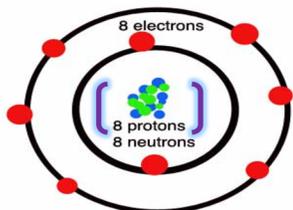


S8P1.
Students will examine the scientific view of the nature of matter.

- Distinguish between atoms and molecules.
- Describe the difference between pure substances (elements and compounds) and mixtures.
- Describe the movement of particles in solids, liquids, gases, and plasmas states.
- Distinguish between physical and chemical properties of matter as physical (i.e., density, melting point, boiling point) or chemical (i.e., reactivity, combustibility).
- Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color).
- Recognize that there are more than 100 elements and some have similar properties as shown on the Periodic Table of Elements.
- Identify and demonstrate the Law of Conservation of Matter.

A.

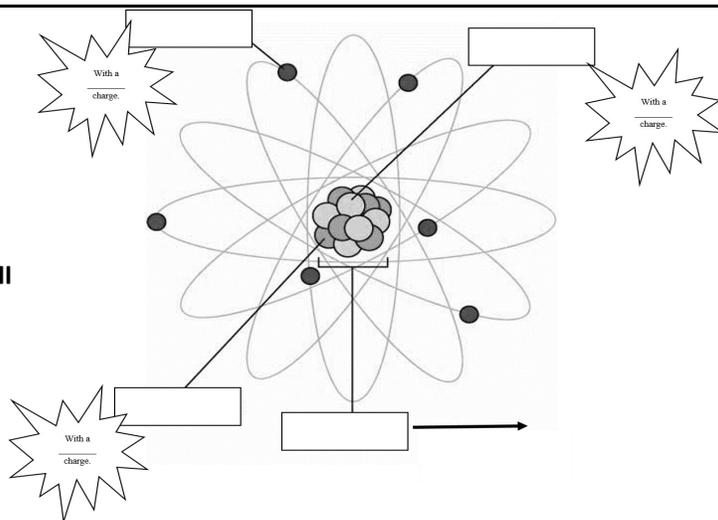
Nature of Matter: The Atom



The center of the atom is called the **Nucleus**

- The nucleus holds two types of particles in it: **neutrons** and **protons**.
- Since the **neutron** has no electric charge, and the **proton** has a +1 charge, the **nucleus** has an overall +1 charge.
- Most of the mass of an atom is located here in the **nucleus**.

HOW CAN WE TELL ONE ATOM



Symbol

A one- or two-letter abbreviation derived from the element's English or Latin name.

Name

Element's common name.

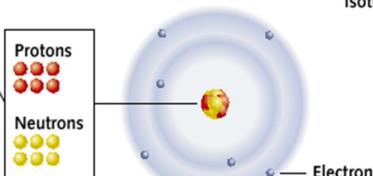
Mass Number

The sum of the numbers of protons and neutrons in a specific isotope.

6	Atomic Number
C	Carbon
12.011	Atomic Mass

Atomic Number
Equal to the number of protons in the nucleus, as well as the number of electrons in the electron cloud.

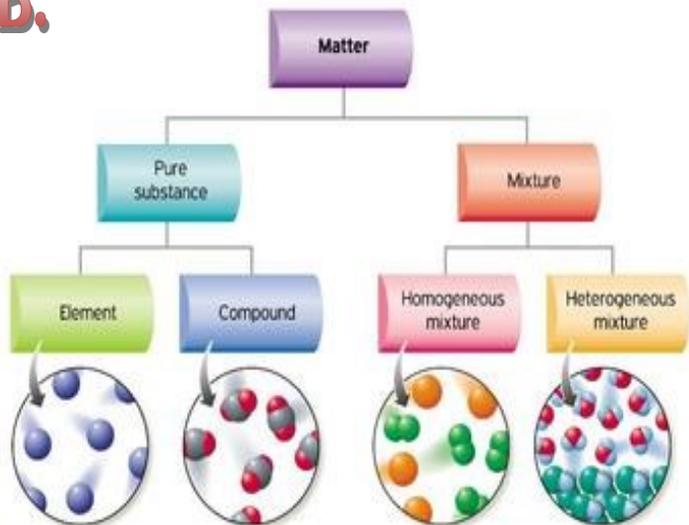
Atomic Mass
Weighted average of the masses of all the element's isotopes. Rounding the atomic mass to the nearest whole number yields the mass number of the most common isotope.



Carbon Atom

Type of Matter	Definition	Sample Drawing
ELEMENT	A pure substance made up of only one kind of atom that cannot be broken down into simpler substances.	
ATOM	The smallest particle of an element that still keeps the properties of that element	
MOLECULE	The smallest particle of a substance that has all the properties of that substance; made of 2 or more atoms that are chemically bonded	
COMPOUND	A substance made up of 2 or more different elements whose atoms are chemically bonded.	

B.

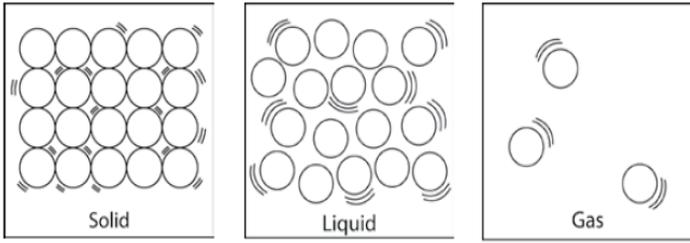


Pure Substance

Mixtures

ELEMENTS	COMPOUNDS	HETEROGENOUS MIXTURES	HOMOGENOUS MIXTURES
Elements are the simplest pure substances. Examples: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> H₂O and CO₂ 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 are 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

C. When energy interacts with matter it can cause a phase change.

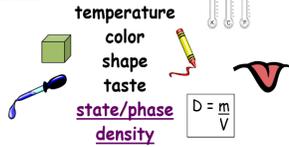


- Attractions strong enough to keep atoms in orderly arrangement
- Vibrate in fixed positions
- Definite volume and shape
- Attractions keep particles together but they can slide past each other
- Random arrangement
- Definite volume, not definite shape
- Attractions too weak to keep particles together
- Particles move independently
- No definite volume or shape

D. Physical Properties of Matter

any property of matter that can be observed or measured without changing the identity of the matter

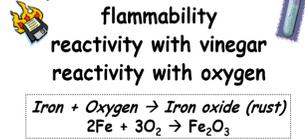
Examples



Chemical Properties of Matter

any property of matter that describes a substance based on its ability to change into a new substance

Examples



E. Physical Change

- a change in shape, size, color, or state
- a change without a change in chemical composition
- a change that is reversible
- *The PHASE CHANGE CHART
- **Examples**

tearing paper
cutting your hair
change in state

Chemical Change

- a change in which a substance becomes another substance having different properties
- a change that is not reversible using ordinary physical means
- Changes that usually cause heat, sound, light, odor, fizzing/foaming, color changes
- You usually need more than one of the above characteristics to be considered a chemical change!

Examples

combining sulfuric acid and sugar
burning a piece of wood
sour milk



PHYSICAL CHANGE OF WATER INTO ICE



CHEMICAL CHANGE OF HYDROGEN PEROXIDE INTO WATER



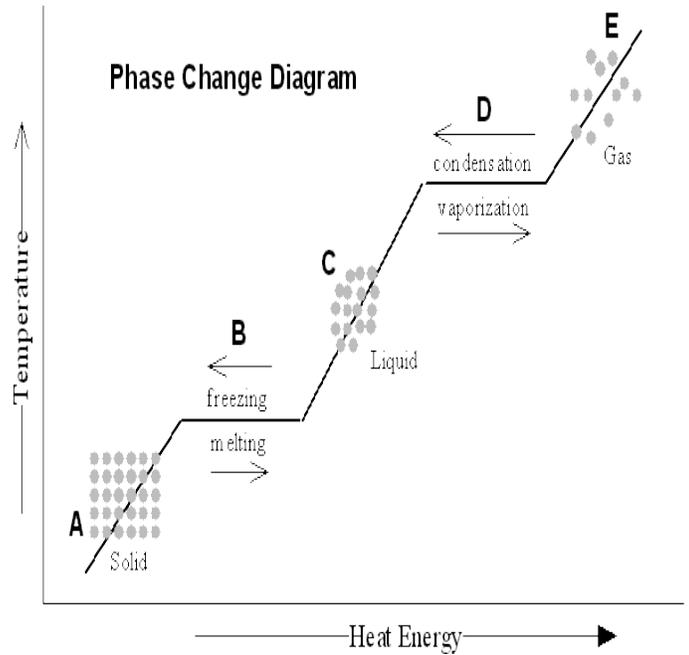
1. Soured milk smells badly because bacteria have formed new substances in the milk. This is an example of _____.
 a. physical change
 b. chemical change



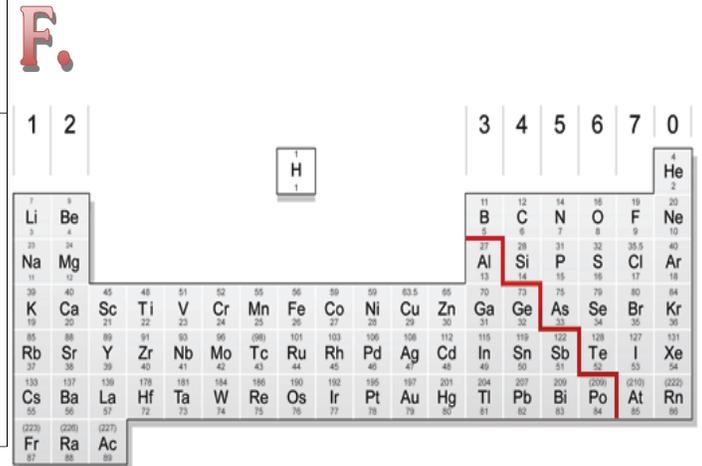
2. Sand flowing in an hour glass is an example of _____.
 a. chemical change
 b. physical change



3. The change of state from a gas to a liquid is an example of _____.
 a. chemical change
 b. physical change



Highlight the state of matter that has the highest energy level.



Reading the Periodic Table

To understand all of the information in the periodic table a scientist has to know the correct way to interpret with how the periodic table is arranged.

The color coded periodic table in your notebook organizes elements within the table according to the characteristics; this is part of the family organization.

* The table sorts elements by atomic number. The number _____ from left to right.

* The lightest elements are in the upper _____ of the table while the heaviest are in the bottom _____ of the table.

G.

