



Name \_\_\_\_\_

# Chapter 4/5: Atoms & the Periodic Table

I. Scientists use \_\_\_\_\_ to represent \_\_\_\_\_ since we cannot easily see them.

A. In the \_\_\_\_\_ century, the Greek philosopher \_\_\_\_\_, said everything was made of \_\_\_\_\_ units called atoms. "Not able to divide".

Greek's Model: Picture

Definition: (you write)

B. \_\_\_\_\_ said every element is made up of \_\_\_\_\_ called atoms.

1. was a solid \_\_\_\_\_.
2. Can't be \_\_\_\_\_.
3. Atoms can \_\_\_\_\_ together to form \_\_\_\_\_.

Dalton's Model: Picture

Definition: (you write)

C. The \_\_\_\_\_ model, by Thompson (1897), said there were \_\_\_\_\_ soup with \_\_\_\_\_ particles in it.

Plum Pudding Model: Picture

Definition: (you write)

B. Bohr's model showed \_\_\_\_\_ traveling in fixed \_\_\_\_\_ around the nucleus (like \_\_\_\_\_ around the sun).

1. Electrons are on an \_\_\_\_\_.

Bohr's Model: Picture

Definition: (you write)

C. Rutherford's model showed that \_\_\_\_\_ all the \_\_\_\_\_ of the atoms was concentrated in \_\_\_\_\_ surrounded by \_\_\_\_\_. Electrons were in specific orbit planes

Rutherford's Model: Picture

Definition: (you write)

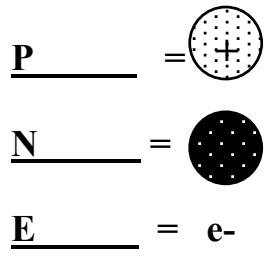
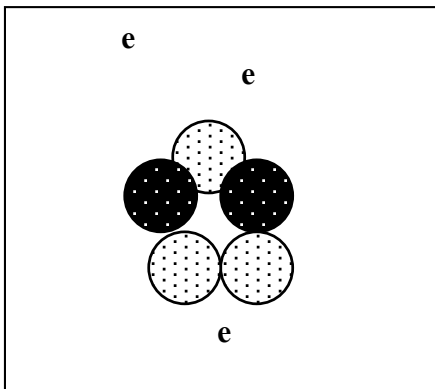
D. Wave Theory shows electrons \_\_\_\_\_ follow fixed \_\_\_\_\_ but tend to be in one area more often.  
 1. electrons cloud is \_\_\_\_\_ times larger than diameter of nucleus.

Wave theory (electron cloud): Picture

Definition: (you write)

II. Atoms – the \_\_\_\_\_ of matter that still has the p \_\_\_\_\_ of the element.

- A. Protons – have an \_\_\_\_\_
- B. Neutrons – \_\_\_\_\_ an electrical charge.
- C. Electrons – have an \_\_\_\_\_
  - 1. Has a very \_\_\_\_\_ mass.
- D. Nucleus – Contains the \_\_\_\_\_ and \_\_\_\_\_
  - 1. Contains most of the m \_\_\_\_\_ of the atom.



Number of P \_\_\_\_\_ = Number of E \_\_\_\_\_.

E. Orbital: place you find the e \_\_\_\_\_.

G. Energy Levels: levels where electrons \_\_\_\_ in the atom.

Energy Level	Number (#) of electrons
1 <sup>st</sup>	
2 <sup>nd</sup>	
3 <sup>rd</sup>	

F: Valence Electrons: any and all electrons in the \_\_\_\_\_ energy level.

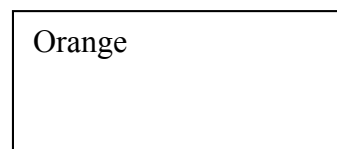
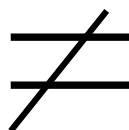
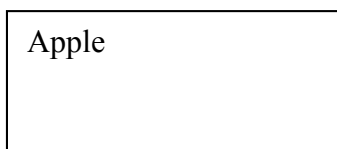


III. Periodic Law = properties of \_\_\_\_\_ tend to change in a regular \_\_\_\_\_ when elements are arranged in order of increasing \_\_\_\_\_ number (\_\_\_\_\_ of the protons in an atom).

A. Periods or Rows = \_\_\_\_\_ rows of elements that contain increasing numbers of p \_\_\_\_\_ and e \_\_\_\_\_.

Atomic # →	3	4	5	6	7	8
<u>P</u> #						

1. Elements are classified as \_\_\_\_\_.
2. Elements in a period or row \_\_\_\_\_ have similar properties.
3. Each row in the periodic table \_\_\_\_\_ when an \_\_\_\_\_ energy level is filled.



B. Group or Families = \_\_\_\_\_ columns in the table

1. Elements in the same group (family) have s \_\_\_\_\_ properties.
2. Elements in same group have the s \_\_\_\_\_ number of e \_\_\_\_\_

in their outer shell.

Group →	1	Group →	4	Group →	2
	3		12		10
	11		20		18
	19		38		36
	37		56		54
	55				86

IV. Atomic Number – the number of p \_\_\_\_\_ in an atom.

A. The number of protons \_\_\_\_\_ the type of e \_\_\_\_\_.

B. The number of protons also e \_\_\_\_\_ the number of electrons in a \_\_\_\_\_ atom.

V. Mass number – the number of p \_\_\_\_\_ and n \_\_\_\_\_ in an atom.

A. Atomic mass unit (amu) – \_\_\_\_\_ of measurement for atomic particles.

1. A p \_\_\_\_\_ has a mass of \_\_\_\_\_ amu.

2. A n \_\_\_\_\_ has a mass of \_\_\_\_\_ amu.

3. Electron mass is n \_\_\_\_\_ added in to the Atomic Mass of an atom.

7	→	number
<b>Li</b>		
3	→	number

Protons of Li = \_\_\_\_\_

Electrons of Li = \_\_\_\_\_

Neutrons of Li = \_\_\_\_\_

	Protons	
	Neutrons	
	Electrons	e

VI. Isotopes = atoms of the s \_\_\_\_\_ element with d \_\_\_\_\_ numbers of

n          .

A. Different isotopes have d                   properties.

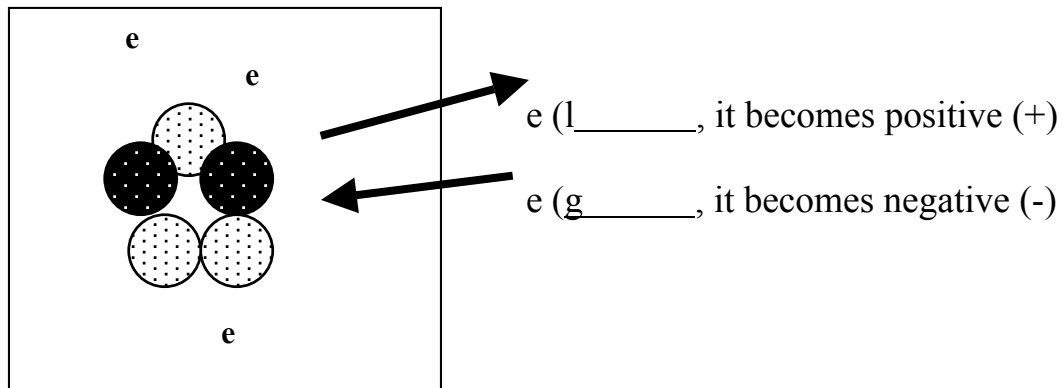
B. Number of neutrons equals atomic m           – atomic n                  .

Sodium	→	Name of Element	Number of protons in sodium = _____
11	→	Atomic Number	Number of electrons in sodium = _____
Na	→	Element Symbol	Number of protons + neutrons = _____
22.990	→	Atomic Mass	Number of neutrons in sodium = _____

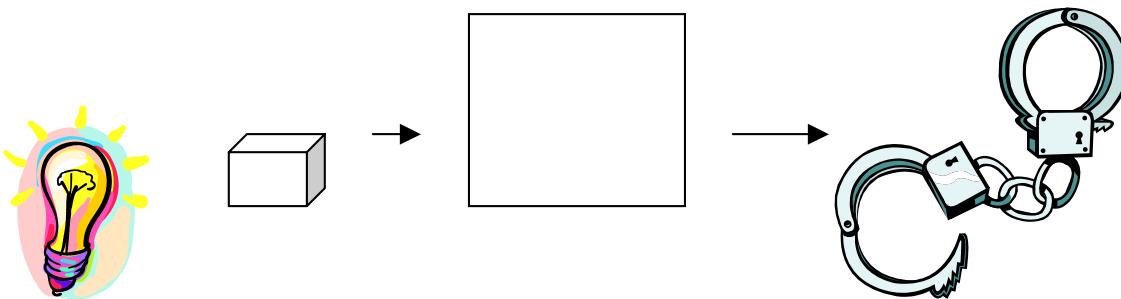
VII. Ions = When an atom l           or g           and electron.

A. Cation: an ion with a p                   (+) charge.

B. Anion: an ion with a n                   (-) charge.



VIII. Metals = elements that are s                  , can be s                   or s                  , and are good c                   of heat and electricity.



A. Alkali metals = highly                    metals located in Group           .

1. These metals have only            electron in their outer shell.

2. Due to being so r\_\_\_\_\_, these metals are found in nature as pure elements – are always c\_\_\_\_\_.

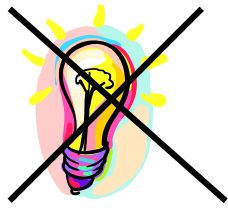
B. Alkaline-earth metals = \_\_\_\_\_ most reactive metals and found in Group   .

1. These metals have \_\_\_\_\_ electrons their outer shell.

C. Transition metals = metals located in Groups\_\_\_\_\_.

1. These metals t\_\_\_\_\_ from very m\_\_\_\_\_ to almost non\_\_\_\_\_.

II. Nonmetals = elements that are n\_\_\_\_ shiny, c\_\_\_\_\_ be stretched or shaped, and are p\_\_\_\_\_ conductors of heat and electricity.



A. Most nonmetals are located on the r\_\_\_\_\_ side of the Periodic Table.

B. Halogens = h\_\_\_\_\_ reactive nonmetals in Group   .

1. These nonmetals have \_\_\_\_\_ electrons in their outer shells.

C. Noble Gases = the \_\_\_\_\_ gaseous elements located in Group   .

1. These elements \_\_\_\_\_ usually form compounds.

2. Have a f\_\_\_\_\_ outer shell.

III. Metalloids = have properties of \_\_\_\_\_ and \_\_\_\_\_.

A. Semiconductors = these elements are able to c\_\_\_\_\_ heat and e\_\_\_\_\_ under certain conditions (only six of them).

#### CIM BENCHMARK

Describe properties of elements and their relationship to the periodic table.

*Eligible content:*

*\*Explain atoms and their base components (protons, neutrons, and electrons) as a basis for all matter.*

*\*Read and interpret the periodic table, recognizing the relationship of the chemical and physical properties of the elements to their position on the periodic table.*

*\*Recognize that the historical development of atomic theory demonstrates how scientific knowledge changes over time, and how those changes have had an impact on society.*