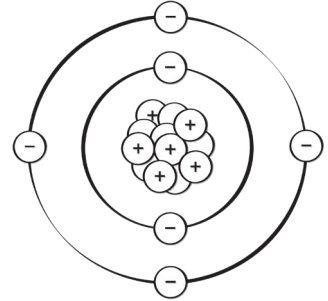
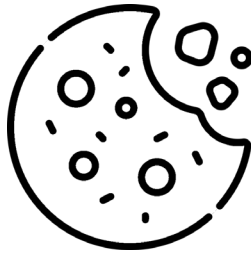
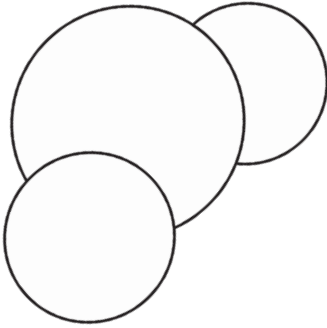


# Classification of Matter



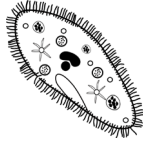
## Anticipation Guide

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



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

### Examples of Matter

- computer
- teacher desk
- .....
- air
- water
- .....



List at least 3 more examples of matter.



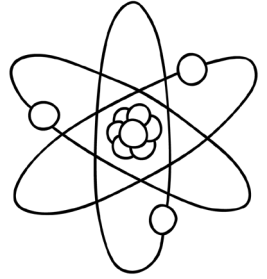
Give an example of something that is not matter.

# Classification of Matter

## Atom

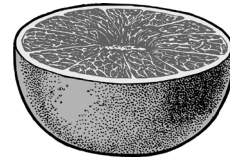
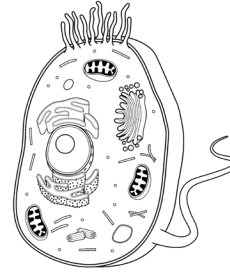
**smallest unit of matter**

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



**How Small Are Atoms?**

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



List the three smaller particles that make up an atom.

## Protons

..... **charged particles**

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



# Classification of Matter



Circle the correct answer.

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

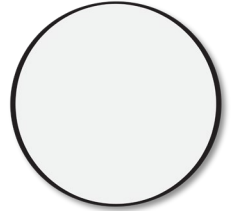
True

False

Neutrons

..... charged particles

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



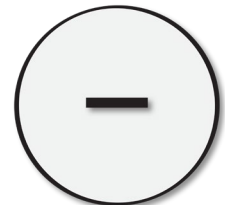
Neutrons are located:  
(bubble in answer)

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

Electrons

..... charged particles

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



# Classification of Matter



Circle all that apply.

Which of the following applies to electrons?

found inside the nucleus of the atom

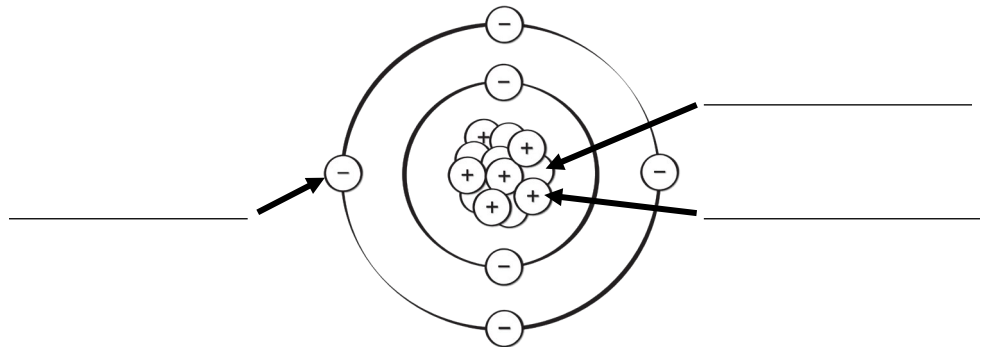
almost no mass

helps in chemical bonds

neutrally charged



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



Atomic  
Number and  
Atomic Mass

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

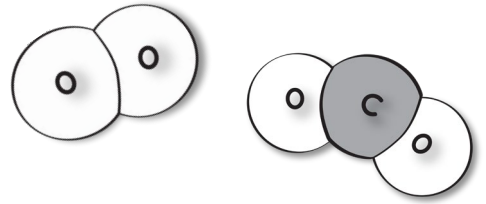
15
<b>P</b>
<b>Phosphorus</b>
30.974

Atomic -----  
mass of atom;  
protons +  
neutrons

# Classification of Matter

## Molecule

- made of \_\_\_\_\_ or more atoms through chemical bonds
- can be simple or \_\_\_\_\_



Circle the correct answer.

A molecule can be made up of just one atom.

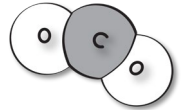
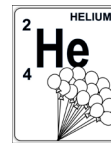
True

False

## Elements, Compounds, Mixtures

All matter can be classified as:

- \_\_\_\_\_
- compounds
- mixtures

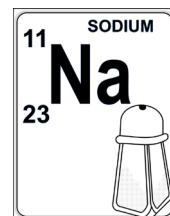
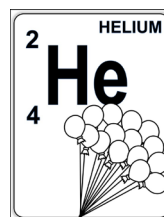


Explain why scientists would not classify matter as things such as phases or physical characteristics (like color).

# Classification of Matter

## Element

- \_\_\_\_\_ substance made from only one type of atom
- all elements are made of atoms
- cannot be \_\_\_\_\_ into anything else



### Elements:

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

The Periodic Table of Elements



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

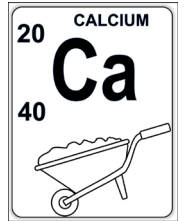
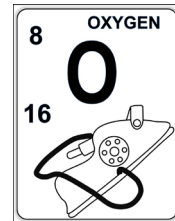
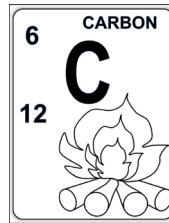
# Classification of Matter

## Element Symbols

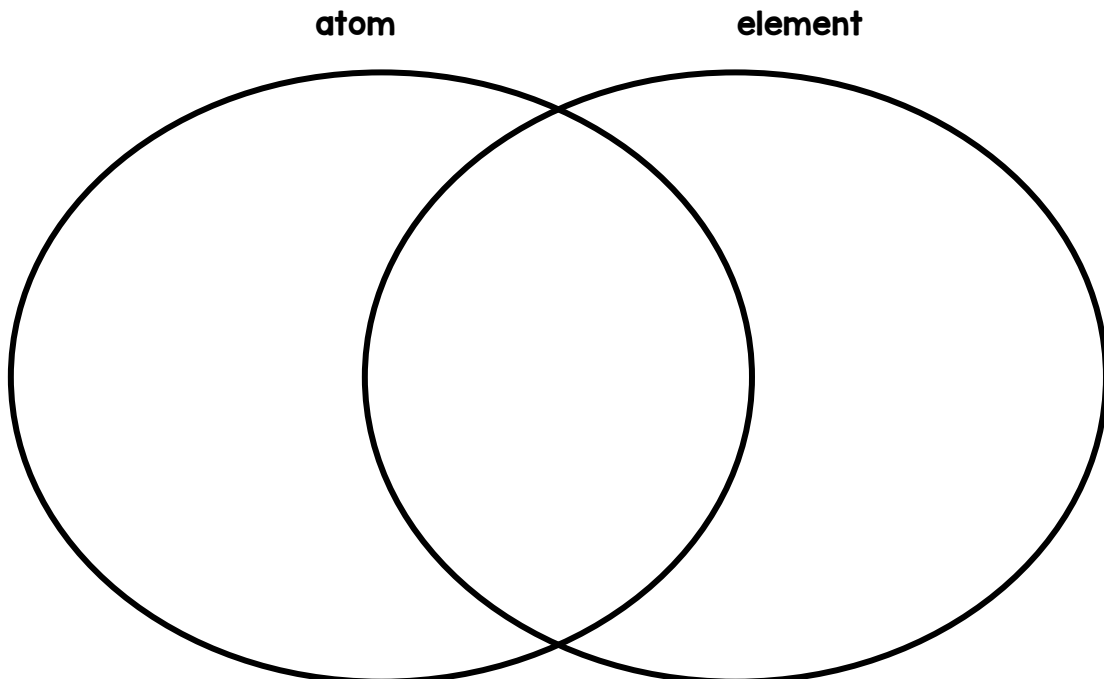
- ..... are used for elements (1-2 letters).
- If the first letter has already been used, 2 letters are used.

## Common Elements

- Aluminum - .....
- Oxygen - O
- Nitrogen - N
- Gold - Au
- Carbon - .....
- Calcium - Ca



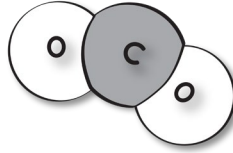
In the diagram below, compare atoms and elements.



# Classification of Matter

## Compound

- pure .....
- made of two or more elements - chemically .....



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

## Mixtures

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



## Differences Between ..... and Mixtures

- **Mixtures**
  - mixed, no .....
  - can be separated by physical methods
  - properties of constituents remain **same**
- **Compounds**
  - substance must **chemically** ..... to form
  - cannot be easily be separated
  - properties of the new compound are ..... than the elements in it

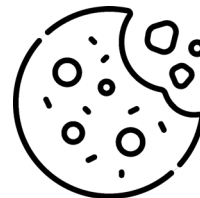
# Classification of Matter

## Heterogeneous Mixture

made of substances that are ..... separate

Examples:

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



least mixed of all .....



Circle the correct answer.

Sand and pebbles are considered a heterogeneous mixture.

True

False

Suspensions: heterogeneous mixture with ..... particles

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

Examples:

- Italian .....
- amoxicillin
- muddy water
- milk of magnesia

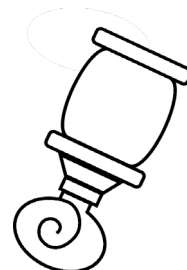


Colloid: heterogeneous mixture of ..... substance that is mixed evenly inside another substance

- special type of .....
- mix with medium-sized particles

Examples:

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



# Classification of Matter

## Homogeneous Mixture

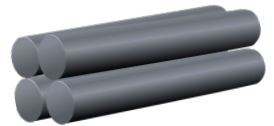
a mixture that has the ..... composition throughout

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



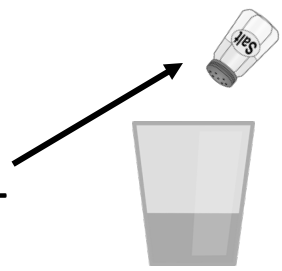
Examples of homogeneous mixtures:

- ink
- chocolate
- salt water
- air
- .....
- steel



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

- **solute:** substance that is .....
- **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:** ..... (gas)
  - **solvent:** nitrogen (gas)
- ocean water
  - **solute:** salt and ..... solids (solid)
  - **solvent:** water (liquid)
- sterling silver
  - **solute:** copper (.....)
  - **solvent:** silver (solid)

Universal Solvent

.....!

Many solutions include water as the solvent!

- body fluids
- ocean
- sweet .....
- 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.

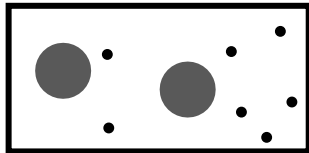
- Italian Dressing
- Sugar Water
- Cereal in Milk
- Coffee
- Steel
- Shaving Cream
- Ink
- Cookie Dough

	Homogeneous Mixture	Heterogeneous Mixture

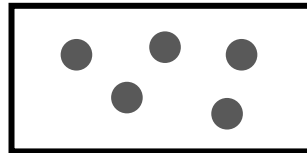


Label the following pictures below with element, compound, or mixture.

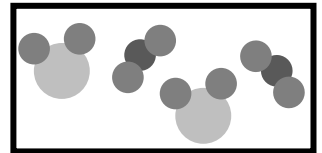
- Each circle represents an element.
- Different colors represent a different element.
- two elements touching = chemically bonded



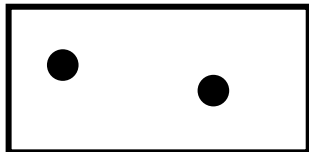
\_\_\_\_\_



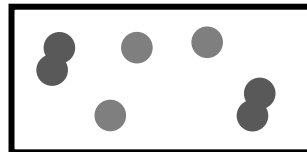
\_\_\_\_\_



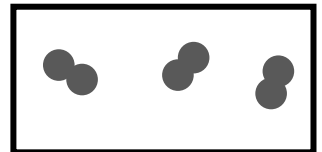
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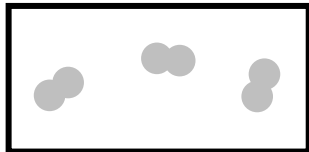
\_\_\_\_\_



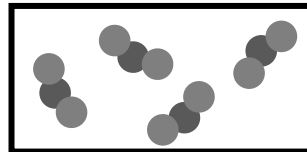
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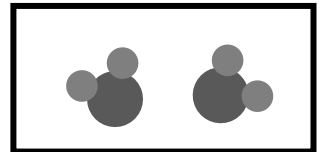
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\_\_\_\_\_



\_\_\_\_\_



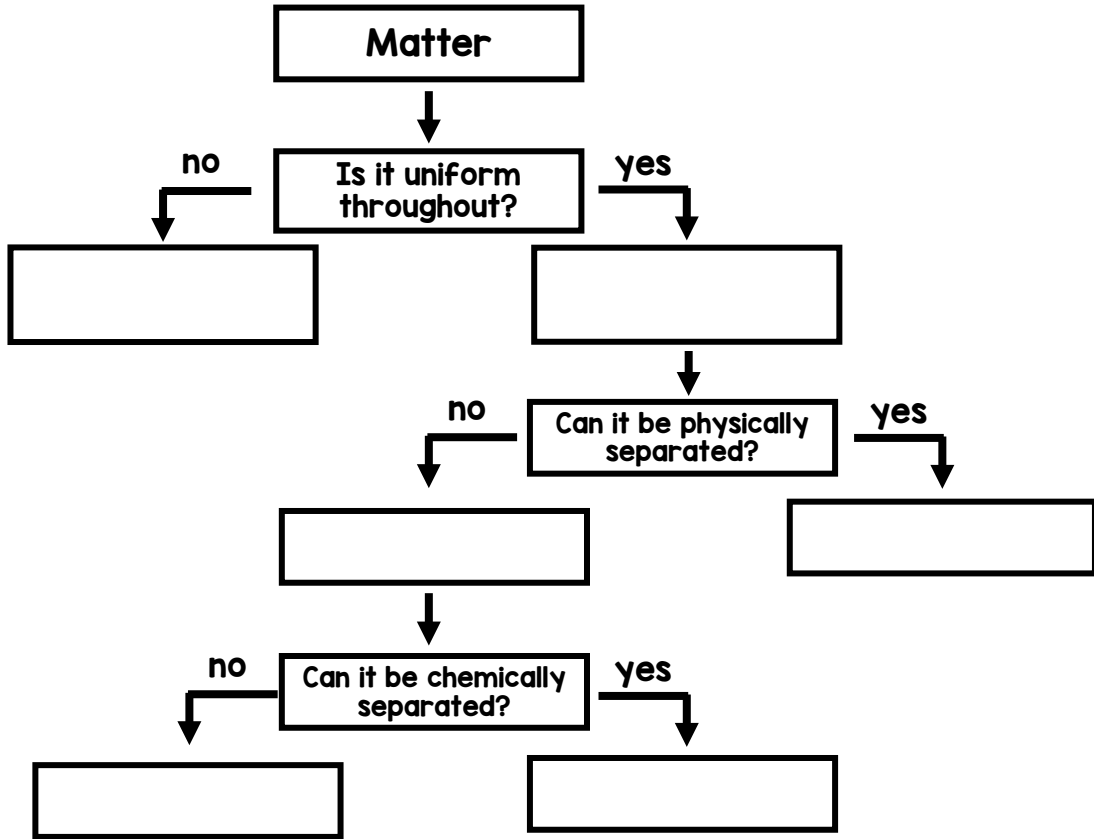
\_\_\_\_\_

# 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