

FPS - States of Matter and Gas Laws

Name

Key

Period

I can...

Explain the states of matter.
Explain Boyle's and Charles's Law.

Bellwork Questions - Complete quietly on your own first!

1. List the 3 states of matter.

*Solid
liquid
gas*

2. What is a phase change? Give an example. Is it a physical or chemical change?

*change of state of matter;
ex: melting
Physical !!*

Notes

3. A solid is matter that has definite shape + volume.
Example: Put a sneaker in a box. It stays the same.

4. A liquid takes the shape of any container. It has definite volume and ^{indefinite} shape. Example: pour juice into the same box. What happens? takes on the shape of box

5. Gas is matter that has indefinite shape + volume. Gases take the shape of whatever container they are in. Example: The air all around us.

6. A phase change is a change in state (solid, liquid, or gas)

Melting - solid to liquid
Freezing - liquid to solid
Evaporation - liquid to gas
Condensation - gas to liquid
Sublimation - solid to gas

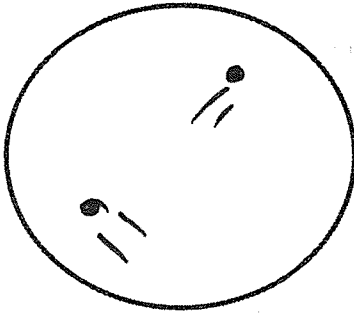
7. A physical change is a change in how matter looks but not the kind of matter.

8. In a chemical change, new substance is formed.

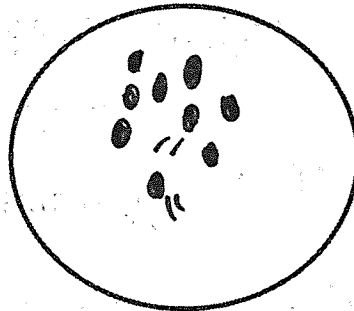


9. The particles of a gas move rapidly and there are much larger spaces between the particles in a liquid or a solid.

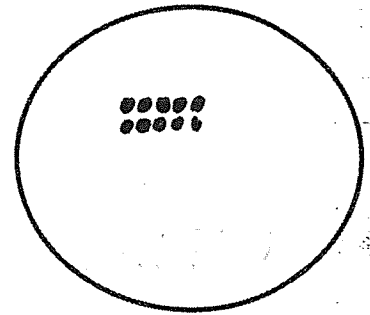
Sketch this.



10. The particles of a liquid move past one another easily. They are close together, but not in a neat, even arrangement as the particles in a solid are.



11. The particles of a solid are arranged in a tight, regular pattern and move very little.



12. Temperature is the measure of how fast the particles are moving.

13. Pressure is defined as the force the gas exerts on a given area of the container.

14. Gas Laws - Boyle's Laws

Charles Boyle determined that for the same amount of a gas without changing the temperature, if we increase the volume, the pressure goes down. (Inverse relationship between Volume/Pressure)

↑ volume ↓ pressure

15. Jacques Charles found that as the temperature increases, the volume also increases. If the temperature decreases that the volume also decreases. (direct relationship between Temp/Volume)

↑ temp ↑ volume

Complete the following questions, then turn in your notes and complete the next assignment.

1. Which state(s) of matter has indefinite volume and shape?

gas

2. Which state(s) of matter take the shape of their container?

liquid + gas

3. Which state(s) of matter have definite volume?

Solid + liquid

4. How are the particles arranged in a solid?

tight neat pattern

5. How do the particles behave in a liquid?

MOVE past each other

6. How do the particles behave in a gas?

large spaces, move freely

7. The weather gets colder and the temperature goes down. The volume of gas in your tires also goes down. Which law does this show?

Charles's Law

8. According to Boyle's Law, what will happen to the pressure of a hot air balloon if we increase the volume?

pressure ↓

9. According to Boyle's Law, what will happen to the pressure of a piston if we decrease the volume?

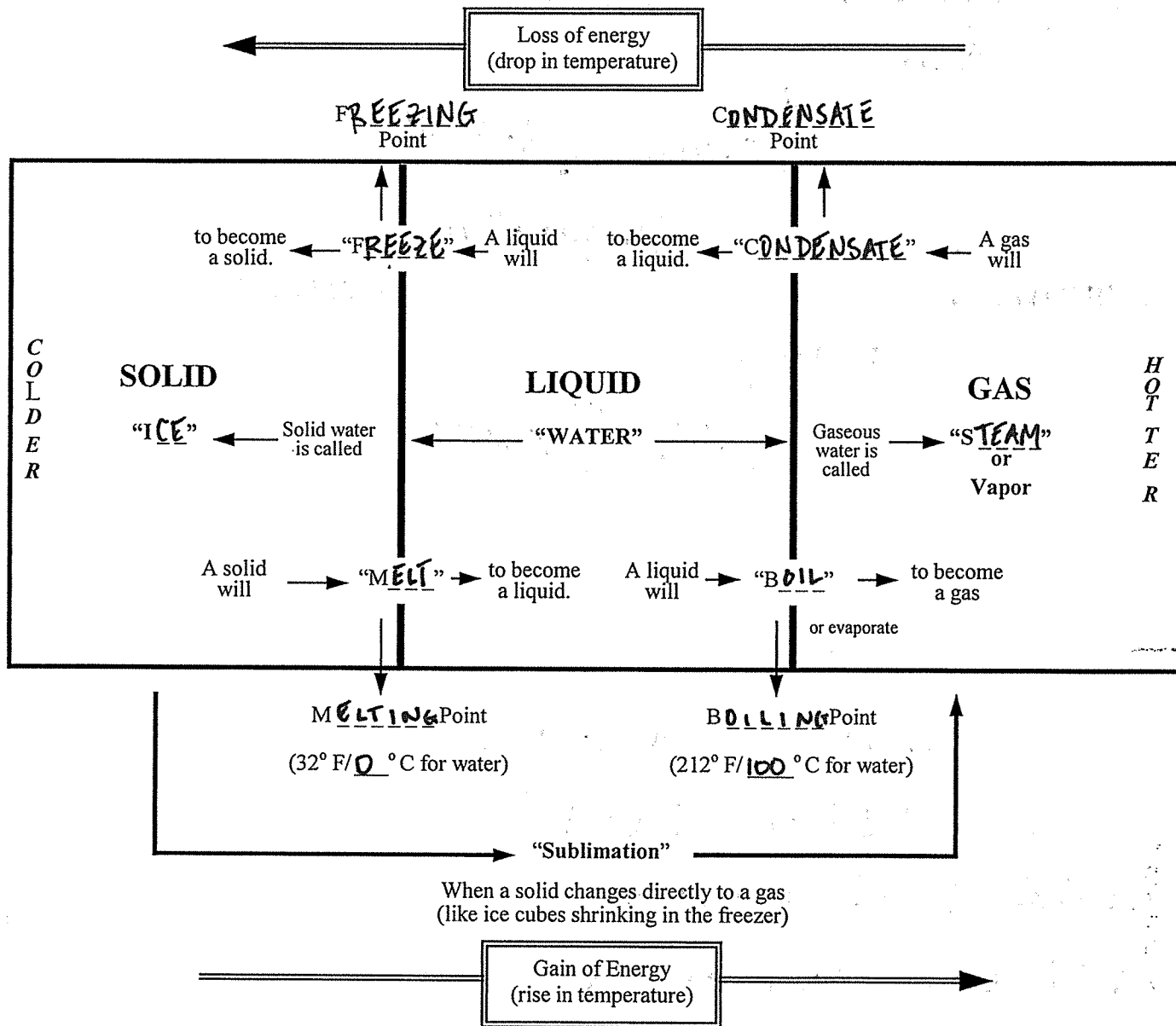
pressure ↑

10. According to Charles's Law, what will happen to the volume of a balloon if we put it in the freezer?

↓ volume (because ↓ temp)

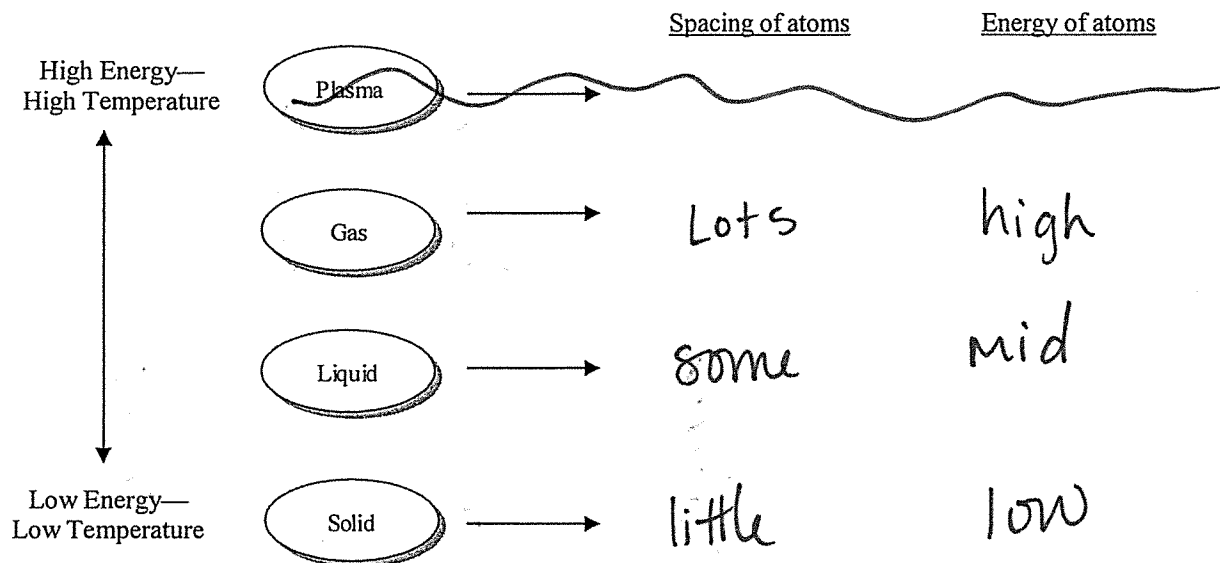
States of Matter

The following chart uses water to teach you about the three most common states of matter.



	Retains Shape or takes the shape of it's Container?	Does it retain its volume?	Is it Compressible?	Speed its of Atoms	Distance Between Atoms
Solid	Retains	Retains	not much	slow (vibrate)	little
Liquid	takes	Retains	some	Moves easily	some
Gas	takes	indefinite	Yes	fastest	lots

States of Matter and Their Energy



Properties of Solids

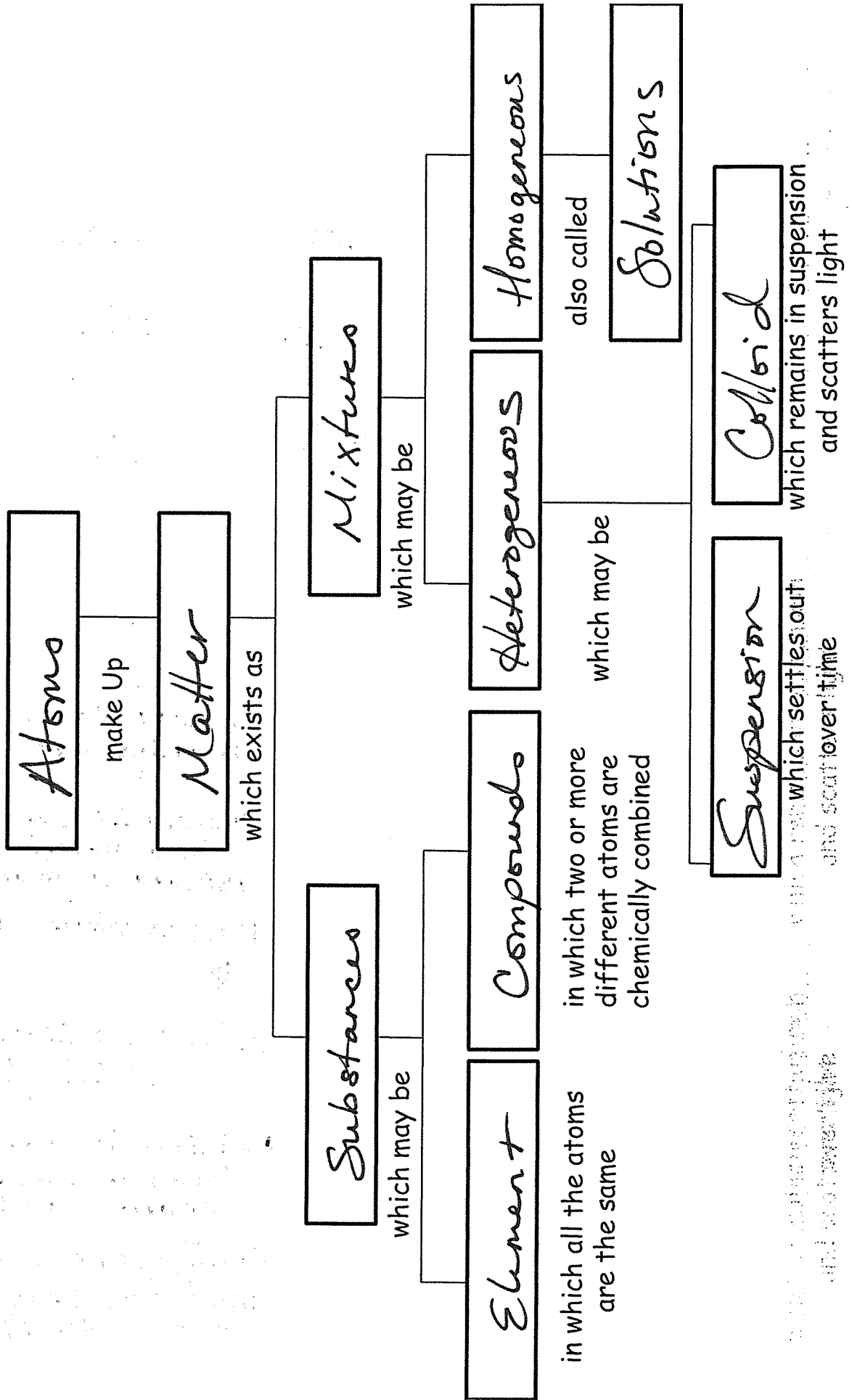
VOCAB.	English Usage and Words that are Close	Science Definition
Brittleness:		shatters when manipulated
Hardness:		Comparative hardness of a material — resistance to breakage
Density:		mass to volume ratio; ✱
Viscosity:		tendency of a liquid to resist flow
Conductivity:		ability to allow heat + electric charge to flow
Malleability:		ability to be bent, molded + shaped w/o shattering

Name _____

Date _____

Classification of Matter

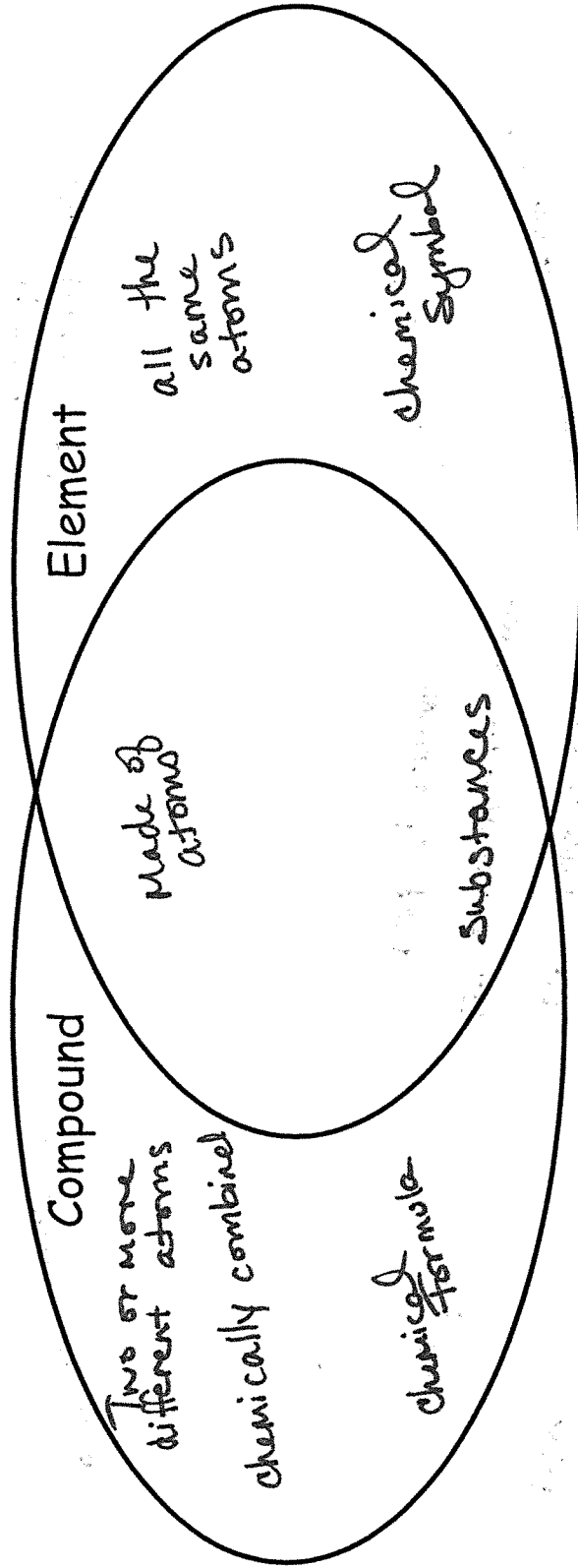
Directions: Complete the concept map using the following terms: Colloid, Atoms, Homogeneous, Element, Mixtures, Matter, Compounds, Suspension, Substances, Solutions, Heterogeneous, ✓
✓
✓

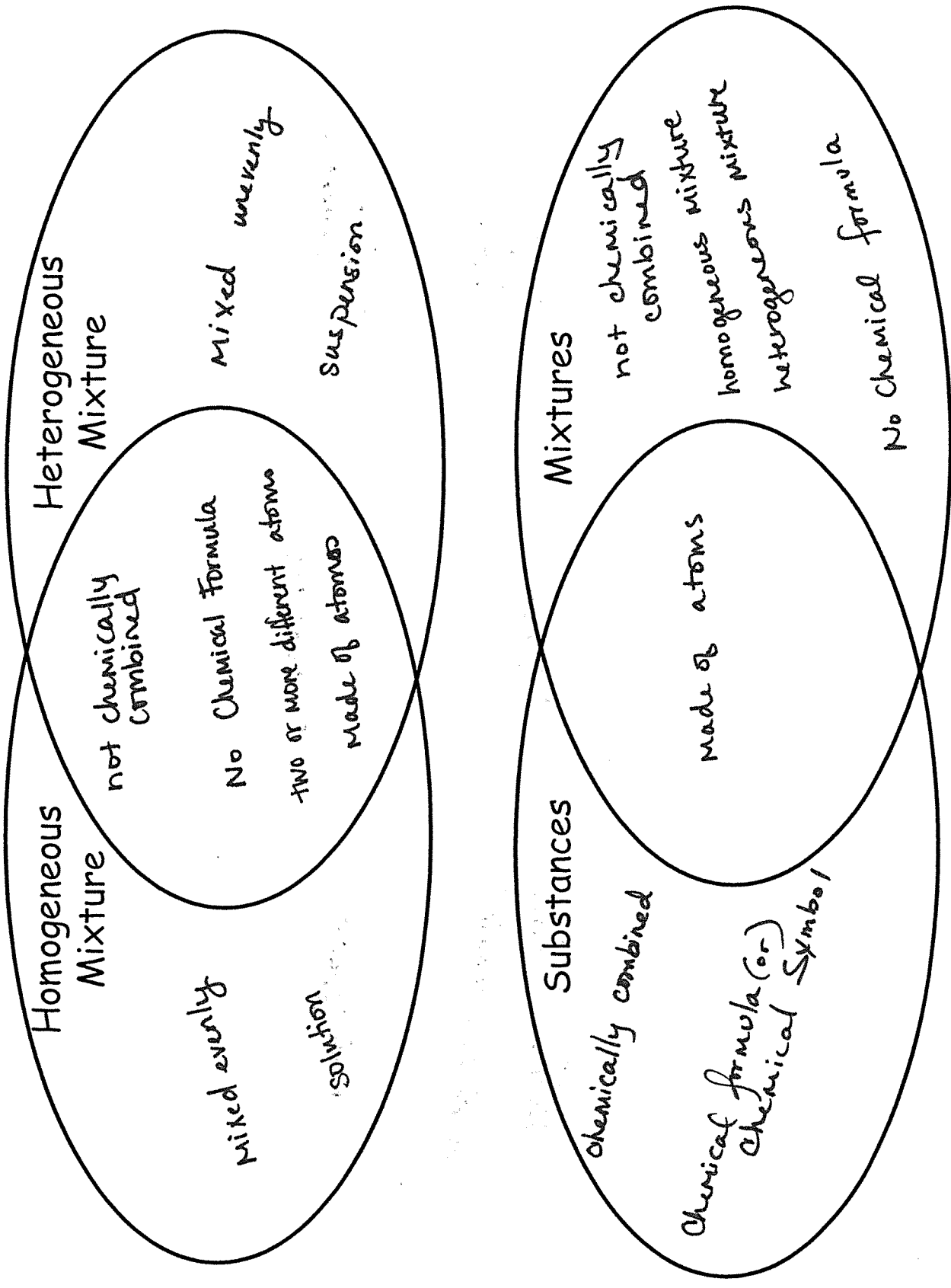


Classification of Matter Venn Diagram

Directions: Complete the Venn Diagrams by placing the following terms in the parts of the ovals that overlap when a characteristic is shared and in the separate parts of the oval is unique to that category. Terms may be used in all three sets, two sets, or just one set.

Terms: Chemically combined; Not chemically combined; Colloid; Made of atoms; ; Mixed Evenly; Two or more different atoms; Mixed unevenly ; Solution; Suspension; Tyndall Effect; Chemical Formula; Chemical Symbol; No Chemical Formula, Substances, Homogeneous Mixture; Heterogeneous Mixture; All the same atoms.





Directions: Place the following items in the category to which they belong:

Iron (Fe), Distilled Water (H₂O), Coffee, Carbon Dioxide (CO₂), Bronze, Calcium (Ca), Fog, Minerals, Rocks, Salt, Saltwater, Pizza, Jell-O, Milk, Muddy Water, Sand (SiO₂), Oil and Vinegar, Chocolate Milk, Blood, Hydrogen (H), Brass, Air, Soil, Sugar (C₁₂H₂₂O₁₁), Salt (NaCl), Steel, Ozone (O₃), Copper (Cu), Kool-Aid.

Elements

1. Fe
2. Ca
3. H
4. Cu

Substances

1. H₂O
2. CO₂
3. C₁₂H₂₂O₁₁
4. NaCl
5. O₃
6. SiO₂
7. Minerals

Compounds

Homogenous Mixtures (Solutions)

1. Coffee
2. Bronze
3. Saltwater
4. ~~Water~~ Kool-Aid
5. Air
6. Bran
7. Steel

Mixtures

Heterogeneous Mixtures

1. Salad
2. Pizza
3. Rocks
4. Soil

Suspension

1. Muddy Water
2. Oil + Vinegar
3. Blood

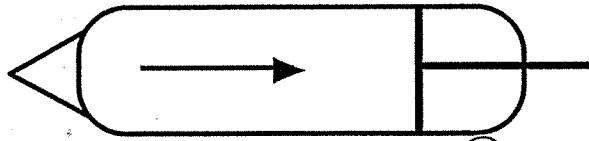
Colloid

1. Fog
2. Milk
3. Chocolate Milk
4. Jell-O

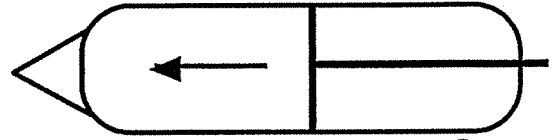
Name _____

Boyle's Law

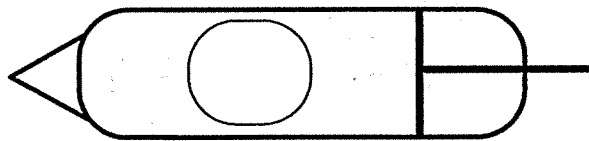
states that as the volume of a gas changes, so does its pressure.



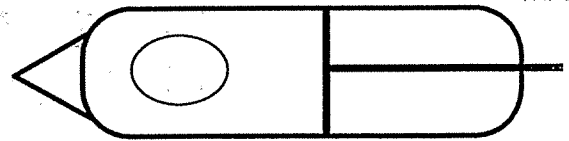
If the volume of a gas \uparrow ,
then the pressure \downarrow .



If the volume of a gas \downarrow ,
then the pressure \uparrow .



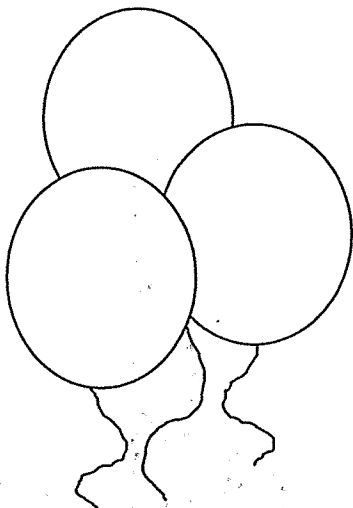
Air inside the syringe is under
 \downarrow pressure, causing the
marshmallow to \uparrow .



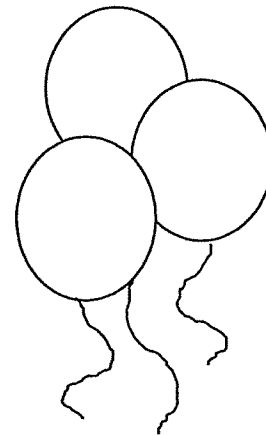
Air inside the syringe is under
 \uparrow pressure, causing the
marshmallow to \downarrow .

Charles' Law

states that as the temperature of a gas changes, so does its volume.



If the temperature of a gas \uparrow ,
then the volume \uparrow .



If the temperature of a gas \downarrow ,
then the volume \downarrow .