

Unit 2 Matter

The universe consists of _____ and _____. Chemistry is the branch of science the studies _____ as well as the _____ it undergoes and the _____ that accompany such transformations.

Matter defined: _____

- A. Can be _____: visible _____ a microscope
- B. Can be _____: visible _____ a microscope
- C. Can be _____: _____ visible – even with a light microscope
 - _____ (STM), developed in 1981, image and manipulate individual atoms within elements
 - The matter studied by chemistry is submicroscopic. To understand submicroscopic matter, chemists _____.

Volume defined: _____

Mass defined: _____ reflecting the amount of _____. It can also be defined as _____. The more mass in an object, the greater its _____. Mass is measured by an instrument called a _____, and the base unit is the _____ (_____).

Fill in the table to compare and contrast *mass* and *weight*.

Mass	Weight

Writing Activity: Answer in complete sentences.

The gravity on the Moon is 1/6 that on Earth. If a person weighs 120 pounds on earth, how much would she weigh on the Moon?

How would her mass on the Moon compare to her mass on Earth?

Classification of Matter

Matter can be classified based on its _____ or its _____.

State of Matter

A. _____ are the physical forms by which matter is classified based upon the characteristics it exhibits.

1. Differences in state of matter are due to differences in the _____ of the particles of matter.

2. There are _____ states or phases of matter:

- _____ (BEC): occurs close to _____ and is characterized by almost no motion, meaning _____. All atoms merge into one _____, with electrons moving to one energy level and all atoms becoming one entity.
 - _____: have _____ kinetic energy and are held in position by _____. There are two types of solids: 1) _____, and 2) _____.
 - _____: have more kinetic energy than _____ and are characterized by _____ shape, _____ volume, and viscosity (_____).
 - _____: have more kinetic energy than _____, allowing particles to flow and expand, giving them _____ shape and volume
 - Vapor is defined as the gaseous state of matter from _____

_____.
 - _____: most common form of matter, (_____
_____). Kinetic energy of plasmas is so high that electrons are stripped from their atoms, creating _____ (negative charges) and _____ (positive charges). As temperature decreases, the _____ return to their usual places. Ordinary solids, liquids, and gases are _____
_____.
3. Chemistry typically studies only three states – _____ – because they tend to occur close to _____ and are the three states generally _____.

Increasing
Energy



	SOLID	LIQUID	GAS
Shape			
Volume			
Compressibility			
Packing			
Particle Movement			
Particle Order			
Particle Energy			
*IMF			

*IMF = _____

4. Phase changes occur as particles _____ kinetic energy (_____) or _____ kinetic energy (_____).

- Absorb energy: _____

- Release energy: _____

Physical Properties

-
-

Two Types

① Extensive properties _____

Examples:

② Intensive properties _____

Examples:

Chemical Properties

-
-

Examples

The ability to

or the _____
to do these
things

Physical Changes

-

Examples

-
-

The Law of Conservation of Mass

Chemical Changes

-
-
-
-

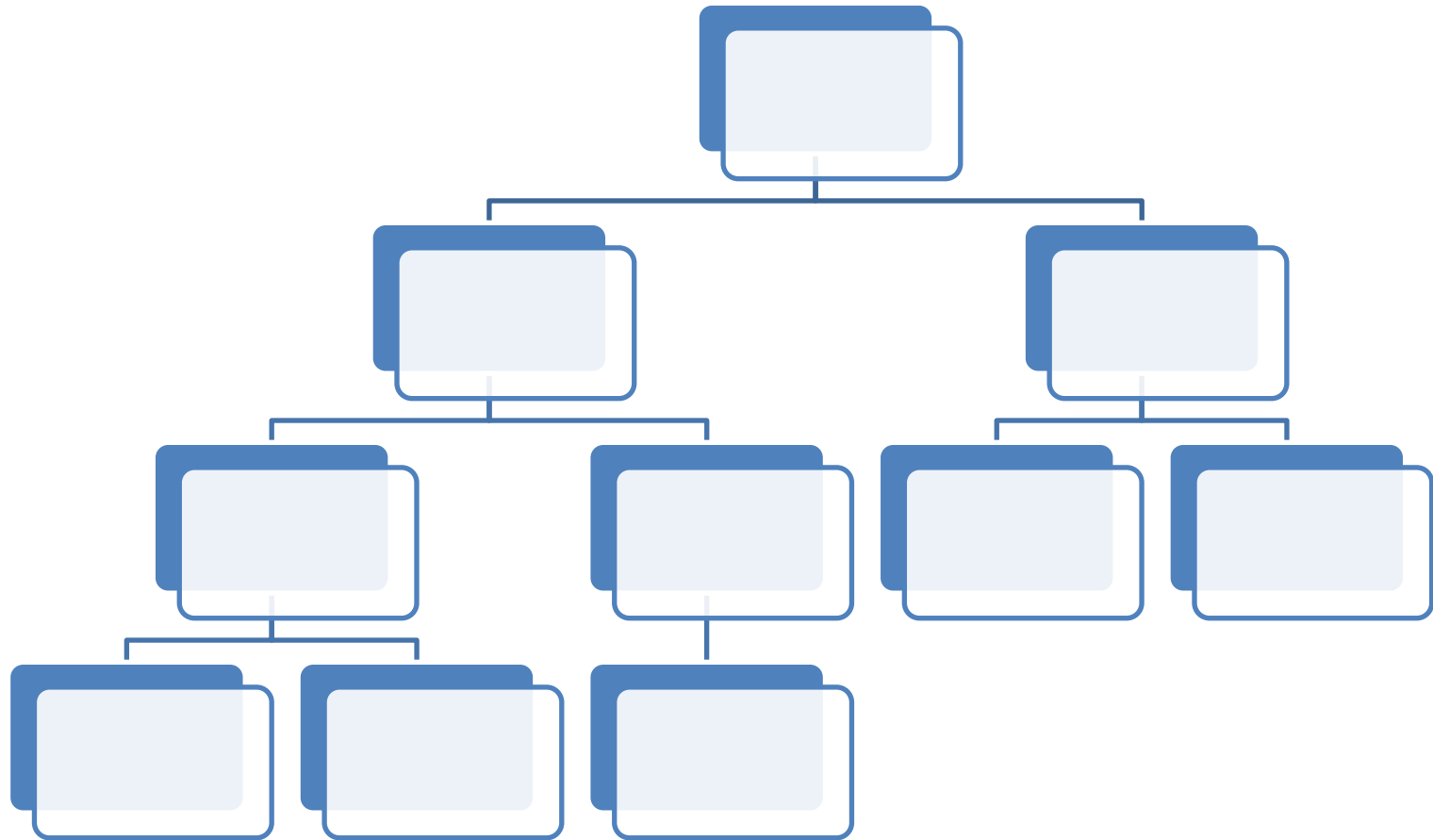
Examples

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-

Indicators of Chemical Reaction

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-
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Classification of Matter Chart



Composition of Matter

- A. Constant composition characterizes _____, whereas variable composition is characteristic of _____.
- B. A pure substance is matter with _____. It is made of a single type or _____ or _____. Therefore, a _____ can be written.
- C. A mixture is a _____, which _____. The composition varies _____ and _____. It is made of two or more types of _____ or _____ that are _____ and consists of two parts: 1) _____: present in lesser amount, and 2) _____: present in greater amount.
- D. Pure substances can be further subdivided into _____ and _____.
1. Elements are the _____ and cannot be broken down into simpler substances through _____ means.
 - The _____ known elements are found on the _____, organized by _____. Elements numbered _____ through _____ occur naturally, while those number greater than _____ are _____.
 - Elements contain only one type of _____, they each have one _____, and they are each represented by one _____.
 2. Compounds are composed of two or more substances _____ in _____. The chemical combination results in _____ or _____.
 - Compounds can be broken down by _____ means, which require _____.
 - Properties of compounds are _____ from properties of _____.
 - Example:

E. Mixtures can be divided into two types of mixtures: _____ and _____.

1. Heterogeneous describes a _____ mixture of two or more substances, existing in _____. Its components are _____ (distinct) and separate into _____. They tend to be _____, and the particles _____ over time. Heterogeneous mixtures are positive for the _____.

- The Tyndall effect is a phenomenon in which particles of mixture _____.
 - Positive:
 - Negative:
- Heterogeneous mixtures with _____ particles are known as _____. The particles are usually visible and can be separated by _____.
- _____ are heterogeneous mixtures with _____ particles that are not completely _____ and remain suspended, causing the mixture to appear _____. These particles cannot be _____ and do not settle into _____.
 - Colloids are classified as _____ or _____ when one component is a gas, and _____, _____, or _____ when only involving liquids and solids.

2. Homogeneous describes a _____ mixture of two or more substances, existing in a _____. The composition is _____ from one mixture to another but is _____ within an individual mixture.

- Liquid homogeneous mixtures are _____ but can be combinations of _____.
 - _____ are solid in solid solutions (example: brass = copper + zinc). _____ is a mixture of _____ (nitrogen, oxygen, argon). Soft drinks are made of _____.
- Also known as _____.

- Consist of _____ (substance that dissolves) and a _____ (dissolving agent present in greater amount). _____ is the universal solvent, forming _____ solutions.
- Homogeneous mixtures are made of multiple substances that appear _____ because particles are so _____ and are mixed uniformly.
- Components are indistinguishable and do not separate into _____. Solutions cannot be separated by _____ or _____ due to small particle size.

Separation of Mixtures

A. Separation techniques are _____
_____.

B. Separation Techniques

1. _____ basically means to separate “by hand.” It involves using tools, such as tweezers or a magnet, to remove and separate components of a suspension.
2. _____ uses a porous barrier to separate solids from liquids and is also used with suspensions. For example, _____ can be used with a _____ to separate sand from water.
3. _____ is based on the difference in boiling points of substances and is used to separate components of _____ and _____. For example, when boiling salt water, the water will boil first, leaving the salt.
4. _____ results in the formation of pure solid particles of a solute from a solution. For example, when making _____, sugar forms solid crystals as liquid evaporates.
5. _____ separates components of solutions based on the tendency of components of a mixture to travel across the surface of another material, such as _____ moving across filter paper.
6. _____ allows a liquid to be separated quickly from a heavier solid and is used with suspensions.
7. _____ uses centripetal force to cause denser substances from a mixture to separate along the bottom while lighter substances move to the top.