

CONCEPT: MAIN GROUP ELEMENTS: DENSITY

Phases

● **Recall:** At standard room temperature (___ °C) and pressure (___ atm), the elements can exist under 3 states of matter.

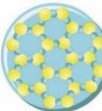
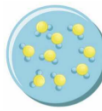
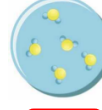
□ In terms of densities: _____ > _____ > _____.

□ **Diatomic Elements:** Elements that are stable in _____ when found in nature.

MEMORY TOOL

_____ave _____o _____ear _____f _____ce _____old _____eer

□ **Polyatomic Elements:** Elements that are stable in numbers greater than _____.

	1A (1)	2A (2)						8A (18)		
1	Hydrogen							He Helium	 Solid	
2	Li Lithium	Be Beryllium	B Boron	C Carbon	Nitrogen	Oxygen	Fluorine	Ne Neon		
3	Na Sodium	Mg Magnesium	Al Aluminum	Si Silicon	Phosphorus	Sulfur	Chlorine	Ar Argon	 Liquid	
4	K Potassium	Ca Calcium	Transition Metals	Ga Gallium	Ge Germanium	As Arsenic	Selenium	Bromine		Kr Krypton
5	Rb Rubidium	Sr Strontium		In Indium	Sn Tin	Sb Antimony	Tellurium	Iodine	Xe Xenon	 Gas
6	Cs Cesium	Ba Barium		Tl Thallium	Pb Lead	Bi Bismuth	Po Polonium	Astatine	Rn Radon	
7	Fr Francium	Ra Radium		Nh Nihonium	Fl Flerovium	Mc Moscovium	Lv Livermorium	Ts Tennessine	Og Oganesson	

EXAMPLE: Which of the following exists as a diatomic liquid at room temperature?

- a) Bromine b) Tellurium c) Sulfur d) Chlorine e) Iodine

PRACTICE: Which of the following diatomic molecules would be expected to have the greatest density?

- a) Chlorine b) Selenium c) Bromine d) Iodine e) Argon

CONCEPT: MAIN GROUP ELEMENTS: DENSITY

Periodic Trend

- Used when asked to compare elements of the _____ phase or Group.
- **Periodic Trend:** Density _____ going up a group, but across a period there is no uniform trend.

	1A (1)	2A (2)		3A (13)	4A (14)	5A (15)	6A (16)	7A (17)	8A (18)
1	H								He
2	Li	Be		B	C	N	O	F	Ne
3	Na	Mg		Al	Si	P	S	Cl	Ar
4	K	Ca	Transition Metals	Ga	Ge	As	Se	Br	Kr
5	Rb	Sr		In	Sn	Sb	Te	I	Xe
6	Cs	Ba		Tl	Pb	Bi	Po	At	Rn
7	Fr	Ra		Nh	Fl	Mc	Lv	Ts	Og

Density (g/mL) ____

- **Exception:** K & Ca have lower densities than Na & Mg because they have _____ volumes than expected.

EXAMPLE: Without any given values, predict which of the following would possess the greatest density?

- a) Lithium, Li b) Barium, Ba c) Magnesium, Mg d) Beryllium, Be e) Sodium, Na

PRACTICE: List the following elements in order of decreasing density under standard conditions:

- a) Magnesium, Mg b) Bromine, Br c) Calcium, Ca d) Barium, Ba e) Hydrogen, H