Unit 1 - Pure Substances and Mixtures
Chapter 1: Classifying Matter

Board Notes

1.1 What is Matter?

Vocabulary:

matter – anything that takes up space and has mass

particles – the tiny bits that all matter is made of
- they are too small to be seen
- there are different kinds
- they don't look like the matter they make up

chemistry – the study of matter and its changes

Check Your Learning p 13 #1-3

1.a) example answer: It may be difficult to understand that matter is made of very tiny particles that move because I can't see or touch these particles. Things like rocks and tables *look* completely solid and stationary.

b) example answer: I can imagine particles to be similar to cell phone waves, or wireless Internet signals. I also can't see or touch them, but they must be real since my cell phone and router work. The same is true of air – I can breathe it, even though I can't see it. Maybe particles are similar.

2. **Matter** is anything that has mass and volume (takes up space).

All forms of matter are made of tiny particles.

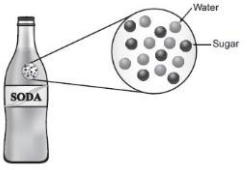
These particles are constantly moving in random directions.

They are also attracted to each other.

(examples of matter: pencil, horse, bike)

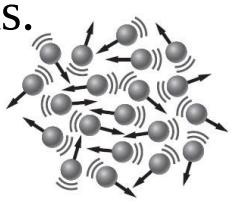
The 5 Main Points of Particle Theory

1. All matter consists of tiny particles.

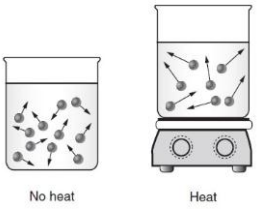


2. There are empty spaces between particles.

3. Particles move continuously in random directions.



4. Heating particles increases their speed and the distance between them.



5. Since particles attract each other, they tend to stay together.

1.2 More About Matter: Solids, Liquids & Gases

Vocabulary:

volume – a measure of the quantity of space occupied by an object

solid – a state of matter with a definite volume and definite shape

liquid – a state of matter with a definite volume, but no definite shape

- a liquid takes the shape of its container

gas – a state of matter that has no definite volume and no definite shape

- a gas takes the shape and volume of its container

Check Your Learning p 16 #2-5

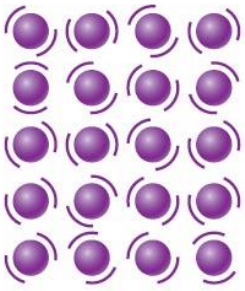
2. The three states of matter are: **solid, liquid** and **gas.**

3. **Melting Ice explained with Particle Theory**: The particles in a solid such as ice are bonded together so that they can vibrate but not move freely. When ice is heated, the particles begin vibrating more quickly. Eventually they break their

bonds and move freely past and around each other. When this happens, the solid ice melts into the liquid water.

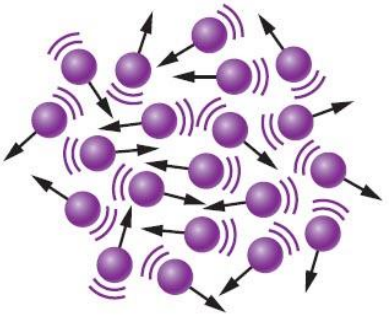
4. A **rock** is a **solid**. **Grape juice** is a **liquid. Air** is a **gas.**

Particle Theory Diagram



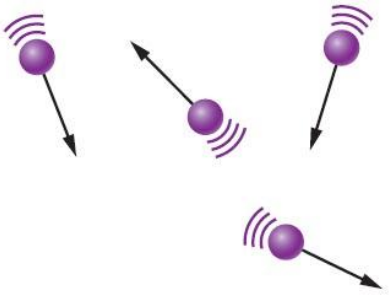
particles of a solid

Particles in a solid are strongly attracted to each other. They vibrate but do not move.



particles of a liquid

Particles in a liquid are attracted to each other, but they can still move around each other.



particles of a gas

Particles in a gas are only weakly attracted to each other. They move quickly and far apart.

1.4 Pure Substances and Mixtures - *Check Your Learning p 21 #1-3*

Pure Substance – matter that contains only one kind of particle

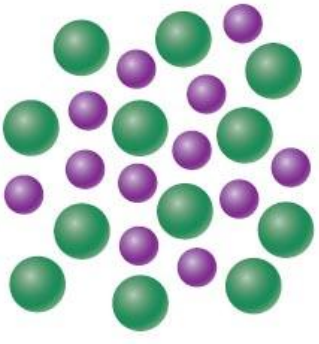
examples: distilled water, salt, sugar, uranium, aluminum

Mixture – matter that contains two or more pure substances mixed together

examples: tap water, steel, air, cola, cloth, cereal

(a) pure substance

pure substance



(b) mixture

3. **Milk** is a **mixture** of water, fats, and other substances. This can be hard to see because most milk looks like just one type of substance. You can tell milk is a mixture though, because if you let it sit out it will separate into solid and liquid parts.

p 26 "Try This: <u>Explore Mixtures at Home</u>" Name: _____

	Mixture 1	**Mixture 2**	**Mixture 3**	**Mixture 4**
Name of mixture				
Mechanical mixture or solution?				
Components of the mixtures				
Safety warning (if present)				

p 26 "Try This: <u>Explore Mixtures at Home</u>" Name: _____*example answers*_____

	Mixture 1	**Mixture 2**	**Mixture 3**	**Mixture 4**
Name of mixture	*potting soil*	*chocolate milk*	*orange juice (with pulp)*	*bathroom cleaner (aerosol spray)*
Mechanical mixture or solution?	*mechanical mixture*	*solution*	*mechanical mixture*	*mechanical mixture when sprayed (bubbles))*
Components of the mixtures	*dirt, peat moss, bark, fertilizer*	*milk, chocolate syrup*	*orange juice, sugar, pulp*	*water, isobutene, tetrasodium EDTA Butoxydiglycol*
Safety warning (if present)	*can be flammable – keep away from combustible material*	*none*	*none*	*can be flammable. Toxic. Use in a well-ventilated room.*

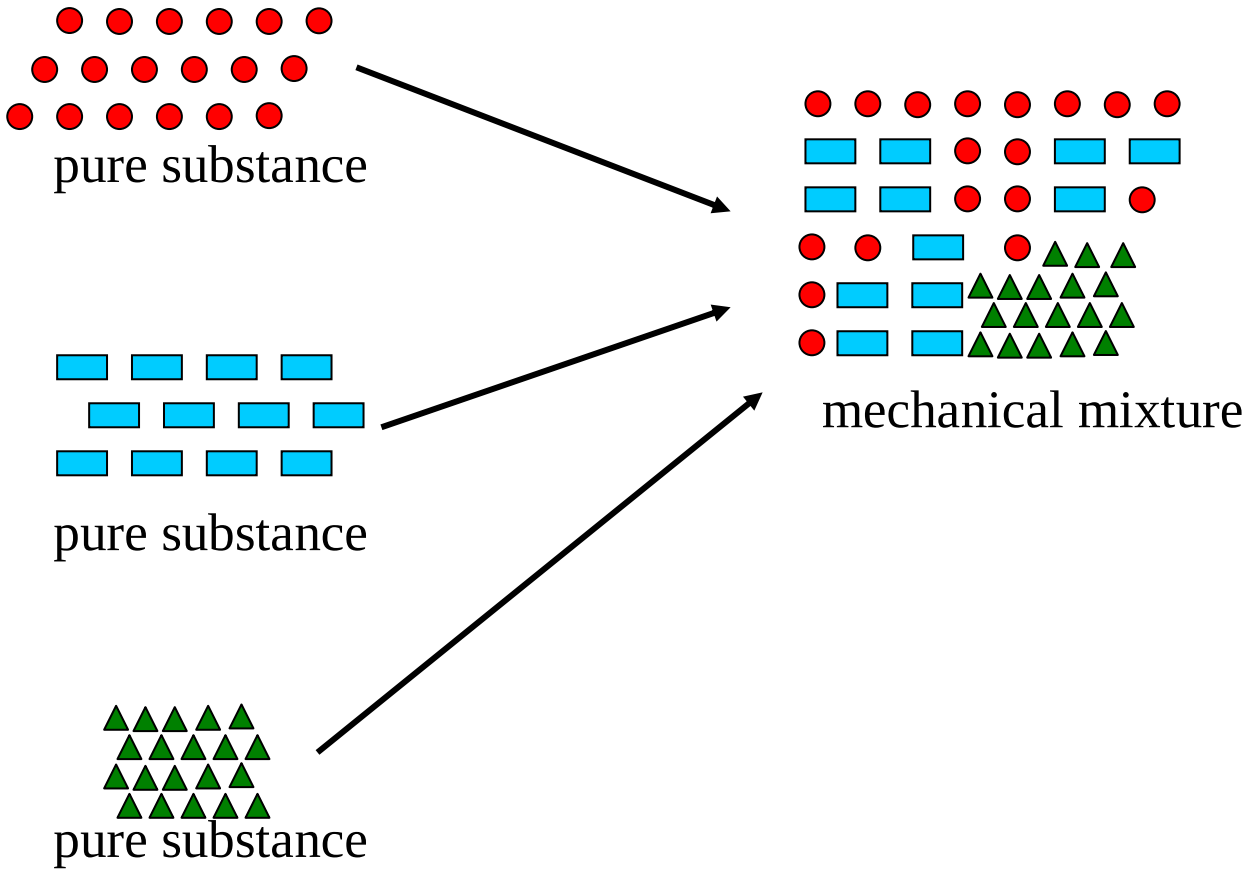
1.6 Mechanical Mixtures and Solutions

Check Your Learning p 27 #2-5

Mechanical Mixture – also called a **heterogeneous mixture**

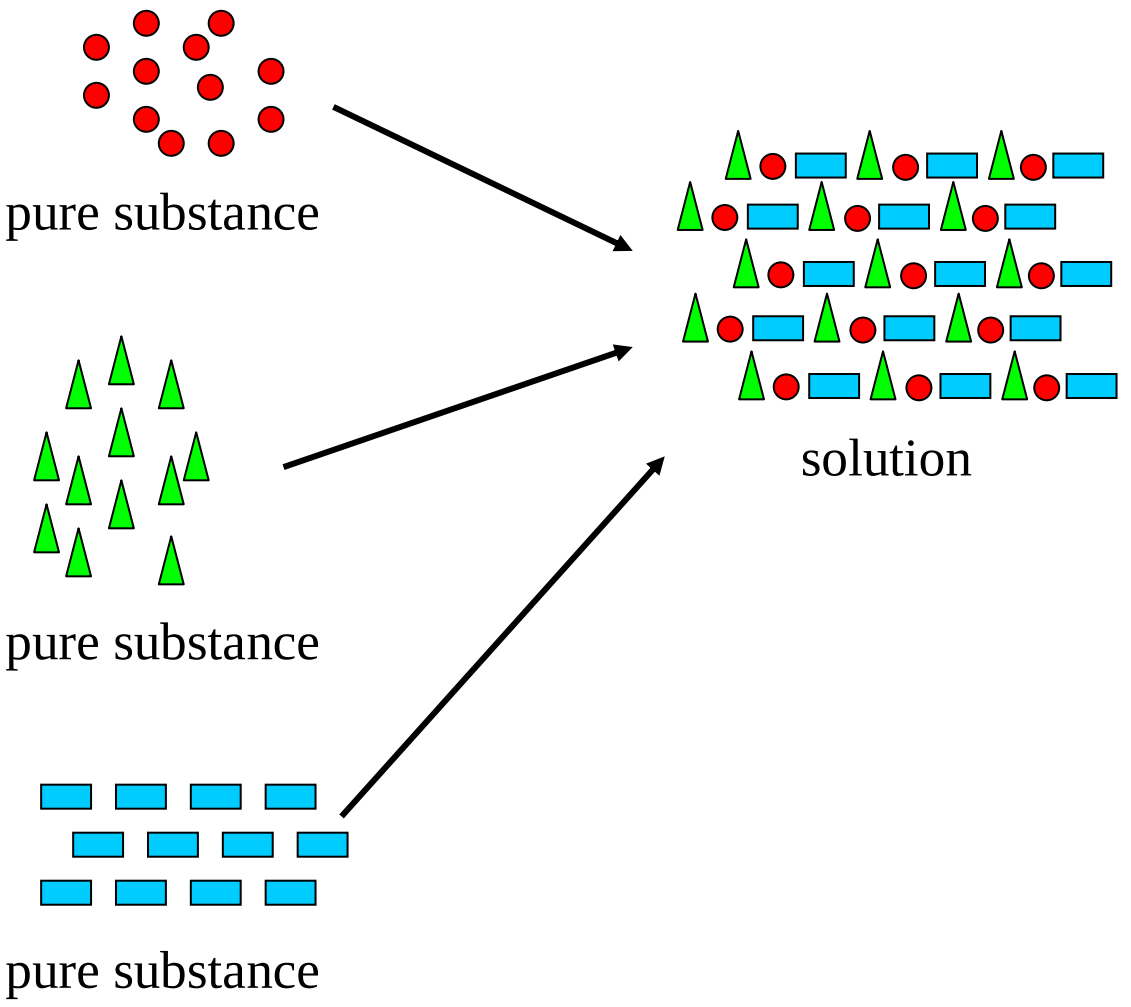
- different particles are unevenly mixed

- a mixture with different parts that you can see

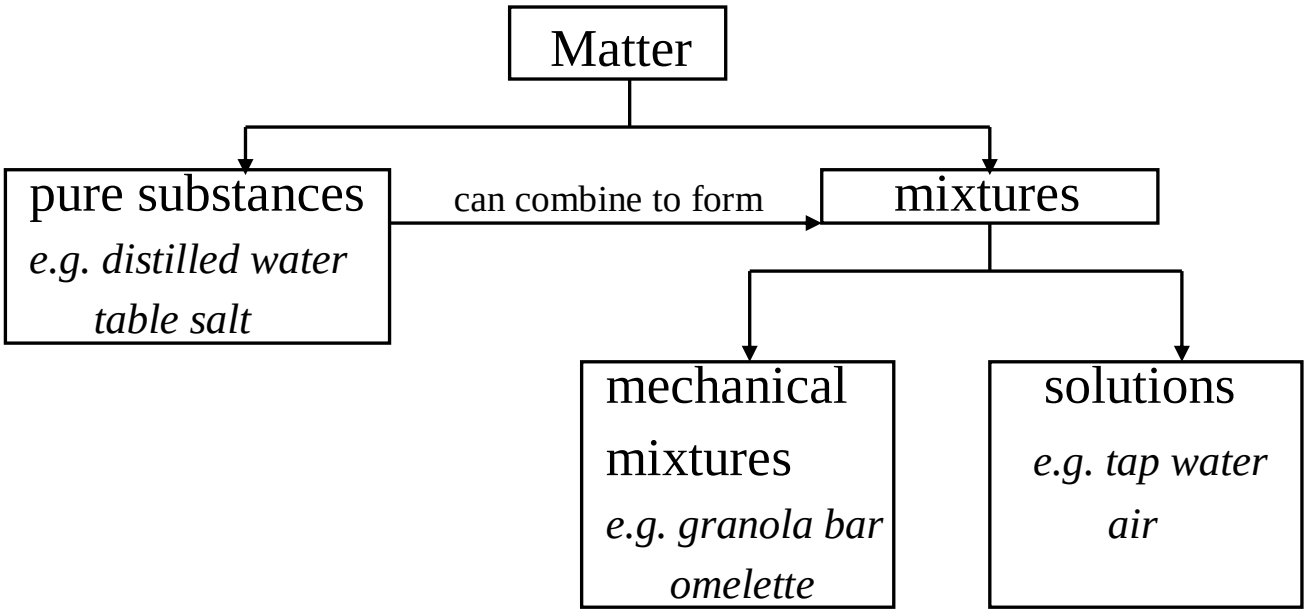


Solution – also called a **homogeneous mixture**

- different particles are evenly mixed
- looks like a single type of matter (*looks* pure)
- a uniform mixture of two or more pure substances



3.



5. Stainless steel is a solution.
A granola bar is a mechanical mixture.
Clear apple juice is a solution.
An omelette is a mechanical mixture.
Soil from my backyard is a mechanical mixture.