

Text Tuesday

MIXTURES 101

WHAT IS A MIXTURE?

A mixture is a combination of two or more substances that are not chemically united and do not exist in fixed proportions to each other. Most natural substances are mixtures. A mixture can be *physically* separated into pure compounds or elements. Just about everything that you can think of is probably a mixture. Even the purest of materials still contain other compounds as impurities. Mixtures may exhibit a changing set of physical properties. For example, mixture of alcohol and water boils over a range of temperatures.

There are two types of mixtures- homogeneous and heterogeneous. Homogeneous mixtures have the same uniform appearance and composition throughout. Many homogeneous mixtures are commonly referred to as solutions. Particle size distinguishes homogeneous solutions from other heterogeneous mixtures. Solutions have particles which are the size of atoms or molecules - too small to be seen. A colloid is a homogeneous solution with intermediate particle size between a solution and a suspension. Colloid particles may be seen in a beam of light such as dust in air in a "shaft" of sunlight. Milk, fog, and jello are examples of colloids.

A heterogeneous mixture consists of visibly different substances or phases. The three phases or states of matter are gas, liquid, and solid. Unlike homogeneous mixtures, whose particles are too small to be seen, heterogeneous mixtures have a mixture of larger particles. These particles are visible and will settle out on standing. Examples of suspensions are: fine sand or silt in water or tomato juice. For example beach sand is heterogeneous since you can see different colored particles. Vinegar and oil salad dressing is heterogeneous since two liquid layers are present, as well as solids. Air with clouds is heterogeneous, as the clouds contain tiny droplets of liquid water.

HOW CAN MIXTURES BE SEPARATED?

Differences in size, density, solubility, and magnetic properties separate one solid from another. Look at the table below to learn about different methods for separating mixtures.

| METHOD | USED FOR... | TOOLS USED... | WHAT HAPPENS? | EXAMPLES |
|----------------------------|--|------------------------|---|---|
| SIFTING | Separating smaller solid particles from larger solid particles. | Screen | Smaller, finer pieces pass through the small holes in the screen, separating it from larger pieces. | Chefs (cooks) sift flour when baking; sand and gravel companies use sifting to separate rocks |
| FILTRATION | Used to separate solid particles from a liquid by pouring the mixture through a filter paper in a funnel | Filter paper or funnel | This filter paper traps the solid particles and only allows the liquid particles to pass through | Water treatment plants use this to separate dirt from water to produce clean drinking water |
| MAGNETIC ATTRACTION | Used to separate magnetic | Magnet | Magnetic pull attracts individual metal pieces, | To take iron filings out of a mixture, |

| | | | | |
|--------------------|--|------------------|---|---------------------------------------|
| | material from a mixture of other substances | | pulling them away from non-metal pieces. | separate metal from non-metal pieces. |
| EVAPORATION | Used to separate a solid that has dissolved in a liquid solution | Evaporating dish | The solution is heated/left out until all the liquid turns to a gas (evaporates) leaving the solid behind | Salt in salt water or ocean water. |

It is important that mixtures are understood and that students are able to identify them as homogeneous and heterogeneous. Can you?

TEXT TUESDAY TASK

1. Create a graphic organizer, such as a Venn diagram that illustrates (words and colorful pictures acceptable) the *differences* between homogeneous and heterogeneous mixtures.
2. Mom says kool-aid is a homogeneous mixture. Dad says it's heterogeneous. Which one is correct? Explain who and why based on information from the text.
3. In at least 5 sentences, explain the difference between heterogeneous and homogeneous mixtures as if you were talking to a 4th grader student.
4. Recreate the chart below and classify the following mixtures as heterogeneous (HET) or homogeneous (HOM) by putting a check in the correct column. An example has been done for you below.

| MIXTURE | HETEROGENEOUS | HOMOGENEOUS |
|----------------|----------------------|--------------------|
| fruit salad | ✓ | |
| veggie salad | | |
| milk | | |
| cereal | | |
| apple juice | | |
| ranch dressing | | |