

Section 1: Solutions and Other Mixtures

Preview

- Key Ideas
- Bellringer
- Heterogeneous Mixtures
- Homogeneous Mixtures

Key Ideas

- › What is a heterogeneous mixture?
- › What is a homogeneous mixture?

Bellringer

Mixtures of solids and liquids are all around us, but are all mixtures classified in the same way?

1. List at least five mixtures that you have encountered today. List the components of each mixture in general terms, if possible. Remember the mixture could be two solids, a liquid/solid, or two liquids. For example: mud is a mixture of soil and water, raisin bran cereal is a mixture of bran flakes and raisins.

Bellringer, *continued*

2. **a.** Which of the mixtures in your list are heterogeneous? Which are homogeneous?
- b.** What is the difference between a heterogeneous and a homogeneous mixture?

Heterogeneous Mixtures

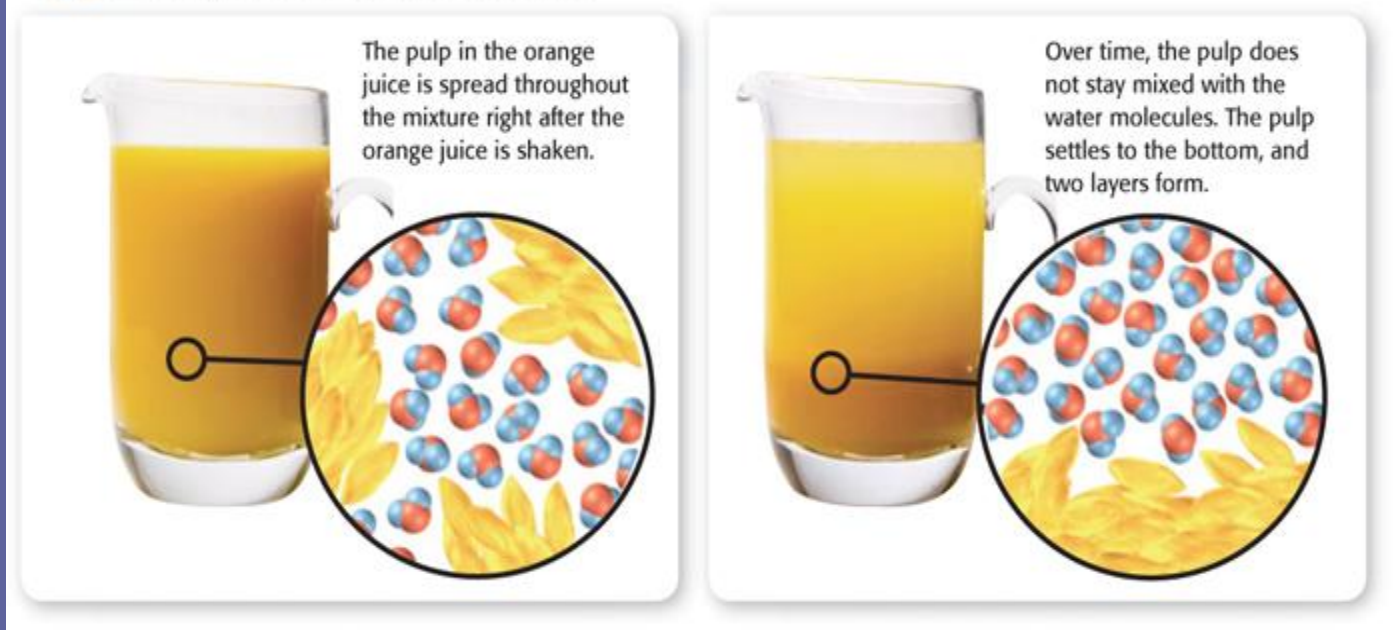
- › What is a heterogeneous mixture?
- › A heterogeneous mixture does not have a fixed composition.
 - The amount of each substance in different samples varies.
 - fruit salad
 - dirt
 - granite

Heterogeneous Mixtures, *continued*

- Particles in a suspension are large and settle out.
- **Suspension:** a mixture in which particles of a material are more or less evenly dispersed throughout a liquid or gas
 - Natural orange juice contains particles of pulp.
- Particles in a suspension may settle over time.
- Particles in a suspension may be filtered out.

Suspension

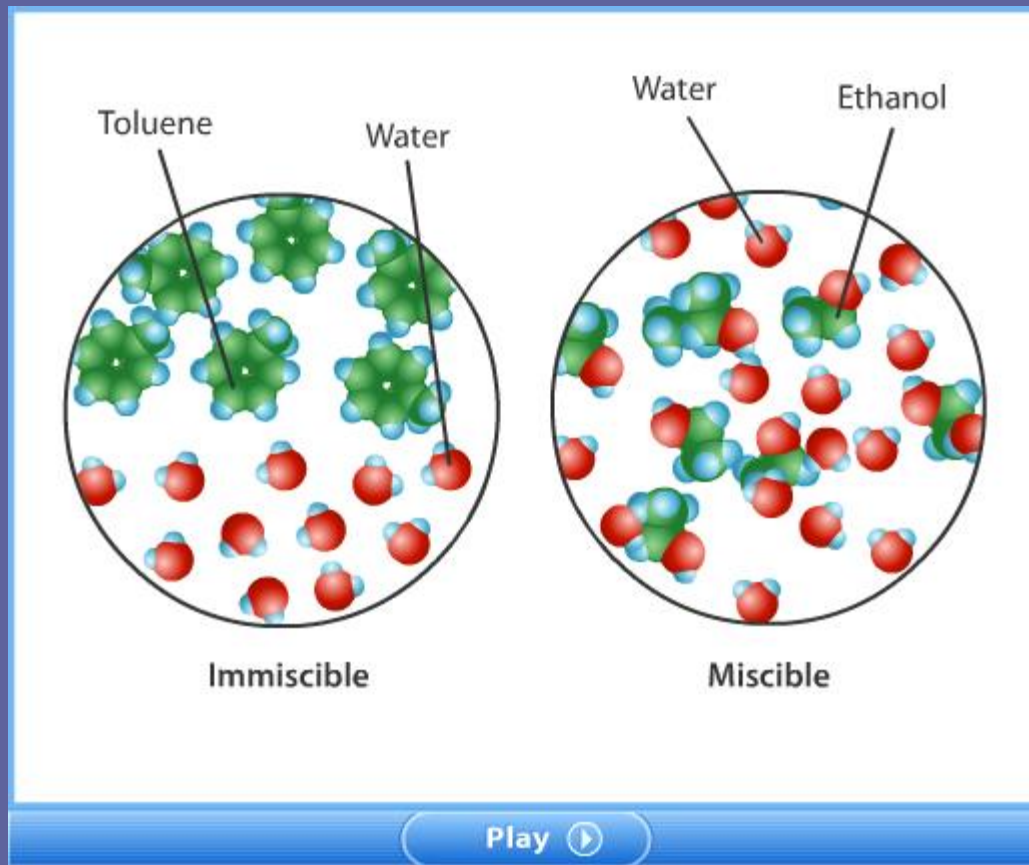
Figure 2 Orange Juice: A Heterogeneous Mixture



Heterogeneous Mixtures, *continued*

- Some mixtures of two liquids will separate.
 - Oil and vinegar in salad dressing separate into two layers.
- Liquids that do not mix with each other are *immiscible*.
- *decanting*: process of pouring a less dense liquid off a denser liquid
 - use to separate two immiscible liquids

Visual Concept: Comparing Miscible and Immiscible Liquids



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Main

Heterogeneous Mixtures, *continued*

- Particles in a colloid are too small to settle out.
- **colloid:** a mixture consisting of tiny particles that are intermediate in size between those in solutions and those in suspensions and that are suspended in a liquid, solid or gas
- Particles in a colloid are large enough to scatter light that passes through.
 - This is called the *Tyndall effect*.

Colloids



Not a colloid

Colloid

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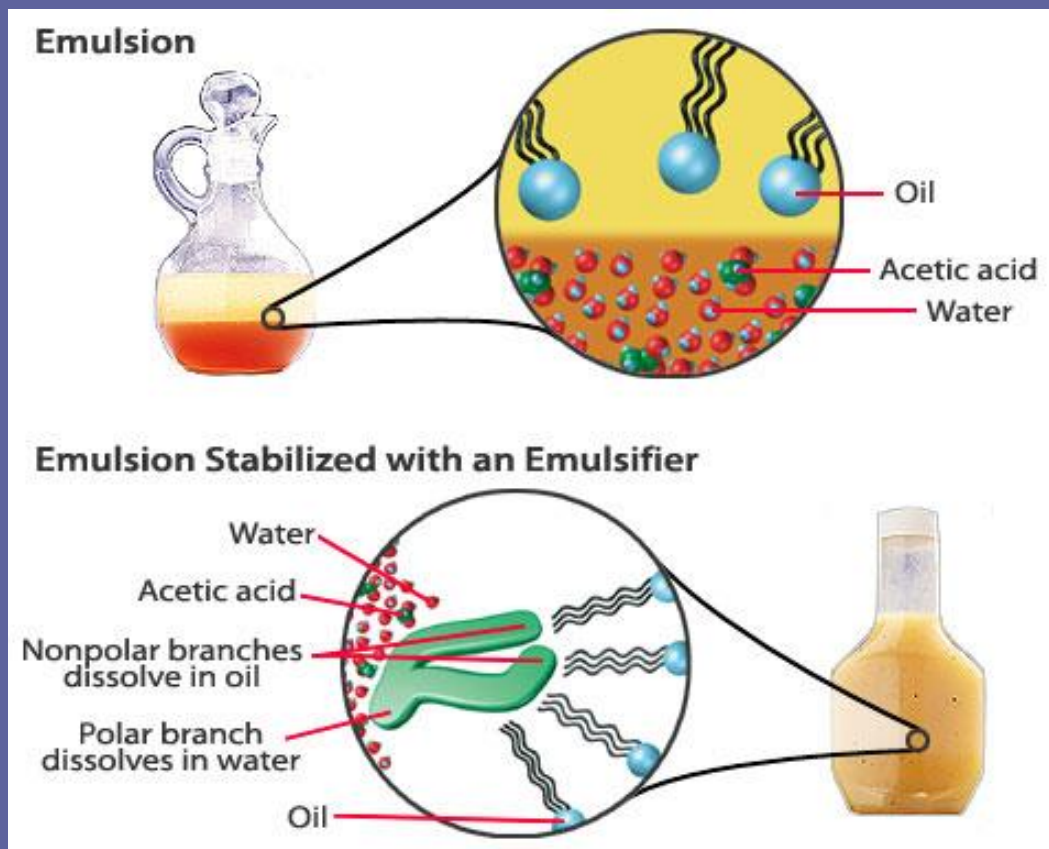
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Heterogeneous Mixtures, *continued*

- Other familiar materials are colloids.
 - gelatin desserts, egg whites, and blood plasma
- Some immiscible liquids can form colloids.
 - **emulsion:** any mixture of two or more immiscible liquids in which one liquid is dispersed in the other

Emulsions



Homogeneous Mixtures

- › What is a homogeneous mixture?
- › A homogeneous mixture looks uniform even when you examine it under a microscope because the individual components of the mixture are too small to be seen.
 - In salt water, the number of ions is the same everywhere.

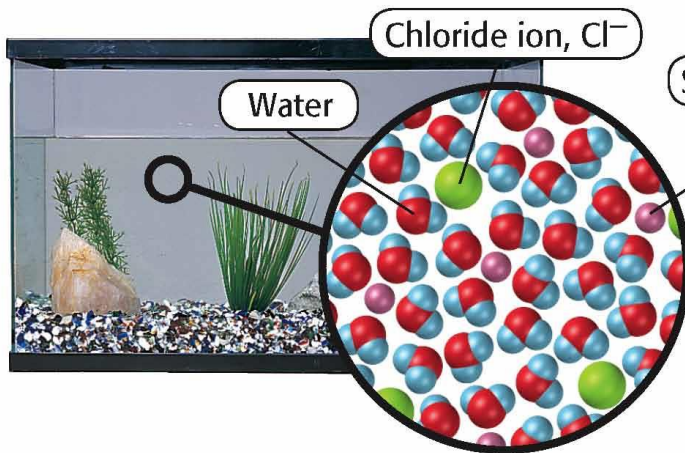
Homogeneous Mixtures, *continued*

- Homogeneous mixtures are solutions.
- **solution:** a homogeneous mixture throughout which two or more substances are uniformly dispersed
- **solute:** in a solution, the substance that dissolves in the solvent
- **solvent:** in a solution, the substance in which the solute dissolves

Homogeneous Mixture

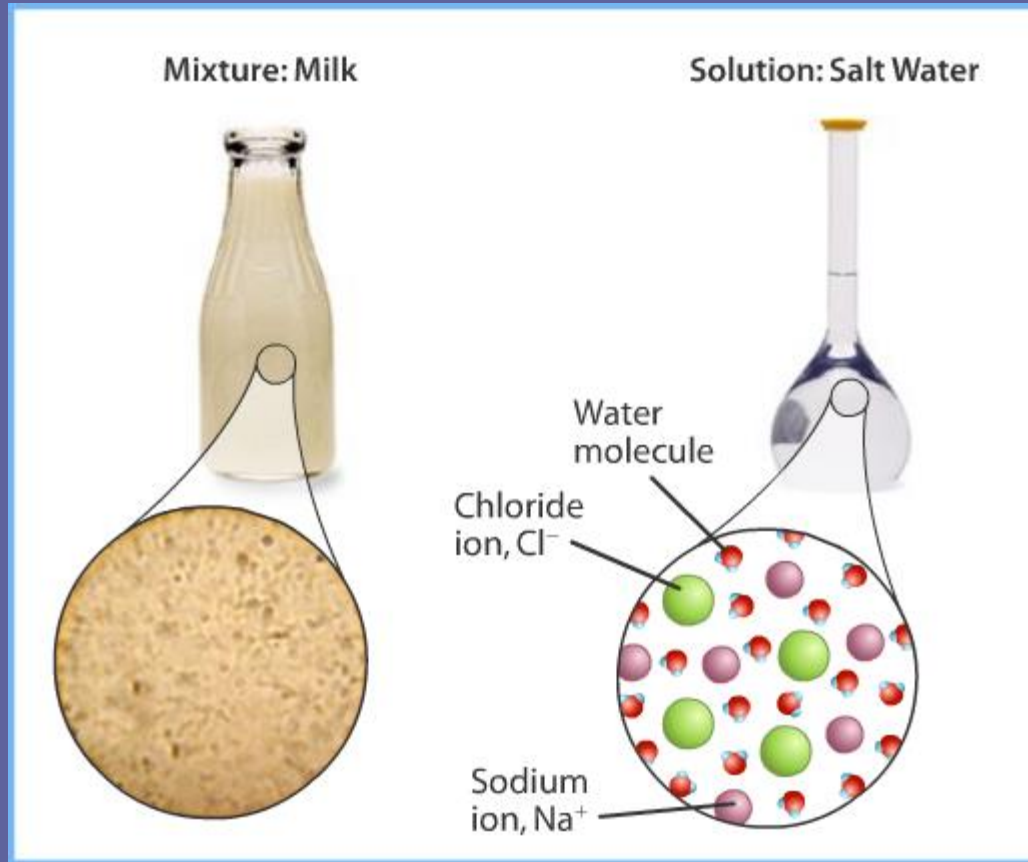


Plain water is homogeneous because it is a single substance.



Salt water is also homogeneous because it is a uniform mixture of water molecules, sodium ions, and chloride ions.

Visual Concept: Solutions



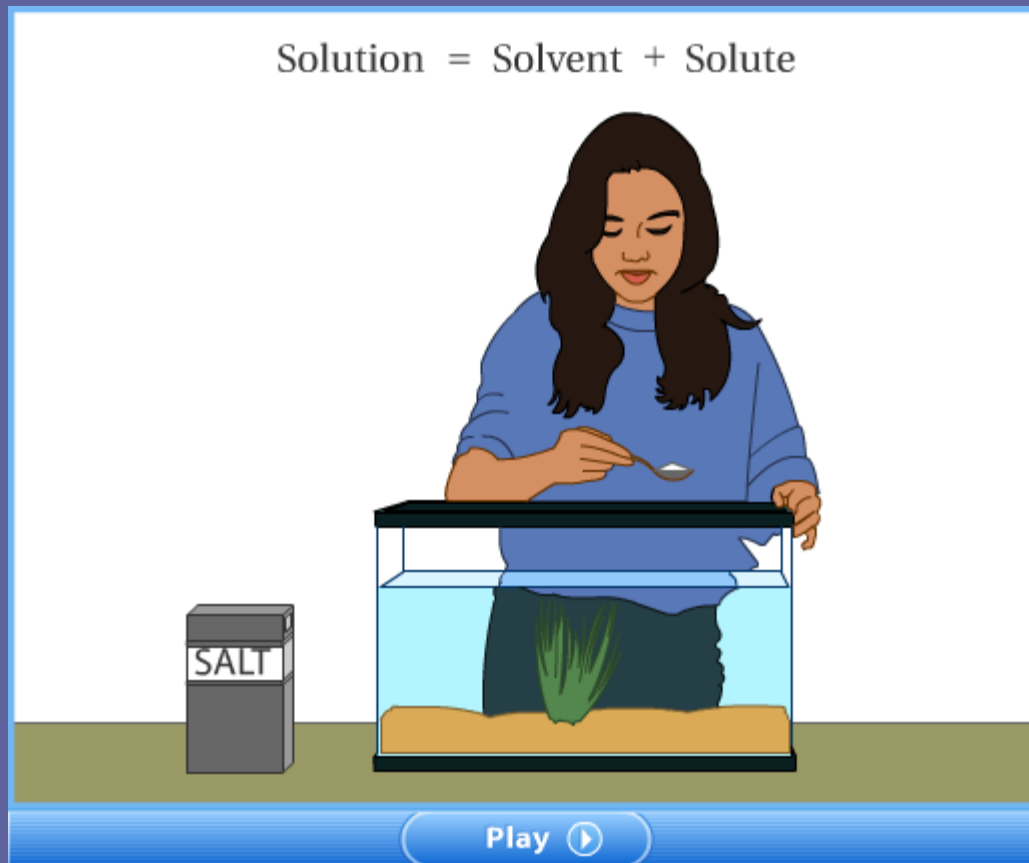
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Main

Visual Concept: Solutes, Solvents, and Solutions



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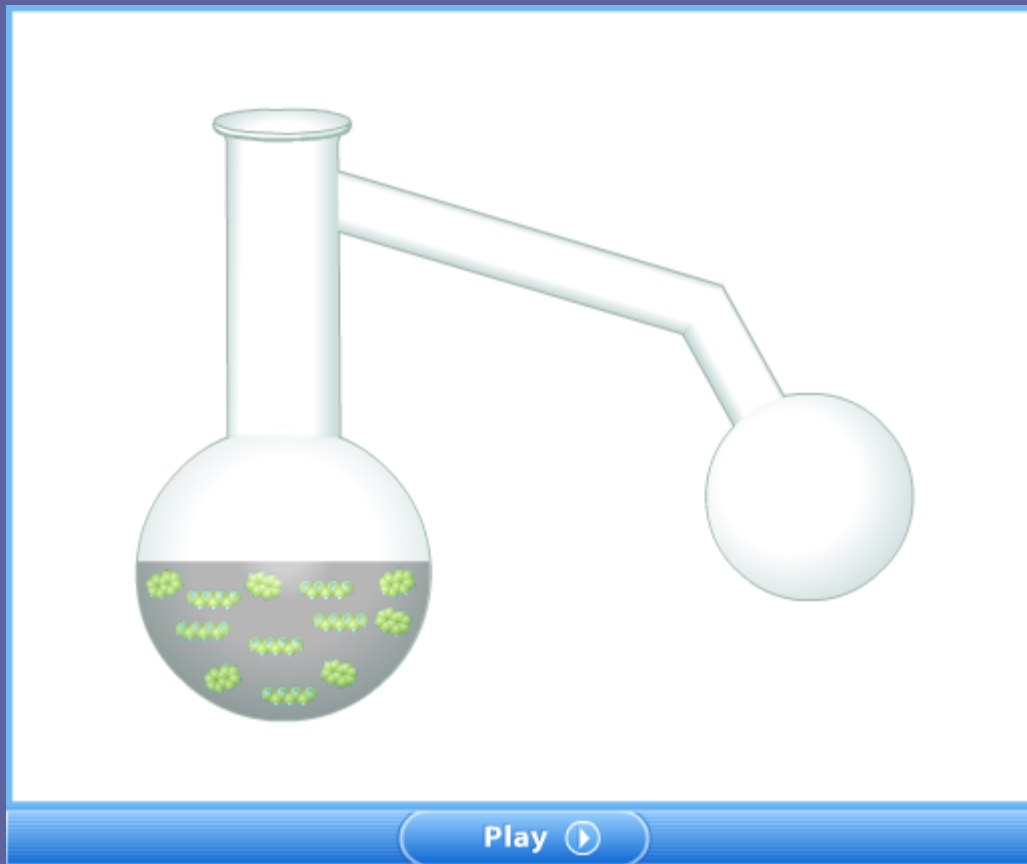
Preview 

Main 

Homogeneous Mixtures, *continued*

- Miscible liquids mix to form solutions.
 - *miscible*: liquids that form a single layer when mixed
 - *distillation*: a method used to separate miscible liquids that have different boiling points
- Liquid solutions sometimes contain no water.
 - *petroleum*: a liquid solution of gasoline, diesel fuel, and kerosene

Visual Concept: Fractional Distillation in Refineries



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Preview 

Main 

Homogeneous Mixtures, *continued*

- Other states of matter can also form solutions.
 - The air is a solution of nitrogen, oxygen, argon, and other gases.
 - **amalgam**: a solution of mercury dissolved in silver
- The substance that there is the most amount of is the solvent.
- The substance that there is the least of amount of is the solute.
- Solids can dissolve in other solids.
 - **alloy**: a solid or liquid mixture of two or more metals