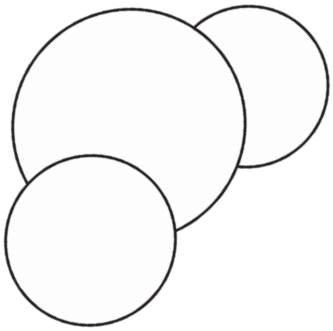
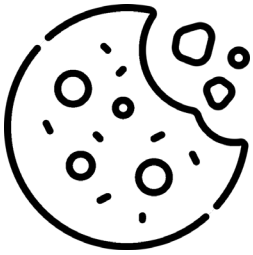
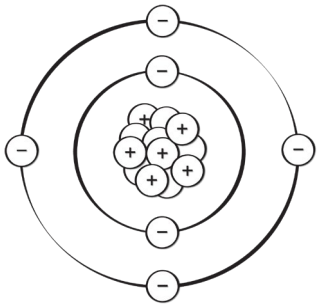
Name _____

Classification of Matter







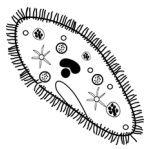
Anticipation Guide

Before completing the lesson, read the statements below, think about your prior knowledge, and put an x in the box for true or false (column 1 and 2). As you go through the lesson, look for evidence to support or refute your ideas. You will revisit this anticipation guide after completing this lesson. For now, only complete columns 1 and 2.

True	False	Statement	True	False	Evidence
		Matter is anything that has mass and takes up space.			
		Atoms are made of cells, organs, and tissues.			
		Electrons are found inside of an atom.			
		Molecules are made of 2 or more atoms through chemical bonds.			
		All elements are made of compounds.			
		There are more than 100 known elements.			
		Mixtures can be separated.			
		A homogeneous mixture is the least mixed of all mixtures.			
		Sugar water is an example of a suspension.			
		Vinegar is the universal solvent.			

Classification of Matter

Matter



- anything that has **mass and takes up space**
- anything we can see, touch, smell, or feel
- makes up everything!

Examples of Matter

- computer
- teacher desk
- eraser
- air
- water
- bicycle

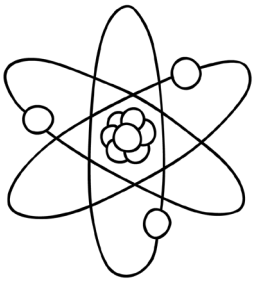
☆ List at least 3 more examples of matter.

☆ Give an example of something that is not matter.

Classification of Matter

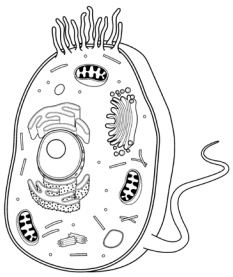
Atom

smallest unit of matter

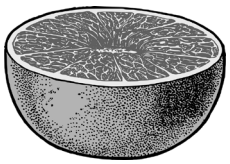


- basic block of all matter
- atoms come together to **make up matter**
- made of protons, neutrons, and electrons

How Small Are Atoms?



- A typical human cell has around **1 trillion atoms.**
- It would take you about **500 years** to count the number of atoms in a grain of salt.
- There are as many atoms in a grapefruit as there would be blueberries **inside of** the Earth!



☆ List the three smaller particles that make up an atom.

Protons

positively charged particles

- inside the nucleus of an atom
- can help identify the atom
- the **atomic number** on periodic table
- part of the atomic mass
- # protons = # electrons in an atom

Classification of Matter

☆ Circle the correct answer.

The number of protons is part of an element's atomic mass.

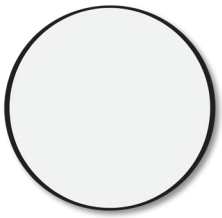
True

False

Neutrons

neutrally charged particles

- inside of the nucleus of an atom
- part of the atomic mass



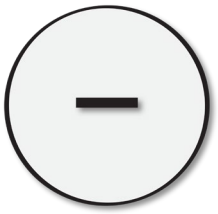
☆ Neutrons are located:
(bubble in answer)

- ◯ inside the nucleus of an atom
- ◯ outside the nucleus of an atom
- ◯ inside of a proton
- ◯ inside of an electron

Electrons

negatively charged particles

- found on the outside of the atom
- almost no mass
- # protons = # electrons in an atom
- help in chemical bonds



Classification of Matter

☆ Circle all that apply.

Which of the following applies to electrons?

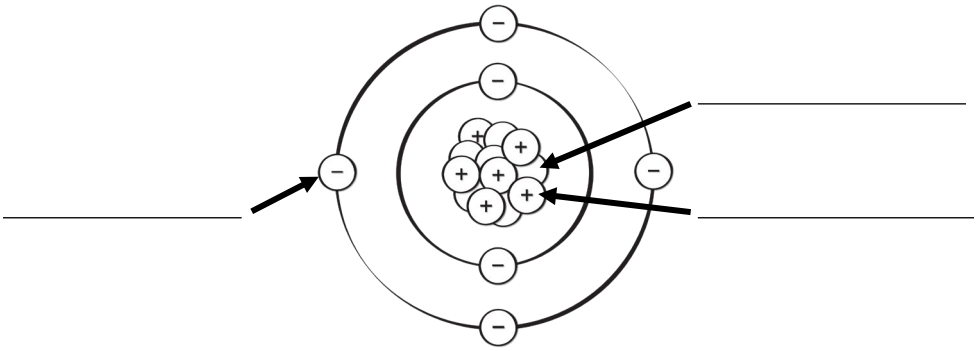
found inside the nucleus of the atom

almost no mass

helps in chemical bonds

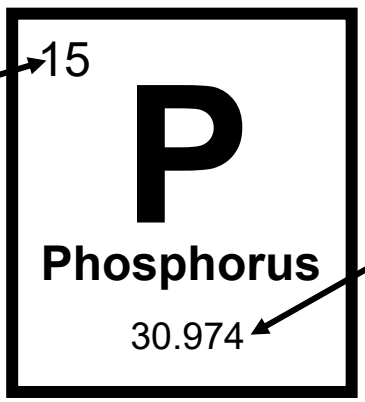
neutrally charged

☆ Label the following with the correct term on the atom model.



Atomic Number and Atomic Mass

Atomic Number
number of protons in the nucleus; determines position on periodic table

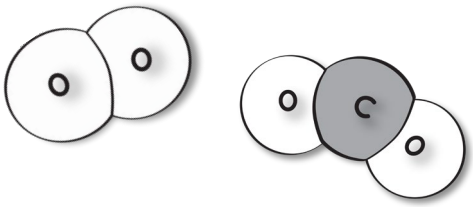


Atomic Mass
mass of atom; protons + neutrons

Classification of Matter

Molecule

- made of **2 or more atoms** through chemical bonds
- can be simple or complex



☆ Circle the correct answer.

A molecule can be made up of just one atom.

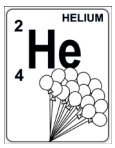
True

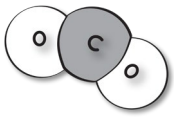
False

Elements, Compounds, Mixtures

All matter can be <u>classified</u> as:

- elements
- compounds
- mixtures



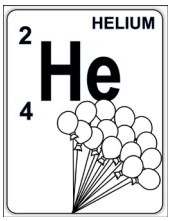


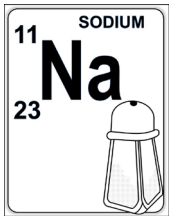
☆ Explain why scientists would not classify matter as things such as phases or physical characteristics (like color).

Classification of Matter

Element

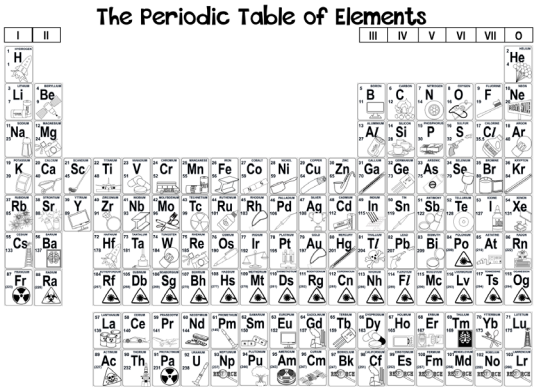
- pure substance made from **only one type of atom**
- all elements are made of atoms
- cannot be broken into anything else





Elements:

- are sorted into three categories: **metals, nonmetals, metalloids**
- include more than 100 known elements (periodic table of elements)
- can be combined to make millions of compounds



☆ **Circle all that apply.**

Which of the following applies to elements?

made of only one type of atom

can be broken into different substances

categorized into 3 groups

pure substance

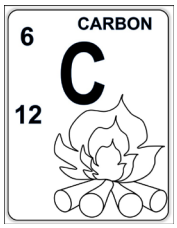
Classification of Matter

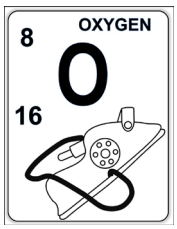
Element Symbols

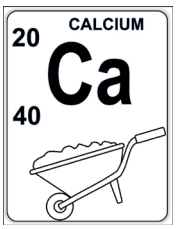
- Symbols are used for elements **(1-2 letters).**
- If the first letter has already been used, 2 letters are used.

Common Elements

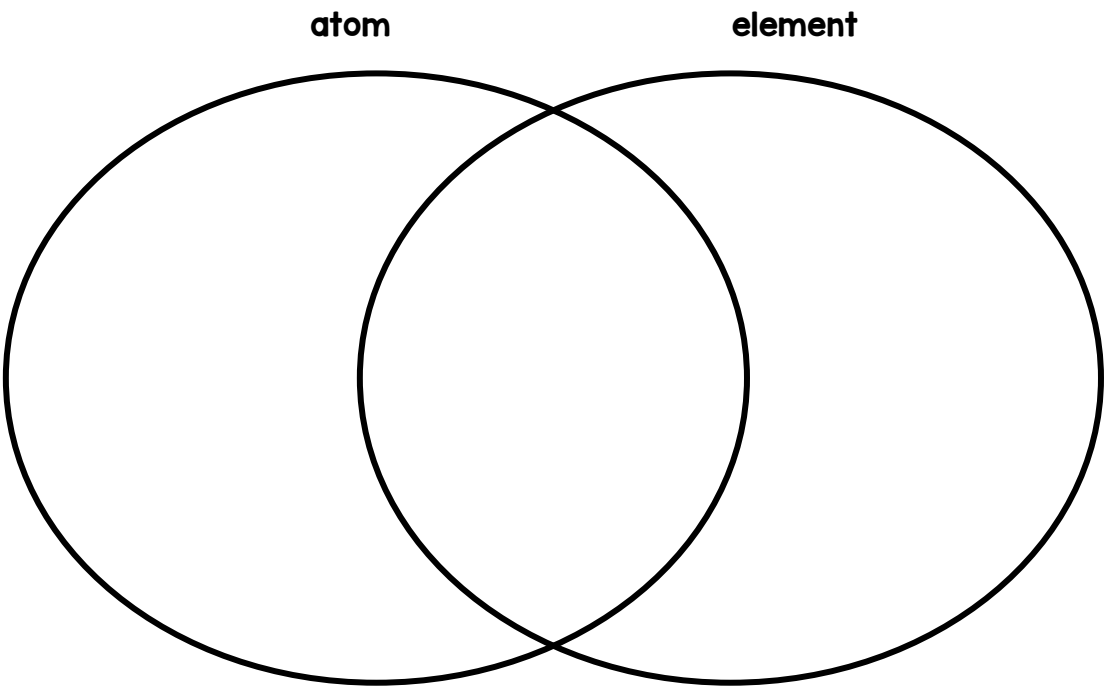
- Aluminum - Al
- Oxygen - O
- Nitrogen - N
- Gold - Au
- Carbon - C
- Calcium - Ca







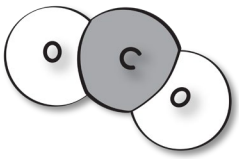
☆ In the diagram below, compare atoms and elements.



Classification of Matter

Compound

- pure substances
- made of two or more elements - **chemically combined**



- common compound: **water**
- can be broken into hydrogen and oxygen

Mixtures

- two or more elements that are **physically combined**, not chemically
- can be separated
- 2 categories: **heterogeneous and homogeneous**

Differences Between Compound and Mixtures

- Mixtures
  - mixed, **no reaction**
  - can be separated by physical methods
  - properties of constituents remain **same**

- Compounds
  - substance must **chemically react** to form
  - cannot be easily be separated
  - properties of the new compound are **different** than the elements in it

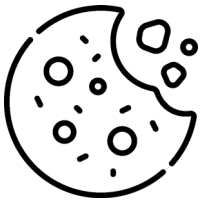
Classification of Matter

Heterogeneous Mixture

made of substances that are physically separate

Examples:

- salad
- oil and water
- sand and pebbles
- ice cubes in soda
- chocolate chip cookies



least mixed of all mixtures

☆ Circle the correct answer.

Sand and pebbles are considered a heterogeneous mixture.

True

False

Suspensions: heterogeneous mixture with **large particles**

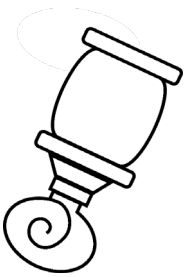
- If you leave it, particles will separate by settling.
- It can be easily separated by filtration or settling.

Examples:
- Italian dressing
- amoxicillin
- muddy water
- milk of magnesia

Colloid: heterogeneous mixture of one substance that is mixed evenly inside another substance

- special type of mixture
- mix with **medium-sized particles**

Examples:
- shaving cream: gas inside a liquid
- gels: liquid inside a solid
- pumice: gas inside a solid



Classification of Matter

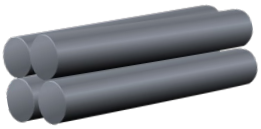
Homogeneous Mixture

a mixture that has the same composition throughout

- looks the same throughout
- well-mixed
- can be separated

Examples of homogeneous mixtures:

- ink
- chocolate
- salt water
- air
- coffee
- steel



Solution: homogeneous mixture where one substance dissolves in another
(mix with tiny particles)

- **solute**: substance that is dissolved

- **solvent**: substance that does the dissolving → example: salt water

Classification of Matter

A solution is:
(bubble in answer)

- ◯ made of only one type of atom
- ◯ a mixture where one substance dissolves in another
- ◯ found inside the nucleus of the atom
- ◯ positively charged particles

Examples of Solutions:

- air
  - solute: oxygen (gas)
  - solvent: nitrogen (gas)
- ocean water
  - solute: salt and other solids (solid)
  - solvent: water (liquid)
- sterling silver
  - solute: copper (solid)
  - solvent: silver (solid)

Universal Solvent

Water!

Many solutions include water as the solvent!

- body fluids
- ocean
- sweet tea
- vinegar
- and so much more!

Classification of Matter

In the chart below, write the term in the correct location to label the solute and solvent of each solution. The first one is done for you.

Solution	Type of Solution	Solute	Solvent
carbonated water	gas in liquid	carbon dioxide	water
sugar water	solid in liquid		
vinegar	liquid in liquid		
sweet tea	solid in liquid		
air	gas in gas		
chocolate milk	liquid in liquid		
coffee	solid in liquid		

Draw an arrow to match each mixture type with the appropriate characteristic.

solution	heterogeneous mix of one substance that is mixed evenly inside another substance
colloid	heterogeneous mixture with large particles
suspension	homogeneous mixture where one substance dissolves in another (mix with tiny particles)

Classification of Matter

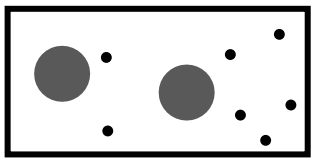
Write the terms below in the correct category.

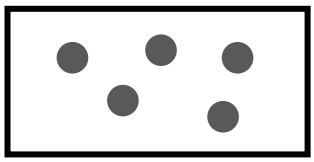
- Italian Dressing
- Sugar Water
- Cereal in Milk
- Coffee
- Steel
- Shaving Cream
- Ink
- Cookie Dough

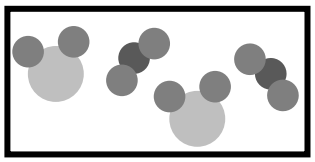
Homogeneous Mixture	Heterogeneous Mixture

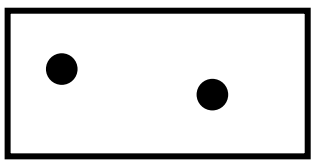
Label the following pictures below with element, compound, or mixture.

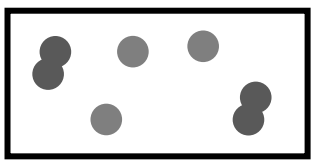
- Each circle represents an element.
- Different colors represent a different element.
- two elements touching = chemically bonded

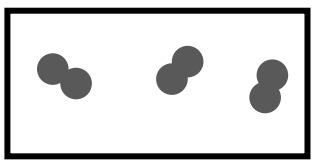


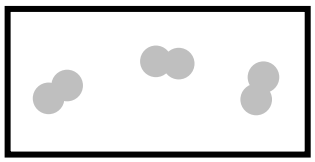


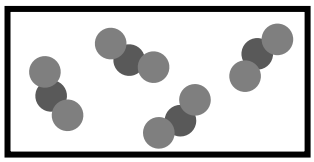


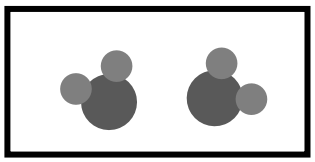








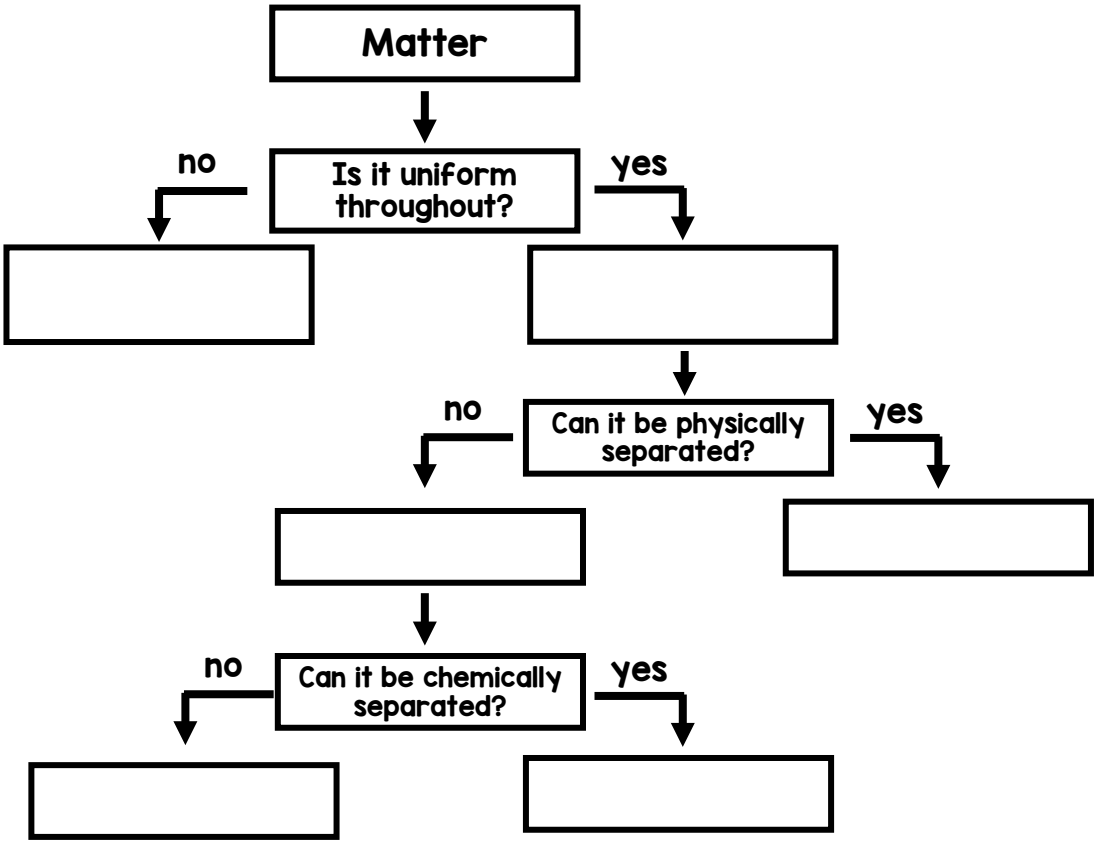




Classification of Matter

Using the terms below, complete the matter flow chart.

- element
- mixture
- homogeneous mixture
- pure substance
- heterogeneous mixture
- compound



DON'T FORGET TO REVISIT THE ANTICIPATION GUIDE!

SUMMARY