September 8th, 2015 page 31

DO:I will be able to explain the differences between pure substances and mixtures.

EQ:

1. How do elements and compounds both qualify as pure substances?
2. Explain how to determine types of mixtures?
3. Compare and contrast pure substances and mixtures.

Daily Check

1. The chemical formula for glucose is C6H12O6. How many different elements make up one molecule of glucose?

a. 1

b. 3

c.12

d. 24

Explanation:

2. Which of the following is the basis for arranging the elements in the modern periodic table?

a. Atomic Name

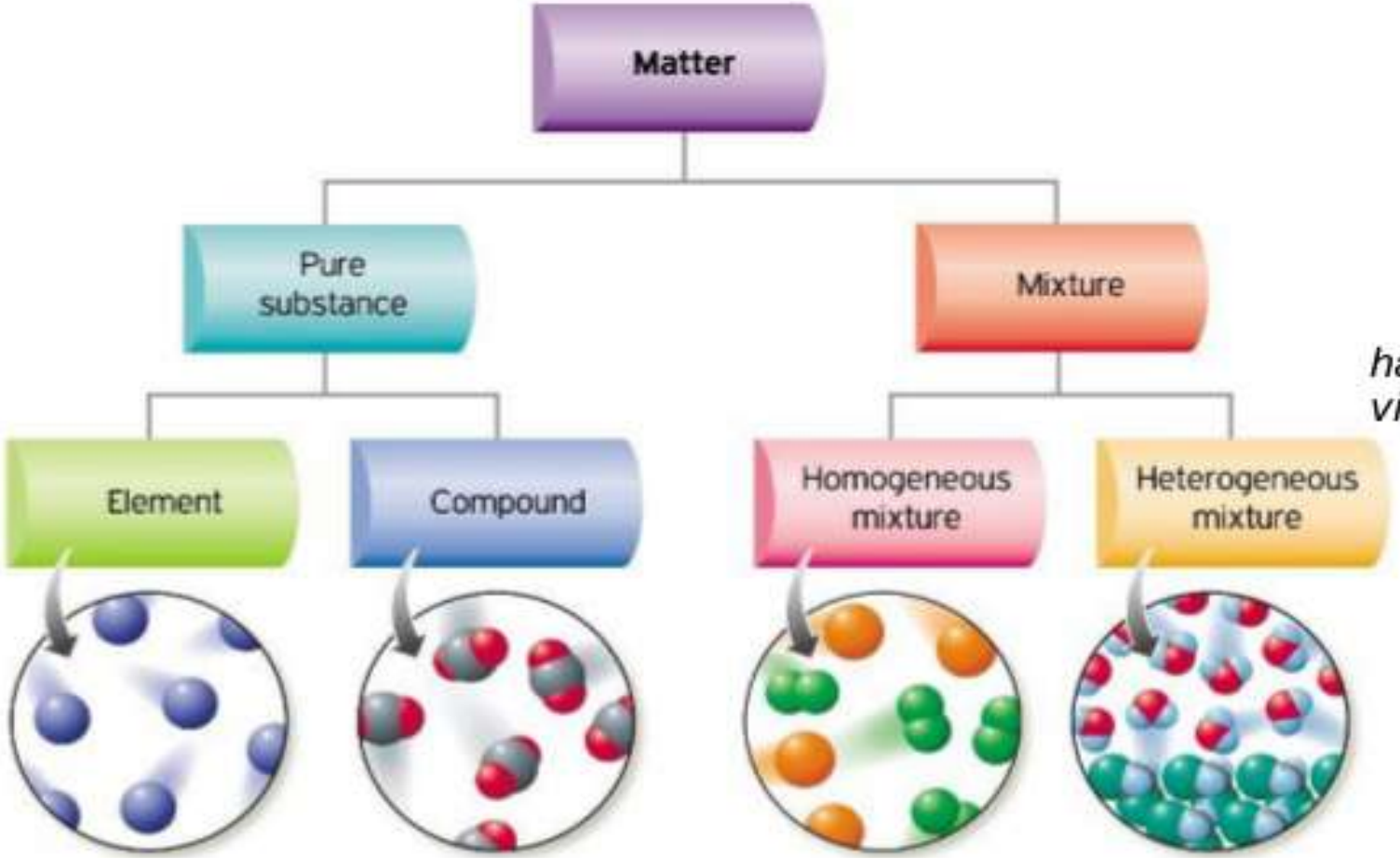
b. Atomic Number

c. Atomic Mass

d. Atomic Symbol

Explaination:

Pure Substances and Mixtures



Look at a Periodic Table. There are 113 elements in the Periodic Table

Most materials we encounter in the world are mixtures. The air we breathe is a mixture of oxygen, nitrogen, and other gases. The oceans are mixtures of water, salts and other substances

Pure Substance

Mixtures

ELEMENTS	COMPOUNDS	HETEROGENOUS MIXTURES	HOMOGENOUS MIXTURES
Elements are the simplest pure substances. Examples: •O-Oxygen •H- Hydrogen •Na- Sodium •C- Carbon •Fe- Iron •Pb- Lead The smallest particle of an element that has the properties of that element is an atom.	Compounds are pure substances that are made of more than one element bound together. Examples: •H_2O and CO_2 A molecule is formed when two or more atoms chemically combine.	All components of the mixture are visible because they do not mix together Particles not distributed evenly EX: sand and water vegetable soup oil and water	Homogeneous mixtures Components cannot be distinguished from each other, appear as one substance Particles distributed evenly throughout EX: air, salt water, 10 karat gold *SOLUTIONS

2 types of mixtures

Heterogeneous mixtures

- All components of the mixture are visible because they do not mix together
- Particles not distributed evenly

EX: trail mix, vegetable soup, oil and water

Homogeneous mixtures

Components cannot be distinguished from each other, appear as one substance
Particles distributed evenly throughout

EX: air, salt water, 10 karat gold


Mocha
STARBUCKS
frappuccino


Kool-Aid

Extras:

- Homogeneous mixtures are also called **solutions**.

- Separate particles are not visible because one dissolves in the other = *dissolution*

In salt water,

- salt is the solute, gets dissolved
  - water is the solvent, dissolves other substance

Smaller quantity

Larger quantity

2 types of mixtures

Q. Why do some substances dissolve and others do not?

A. In a solute, each particle is attracted to each other to form a grain of it. When the solute is placed in a water, new attractive forces are present. If the attractive forces between the water and the solute are stronger than those holding the solute together, then the solute will break down and get dissolved in the water.

SOLUBILITY

- Because different amounts of solute can be dissolved in a solvent, we look at a solution's **SOLUBILITY**.
- Definition: The maximum amount of solute that can be dissolved in a given amount of solvent at a specific temperature.
- Usually expressed as the number of grams of solute per 100mL of solvent.

SOLUBILITY

- Every chemical substance which dissolves in water has a fixed solubility.
  - **If it does not dissolve, solubility = zero.**

- Many of these solublities have been measured and special charts are produce displaying solubility of many substances at once.

Solution terminology:

- **Saturated**:

Maximum amount of solute dissolved in solvent

- **Unsaturated**:

Less than maximum amount of solute dissolved in solvent

- **Supersaturated**:

More than maximum amount of solute dissolved in solvent

- **Dilute**:

to make less concentrated

Separation of Mixtures

1. Sedimentation: occurs naturally when solid substances that are heavier than their solvent deposit at the bottom of the mixture.

EX: Water treatment

2. Decantation: a heterogeneous mixture that has distinct layers can be separated by slowly pouring one of the layers into another container.

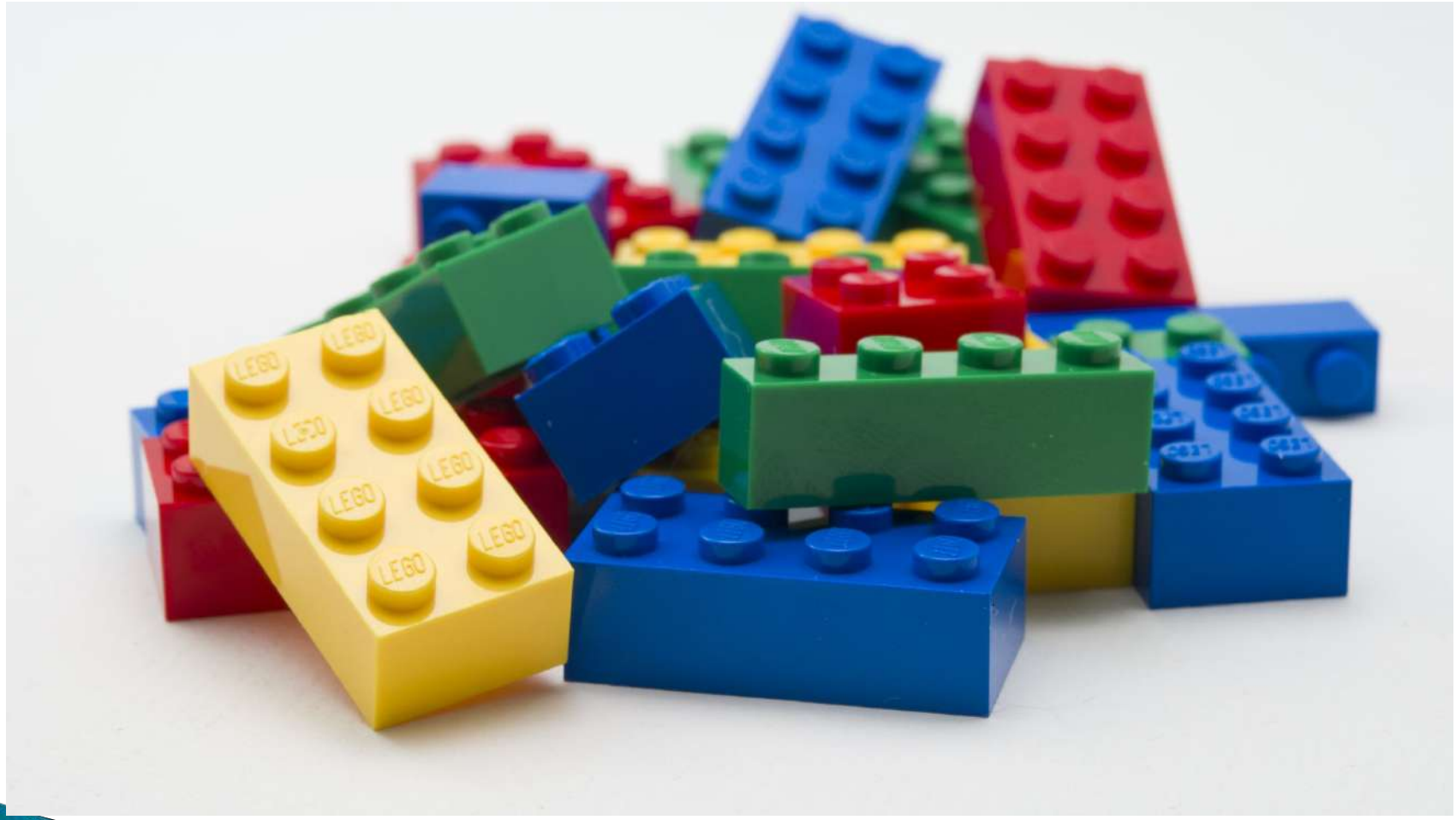
EX: Separating cream from milk

3. Filtration: separates parts of a heterogeneous mixture by pouring it though a filter, the larger particles (residue) will be held in the filter while the smaller ones (filtrate) will pass through.

EX: Brita

4. Distillation: used to separate components of a homogeneous mixture based on their different boiling points. Solution is heated and substance with lower boiling points evaporates and passes through a tube where it cools and turns back to water in another container.

ELEMENT OF SURPRISE

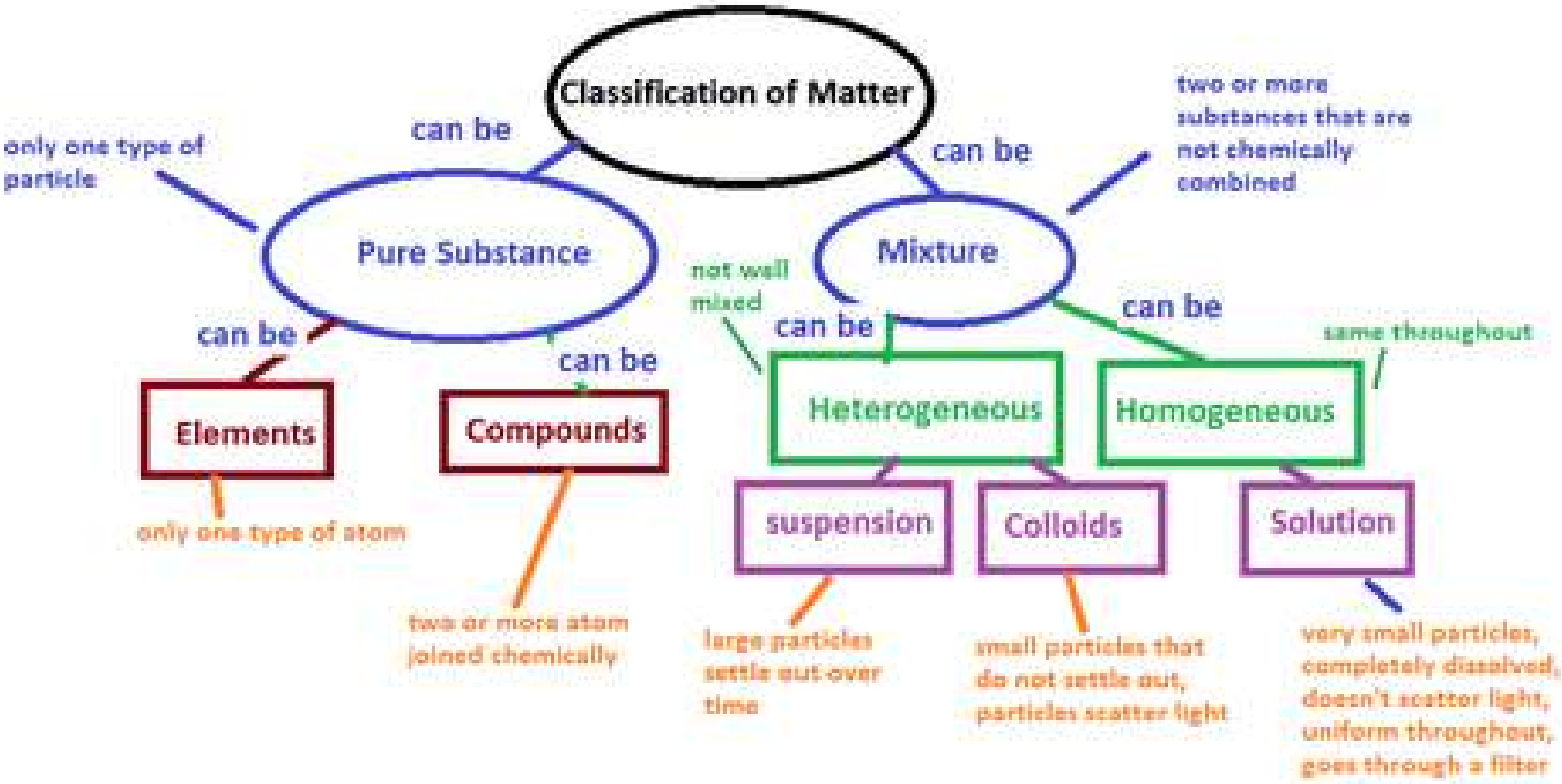


September 9th, 2015 page 33

DO: I will be able to explain ~~the~~ matter & its molecular composition, characteristics, ability to change, and how combinations of elements and atoms from the different types of matter that make up the world.

EQ:

1. How do elements and compounds both qualify as pure substances?
2. Explain how to determine types of mixtures?
3. Compare and contrast pure substances and mixtures.


Classification of Matter
can be
only one type of particle
Pure Substance
can be
Elements
only one type of atom
can be
Compounds
two or more atom joined chemically
can be
two or more substances that are not chemically combined
Mixture
not well mixed
can be
Heterogeneous
suspension
large particles settle out over time
Colloids
small particles that do not settle out, particles scatter light
can be
same throughout
Homogeneous
Solution
very small particles, completely dissolved, doesn't scatter light, uniform throughout, goes through a filter

NBI 9–10

- An atom is to an element as a _____ is to _____.
- An atom is to a molecule as a _____ is to _____.
- An atom is to a compound molecule as a _____ is to _____.

ELEMENT An element is the simplest substance. There are many unique elements but they are all different and cannot be broken down any further and still have their own characteristics.		An element is like a flavor of ice cream, there are many different flavors but each is unique and cannot be substituted for another; if you want chocolate ice cream you have to pick the flavor chocolate.
ATOM An atom is the building block of all matter. An atom is the basic unit of an element. An atom is made of subatomic particles.		A scoop of ice cream is like an atom. It contains all of the characteristics of an element in **one unit.**
MOLECULES A molecule is **2 or more** atoms that are chemically bound.		A molecule is like an ice cream cone with multiple scoops of ice cream. These scoops can be the same or different flavors so long as there are **more than 2 scoops.**
COMPOUND MOLECULE A compound molecule is a molecule(2 or more atoms) that is made of 2 or more elements.		A Compound **molecule** is like an ice cream cone with multiple scoops of differently flavored ice cream. **At least 2 scoops** AND 2 flavors!!

September 10th, 2015 page 35

DO: I will be able to explain ~~the~~ matter at its molecular composition, characteristics, ability to change, and how combinations of elements and atoms from the different types of matter that make up the world.

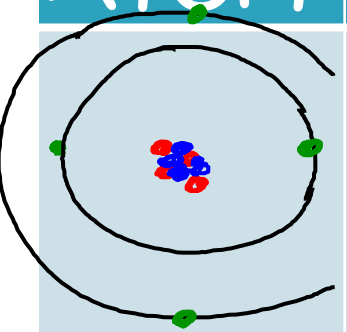
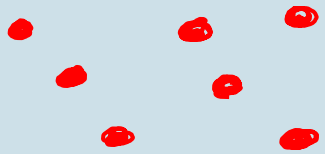
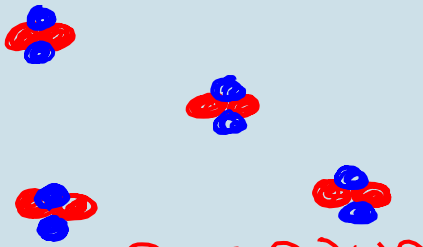
EQ:

1. How do elements and compounds both qualify as pure substances?
2. Explain how to determine types of mixtures?
3. Compare and contrast pure substances and mixtures.

Writing Prompt

Explain the correlation between atom, element molecule, and compound.

interchangable

ATOM	ELEMENT	MOLECULE	COMPOUND
			
atom of Boron	Boron	1 molecule of Boron	Boron compound
1 lego	the color of a lego	2 legos clicked together	2 legos of different colors
1 Scoop of Ice Cream	flavor of ice cream	2 scoops of icecream	2 or more scoops of different flavors
*Basic unit of an element	*Simplest Substance	*2 atoms that are Chemically Bond	*2 or more atoms of 2 or more element

Writing Prompt
Explain the correlation between atom, element molecule, and compound.

ATOM	ELEMENT	MOLECULE	COMPOUND
Basic unit of an element	Is a name for a unique arrangement of subatomic particles in an atom + explains how atoms behave	Is made of 2 or more atoms from the same or different elements	are made with combinations of 2 or more atoms of 2 or more elements