

Name: _____

Date: _____

Block: _____

Chemical Reactions:

Lesson 1 – Atomic Theory & Periodic Table

Atom: The smallest particle of an element that retains the properties of that element.

Subatomic particles: particles that make up atoms (3)

Proton: - Has a positive charge

- Symbol: p^+ or \oplus
- Found inside the nucleus

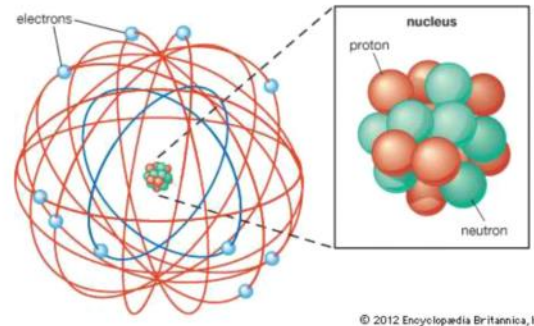
Neutron: - Has no charge

- Symbol: n or \circ
- Found inside nucleus

Electron: - Has a negative charge

- Symbol: e^- or \ominus
- found outside nucleus

protons = # electrons
For Atoms



Atomic Number: the # of protons in the nucleus (# of electrons)

Atomic Mass: the average mass of an atom. Measured in AMU

AMU (Atomic Mass Unit): 1 proton = 1 AMU

1 neutron = 1 AMU

1 electron = So small, we say 0 AMU

Ex. Aluminum

atomic #	13	3+
Symbol	Al	
Name	Aluminum	
atomic mass	26.9	

ion charge

Ex. How many neutrons does Aluminum have?

$$26.9 - 13 = 13.9$$

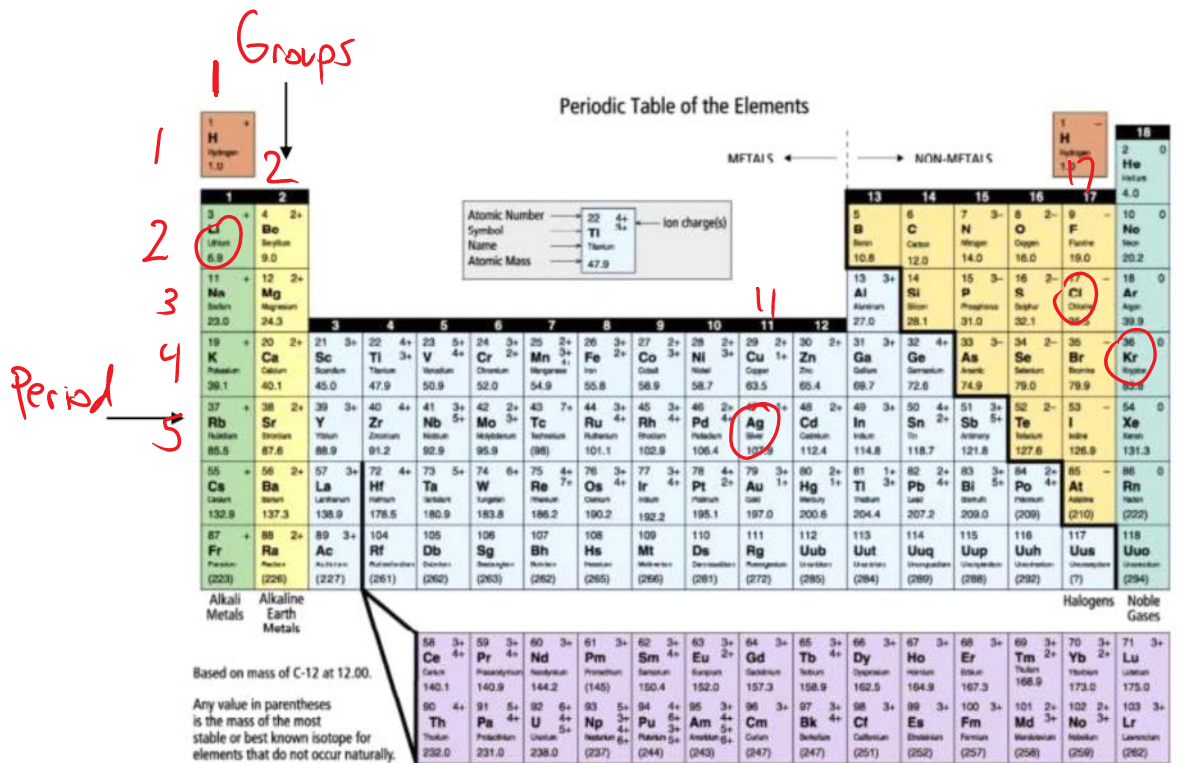
$$\Rightarrow 14 \text{ neutrons}$$

To find neutrons!
Atomic Mass – Atomic Number

Mass Number: Rounded atomic mass

Ex Aluminum mass number = 27

When Rounding:
.5 or more round up
.4 or less round down



Period: a row in the periodic table

Group/Family: a column in the periodic table

Elements in the same chemical group or family have similar chemical properties.

- Alkali Metals: Group 1 (not H), very reactive metals
 - Alkaline Earth Metals: Group 2, somewhat reactive
 - Halogens: Group 17, very reactive non-metals
 - Nobel Gases: Group 18, unreactive gaseous non-metals
- neutrons = atomic mass - atomic number

Examples:

Name	Symbol	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons	Period	Group	Metal or Non-metal
Lithium	Li	3	6.9	3	4	3	2	1	Metal
Silver	Ag	47	107.9	47	61	47	5	11	metal
Chlorine	Cl	17	35.5	17	19	17	3	17	Non metal
Krypton	Kr	36	83.8	36	48	36	4	18	non-metal

Name: _____

Date: _____

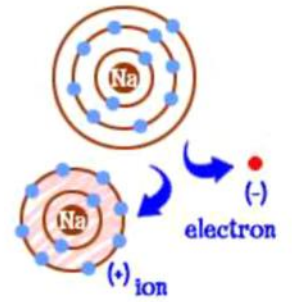
Block: _____

Chemical Reactions:

Lesson 2 – Atoms vs Ions & Bohr Models

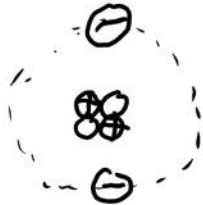
Valence electrons: _____

Atoms	Ions
# protons = # electrons	# protons ≠ # electrons



Atom or Ion?

Ex.



Atom or Ion

Net charge:

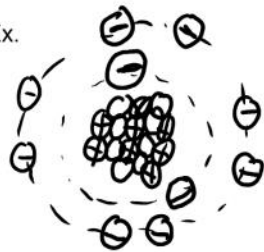
Ex.



Atom or Ion

Net charge:

Ex.



Atom or Ion

Net charge:

Bohr Model

Ex. Magnesium Atom

Step 1: Find element on periodic table.

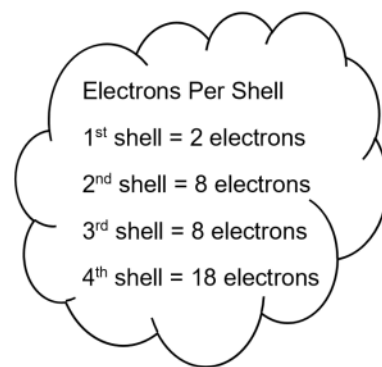
Step 2: Determine: Number of protons =

Number of neutrons =

Step 3: Determine: Number of electrons =

Step 4: Draw nucleus.

Step 5: Add electrons starting with the lowest shells



Ions: _____

Ex. Magnesium Ion

Step 1: Find element on periodic table.

Step 2: Determine: Number of protons =

Number of neutrons =

Step 3: Determine: Number of electrons =

Step 4: Draw nucleus.

Step 5: Add electrons starting with the lowest shells

*Step 6: Determine charge.

On the periodic table the period shows how many shells an element has. The group can help you find the number of valence electrons.

Name: _____

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Chemical Reactions: Lesson 3 – Ionic Compounds

Periodic Table Hacks

Periodic Table of the Elements

MFTAI S ←										NON-MFTAI S →																																																																																																																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">1 H Hydrogen 1.0</td> <td colspan="16"></td> <td style="text-align: center;">18 He Helium 4.0</td> </tr> <tr> <td style="text-align: center;">3 Li Lithium 6.9</td> <td style="text-align: center;">4 Be Beryllium 9.0</td> <td colspan="10"></td> <td style="text-align: center;">5 B Boron 10.8</td> <td style="text-align: center;">6 C Carbon 12.0</td> <td style="text-align: center;">7 N Nitrogen 14.0</td> <td style="text-align: center;">8 O Oxygen 16.0</td> <td style="text-align: center;">9 F Fluorine 19.0</td> <td style="text-align: center;">10 Ne Neon 20.2</td> </tr> <tr> <td style="text-align: center;">11 Na Sodium 23.0</td> <td style="text-align: center;">12 Mg Magnesium 24.3</td> <td colspan="10"></td> <td style="text-align: center;">13 Al Aluminum 27.0</td> <td style="text-align: center;">14 Si Silicon 28.1</td> <td style="text-align: center;">15 P Phosphorus 31.0</td> <td 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90 Th Thorium 232.0	91 Pa Protactinium 231.0	92 U Uranium 238.0	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)

Based on mass of C-12 at 12.00.
Any value in parentheses is the mass of the most stable or best known isotope for elements that do not occur naturally.

Cation: _____

Anion: _____

Ionic Bond: _____

Covalent Bond: _____

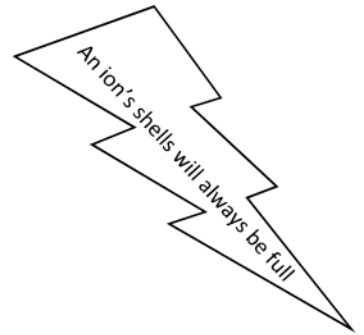
Cation or Anion

Ex. Magnesium Ion

Ex. Sulfur Ion

Ionic Bonds TEXT p. 120

Ex. Ionic bond between Sodium and Chlorine



Ex. Ionic bond between Beryllium and Oxygen

Ex. Ionic bond between Lithium and Oxygen



ASSIGNMENT: Drawing Bohr Diagrams of Ionic Compounds

Chemical Reactions
Lesson 4: **Covalent Compounds**

Date: _____

Review:

Ionic Compounds are formed between _____ IONS and _____ IONS.

The metal ion is _____ charged, and called a _____. Eg. aluminum ion Al^{3+}

The nonmetal ion is _____ charged, and called an _____. Eg. Fluorine ion F^{1-}

The oppositely charged ions are ATTRACTED to each other, and this force of attraction is what holds them tightly together = IONIC BOND

New:

Covalent Bonding text p. 121

Covalent compounds are made up of atoms of two or more _____
_____ joined together by covalent bonds.

UNLIKE in Ionic Bonding, _____

A covalent bond is a strong connection between atoms when they share electrons.

The sharing of electrons results in _____

Examples of Covalent Bonding:

a) WATER

H_2O

Bohr model

Common Model

b) Carbon Dioxide CO_2

c) Carbon Monoxide CO

Most Covalent compounds exist as _____. A molecule is the smallest independent unit of a covalent compound.

Two or more atoms of the _____ that are joined covalently are also molecules. These elements include _____. You will see that these elements make up an "upside down hockey stick" plus a 'puck' on the periodic table!

Video: Covalent Bonding

Activity:

Draw *Bohr Diagrams* showing each of the following Covalent Molecules. Use the internet to help you if needed.

a) CH₄ Methane Gas

b) NH₃ Ammonia

c) O₂ Oxygen Gas hint: double bonding

d) N₂ Nitrogen Gas hint: triple bonding

Name: _____

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Chemical Reactions:
Lesson 5 -Lewis Diagrams

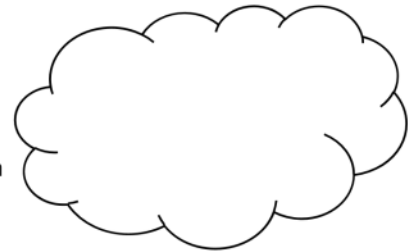
Lewis Diagrams: _____

Bohr Diagram	Magnesium	Lewis Dot Structure
	Atom	
	Ion	

Lewis Dot Structure

Ex. Oxygen Atom

Ex. Oxygen Ion



Ex. Negative Hydrogen Ion

Ex. Positive Hydrogen Ion

Ex. Aluminum Atom

Ex. Aluminum Ion

A: Lewis Diagram for IONIC COMPOUNDS

a) Draw a Lewis Diagram for Lithium Chloride.

Step 1:

Step 2:

b) Draw a Lewis Diagram for Calcium Iodide.

Step 1:

Step 2:

B: Lewis Diagrams for COVALENT COMPOUNDS

a) Draw a Lewis Diagram of an Oxygen Molecule O_2

Step 1:

Step 2:

c) Draw a Lewis Diagram of the molecule formed when Fluorine bonds with Chlorine (FCl)

Step 1:

Step 2:

Ionic Bonds	Covalent Bonds
Metal and non-metal	Non-metal and non-metal
Use ions	Use atoms
Gaining or losing electrons	Sharing electrons