chemical reactions
_____ 6. products	d. shows numbers of atoms of each element in a compound
_____ 7. reactants	e. materials present before a reaction
_____ 8. conservation of mass	f. numbers telling how many molecules are involved in a chemical reaction
_____ 9. subscript	g. matter is not created or destroyed during a chemical reaction

Section 3-1 Working with Solutions

Use the diagram to answer questions 1 and 2.



1. Is mixture A a suspension or a solution? _____ Explain
1. Is mixture B a suspension or a solution? _____ Explain
1. What are two factors that affect the solubility of a particular solute?
 - a)
 - b)
1. What effect does adding a solute have on the **freezing point** of a solvent?
1. What effect does adding a solute have on the **boiling point** of a solvent?

From the list below, choose the term that best completes each sentence.

suspension solution solvent concentrated solution
 dilute solution solubility solute unsaturated solution
 saturated solution

1. The part of a solution that is present in **the smaller** amount is the _____
1. The part of a solution that is present in the **larger** amount is the _____
1. _____ is measure of how well a solute can dissolve at a given temperature.
1. Additional solute will **not** dissolve in a(n) _____
1. Additional solute will dissolve in a(n) _____
1. A mixture in which the particles cannot be separated by settling or filtration is called a(n) _____
1. A mixture in which particle can be seen and easily separated by settling or filtration is called a(n) _____
1. A (n) _____ has only a little solute dissolved in a solvent, but a(n) _____ has a lot of solute dissolved in a solvent.

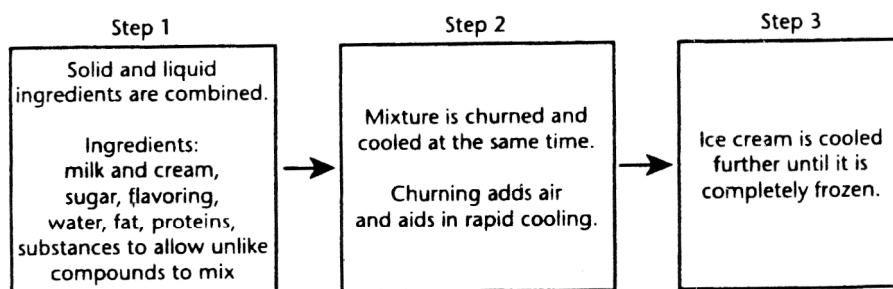
The Chemistry of Ice Cream

In chapter 3 section 1 you learned the difference between a solution and a suspension. A *colloid* is a mixture that is intermediate between a suspension and a solution. A colloid is similar to a suspension in that its particles are larger than those of a solution. However, the particles of a colloid, like those of a solution, are small enough that they cannot be separated by settling or filtration. The particles in a colloid are said to be *dispersed*, rather than dissolved or suspended. Familiar colloids include shaving cream, whipped cream, fog, and smoke.

Ice cream is another familiar colloid. The particles in this colloid are solid fat, tiny crystals of ice, and droplets of water. A high concentration of sugars, salts, and proteins is dissolved in the water. Here, air acts something like a solvent. The particles of ice cream are dispersed in many tiny bubbles of air. Ice cream also contains other substances that allow “unlike” compounds to mix and stay mixed under the proper conditions. The unlike compounds in ice cream are water and fat.

The colloid formed by ice cream remains stable only at cold temperatures. When ice cream is warmed above freezing, its dispersed particles absorb energy and begin to move faster. When the fast-moving particles collide, they sometimes stick together.

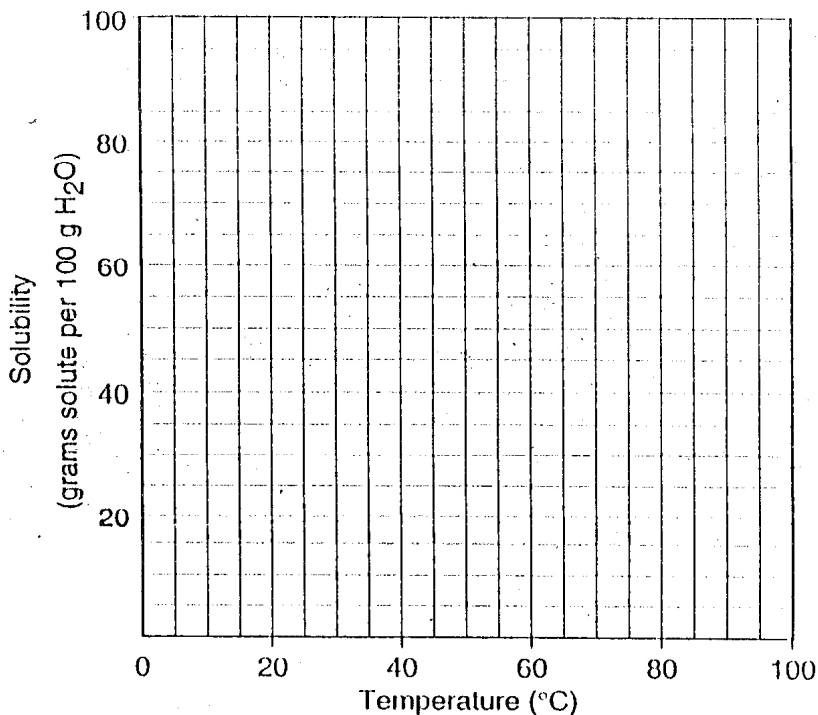
Eventually, the particles grow so large that they can no longer remain dispersed, and they settle out of the colloid.



1. What do you think happens to the air in the ice cream colloid when the ice cream melts?
2. Look at the diagram above. Why do you think air isn't added until step 2 when the mixture is cooled?
3. What would water normally do at the temperature at which ice cream is kept?
4. Milk is also a colloid. It consists mainly of water, proteins, and fat. Which colloid is more stable (will stay a colloid better), milk or ice cream? How do you know?

Solubility and Concentration

Graph the data from the table below. Label each graphed line with the name of the substance or make a key. Then answer the questions.



Substance g/100g water	Temperature (°C)					
	0°	20°	40°	60°	80°	100°
Copper sulfate	15g	20g	30g	40g	55g	79g
Lithium sulfate	35g	35g	33g	31g	30g	29g
Ammonium sulfate	30g	38g	45g	55g	65g	78g

- _____ 1, Which substance has the greatest solubility at 0°C?
- _____ 2. Which substance has the greatest solubility at 100°C
- _____ 3. Which solution would NOT be saturated with 40 g of the substance dissolved in 100g of water at 60°C?
- _____ 4. Which substance **decreases** its solubility as the temperature increases?
- _____ 5. If a student put 20 g of copper sulfate in 100g of water at 0°C, how many grams of copper sulfate would not dissolve?