

## 24/7 Chemistry Notes: Solutions, Colloids, and Suspensions

There are 3 categories for mixtures with water.

**Solutions**- homogeneous

**Colloids**- heterogeneous

**Suspensions**- heterogeneous

### Homogeneous Aqueous Systems

**Aqueous solution**- a water solution containing dissolved substances

**Solvent**- the dissolving medium (the substance that does the dissolving)

**Solute** – particles dissolved in the solution (what gets dissolved)

**Solvation**- the process that occurs when a solute dissolves in a solvent

**“Like Dissolves Like”**

Polar substances dissolve in polar solvents.

H<sub>2</sub>O: dissolves things that are polar and ionic

Nonpolar substances dissolve in nonpolar solvents.

Gasoline: dissolves things that are nonpolar

**Miscible**- Liquids that are soluble in each other (MIXABLE)

Ex: Sprite and orange juice

**Immiscible** – liquids that are not soluble in each other (not mixable)

Ex: oil and water

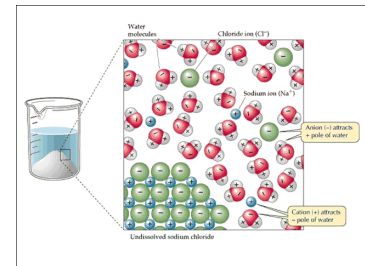
Which of the following would be miscible in water?

Olive oil \_\_\_\_\_

Apple Juice \_\_\_\_\_

Kerosene \_\_\_\_\_

Acetic Acid (vinegar) \_\_\_\_\_



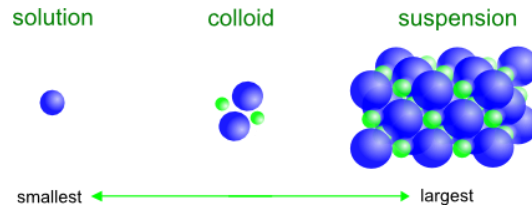
## Heterogeneous Aqueous Systems

Suspensions – mixtures from which particles settle out upon standing.

- Suspensions have particle sizes that are generally larger than 100 nm.
- Ex: children’s medicine, muddy water, Italian salad dressing

Colloids – mixtures with particle sizes that are intermediate in size and do not settle out upon standing.

- Ex: glue, Jello, paint, smoke, milk



Tyndall effect- the scattering of light in all directions. Suspensions and colloids exhibit this effect but solutions do not due to the fact that solutions particle sizes are too small to reflect light.



Brownian motion – chaotic movement of colloidal particles. When viewed under a microscope, the particles seem to be moving about erratically.

Emulsion – a colloid which contains one liquid in another in which it is not soluble or miscible.

Emulsifying agents- used to keep the emulsion stable. They have polar and nonpolar ends.

Soaps and detergents are good emulsifying agents.

- Ex: mayonnaise is an emulsion with oil, vinegar, and egg yolk (the emulsifying agent)

	System		
<u>Property</u>	<u>Solution</u>	<u>Colloid</u>	<u>Suspension</u>
Particle type	ions, atoms, small molecules	large molecules or particles	large particles or aggregates
Particle size (approximate)	0.1-1 nm	1-100 nm	100 nm and larger
Effect of light	no scattering	exhibits Tyndall effect	exhibits Tyndall effect
Effect of gravity	stable, does not separate	stable, does not separate	unstable, sediment forms
Filtration	particles not retained on filter	particles not retained on filter	particles retained on filter
Uniformity	homogeneous	borderline	heterogeneous

## Properties of Aqueous Systems

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