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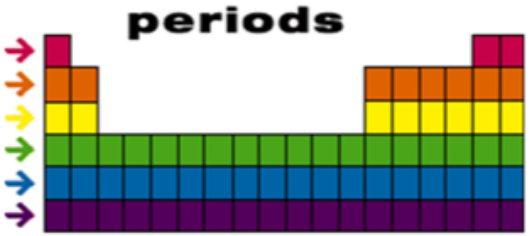
LESSON 7.1: Development of the Periodic Table

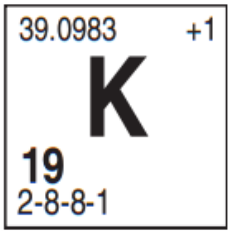
1869: Dimitri Mendeleev
- Originally organized elements based upon _____
- Elements with similar properties were supposed to be in the same _____ (up and down)

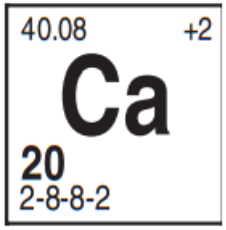
1914: Henry Moseley
- Developed the _____
- Organized elements by _____ (# of protons)
- Created the Periodic Law which states, "Properties of elements are periodic functions of their atomic numbers."
- This means –
    - The Result…

Organization of the Periodic Table

Periods
- Period number = _____

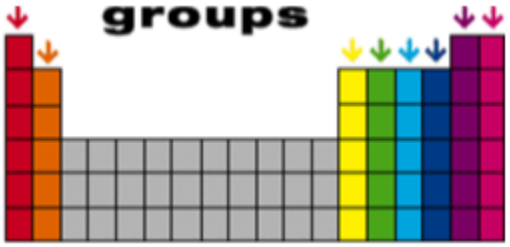


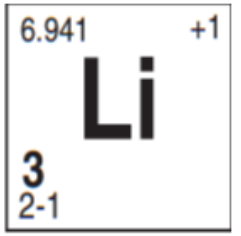


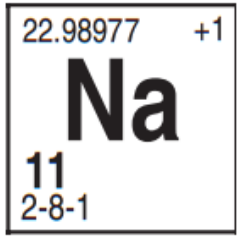


Groups
- Same group means same _____

resulting in _____

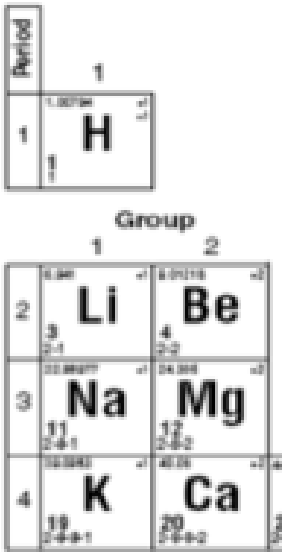






Reactivity of Elements

-
-
-



Example: Which two elements have similar chemical properties and why? *Na, K, Li, Be*

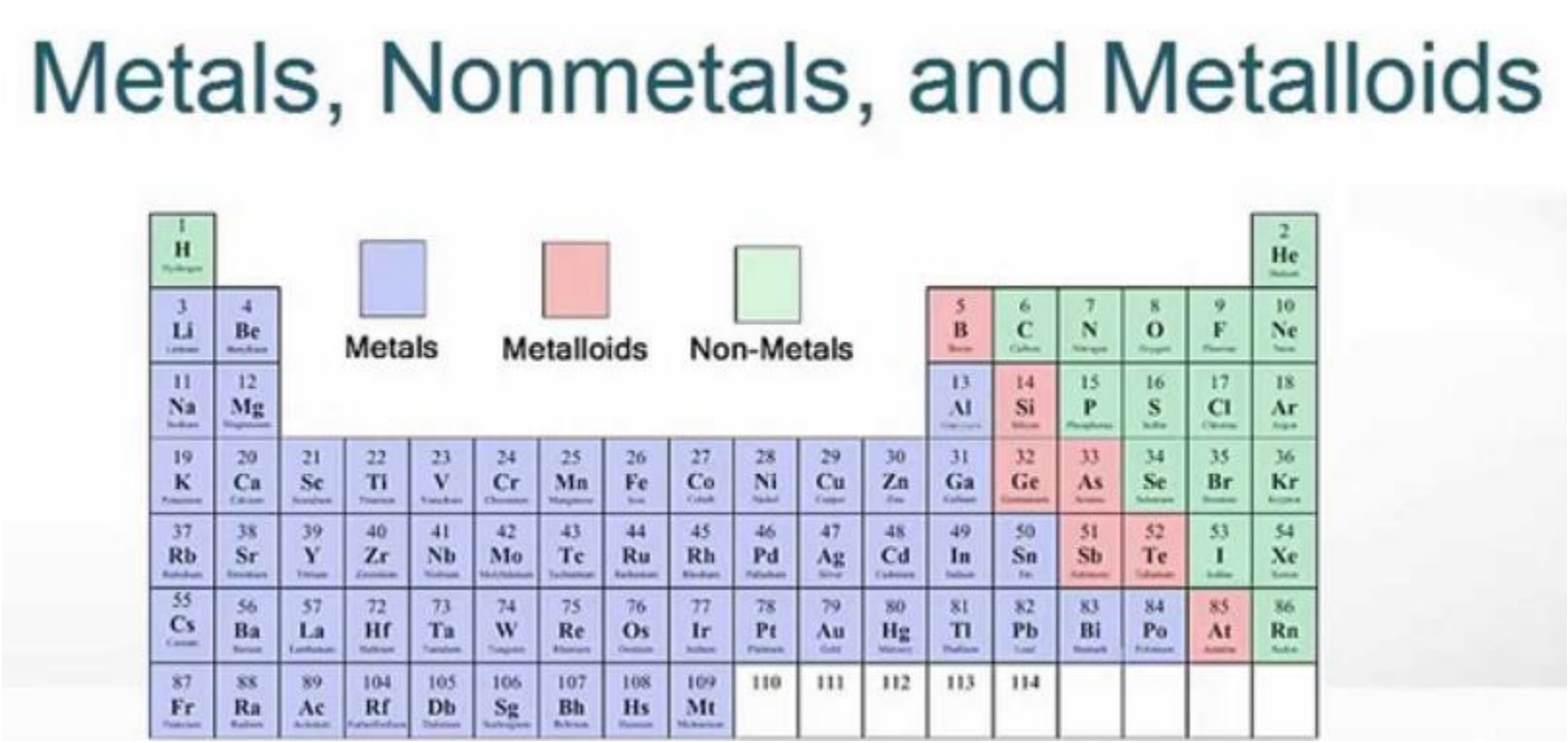
LESSON 7.2: Categories & Properties of Elements

Quick Definitions (helpful for later)

☆ Electronegativity –

☆ Ionization Energy–

NEED TO KNOW!



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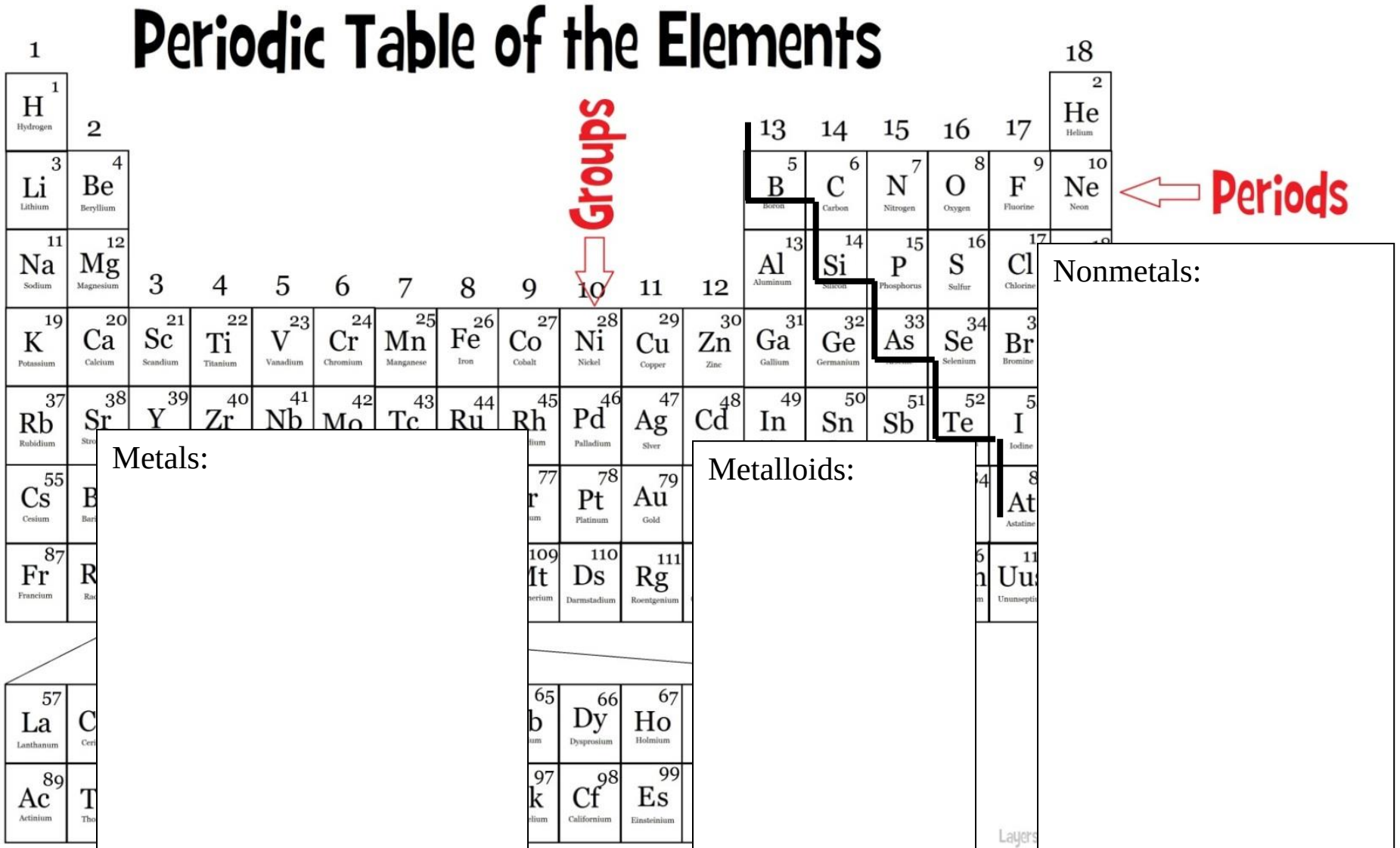

PRACTICE!

Name: _____

1. On the present Periodic Table of the Elements, the elements are arranged according to increasing

(1) # of oxidation states (3) atomic mass
(2) # of neutrons (4) atomic number

2. The properties of elements are periodic functions of their

(1) mass numbers (3) atomic radii
(2) atomic masses (4) atomic numbers

3. Bromine has chemical properties most similar to

(1) fluorine (3) krypton
(2) potassium (4) mercury

4. Which element is in Group 2 and Period 7 of the Periodic Table?

(1) magnesium (3) radium
(2) manganese (4) radon

5. In which shell are the valence electrons of the elements in Period 2 found?

(1) 1 (2) 2 (3) 3 (4) 4

6. The atoms of the elements in Group 2 have the same

(1) mass number (3) # of protons
(2) atomic number (4) # of valence e-

7. In which list are the elements arranged in order of increasing atomic mass?

(1) Cl, K, Ar (3) Te, I, Xe
(2) Fe, Co, Ni (4) Ne, F, Na

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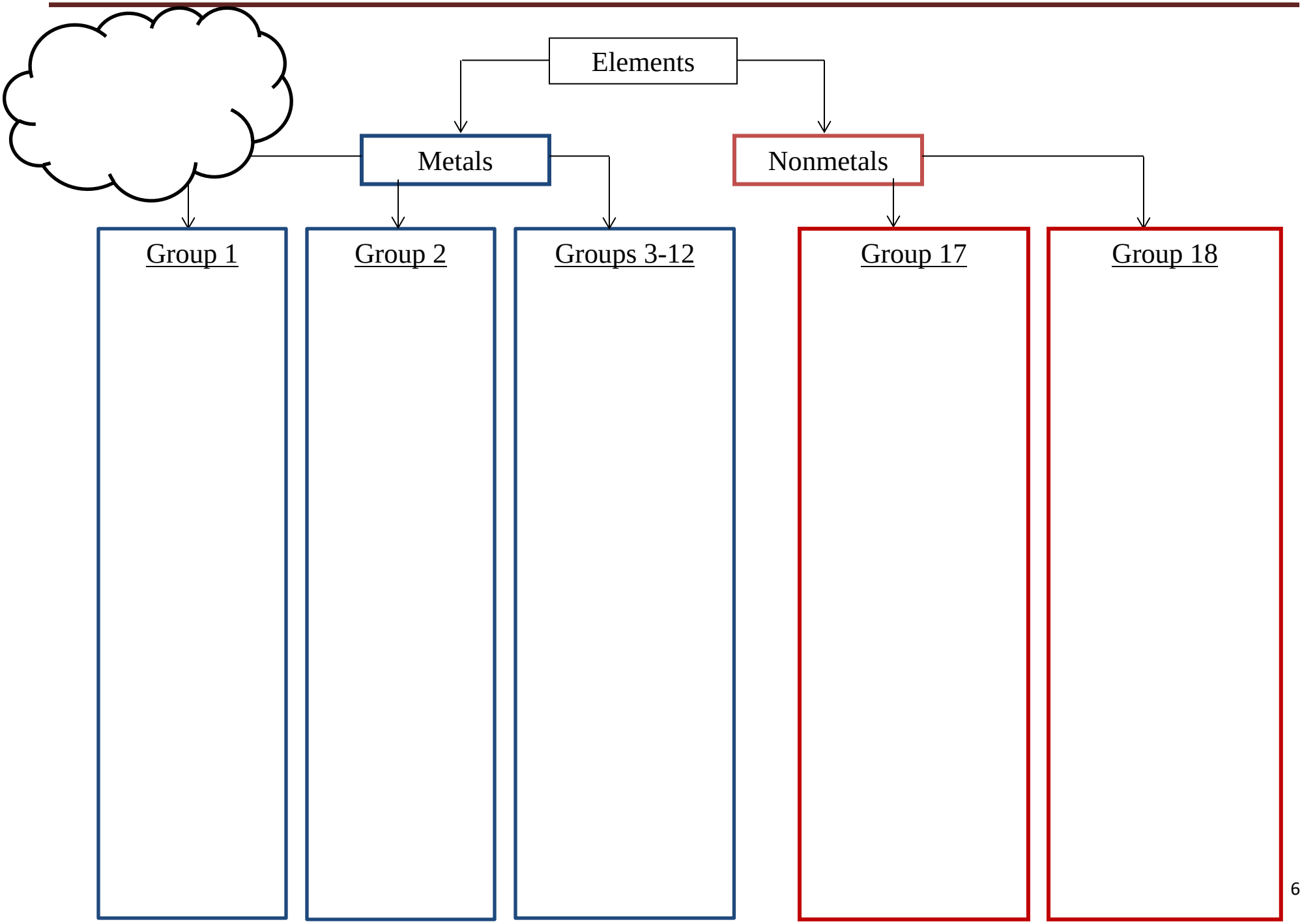
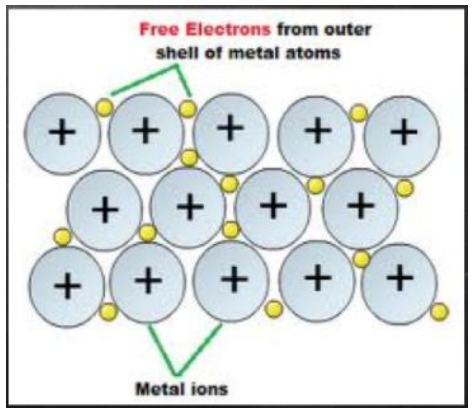


PROPERTIES OF METALS

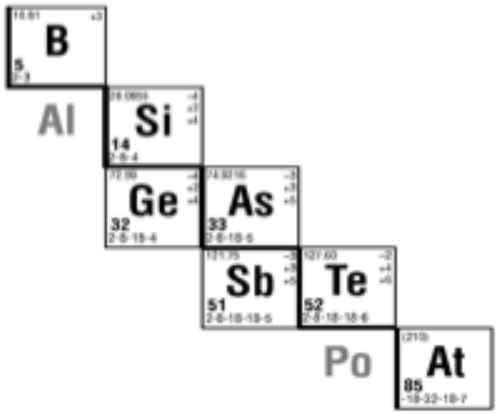
-
-
-
-
-
-



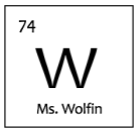
What makes metals malleable & ductile?

Metals & Metal Alloys

PROPERTIES OF METALLOIDS



PROPERTIES OF NONMETALS



Periodic Trends

LESSON 7.3: Periodic Trends DOWN A GROUP

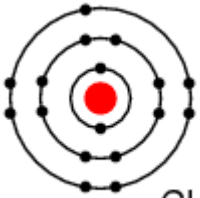
Down a Group (Don't Guess – Check Table S!)

-Number of energy levels

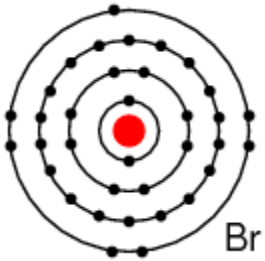
-Nuclear charge

-Atomic radius (size of the atom)

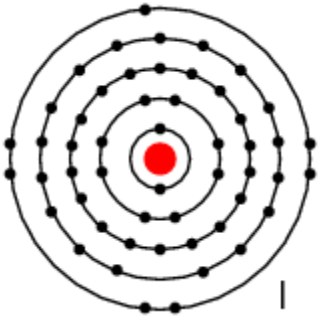
F



Cl



Br



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-Ionization energy (how much energy it takes to lose valence e-)

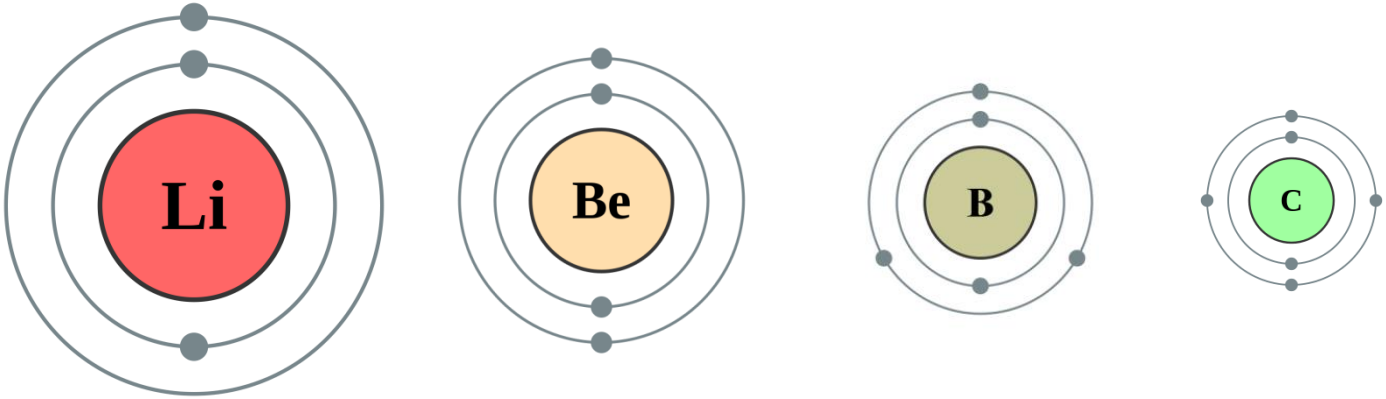
-Electronegativity (how strongly an atom attracts e-)

☆What is Electron Shielding?

-Metallic character (how much it acts like a metal/how easily it loses e-)

LESSON 7.4: Periodic Trends ACROSS A PERIOD

<u>Across a Period</u> (Don't Guess – Check Table S!)

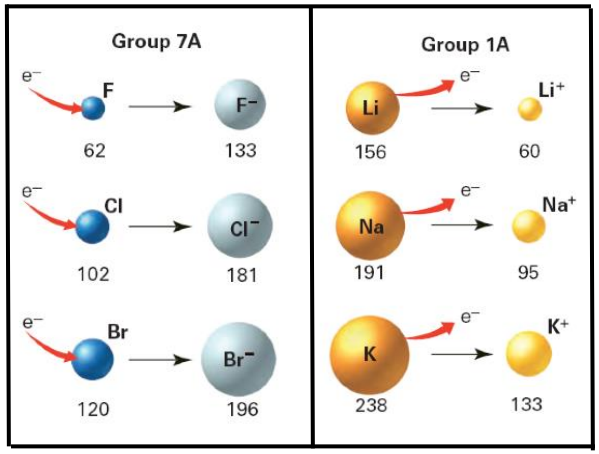


-Number of energy levels

-Nuclear charge

-Atomic radius (size of the atom)

Ionic vs. Atomic Radius



- Ion Size: Nonmetals

- Ion Size: Metals

- Comparing Ionic & Atomic Radii

-Ionization energy (how much energy it takes to lose valence e-)

-Electronegativity (how strongly an atom attracts e-)

-Metallic character (how much it acts like a metal/how easily it loses e-)

Best Metal on the Periodic Table: _____

Best Nonmetal on the Periodic Table: _____

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Periodic Table Graphic Organizer

Atomic Radius

Across a Period — Ionization Energy

Electronegativity

Why?

Alkali Metals

Same period means same...

Noble Gases

Down a Group

Alkaline Earth Metals

Halogens

Purpose of this?

Transition Metals

Atomic Radius

Ionization Energy

Electronegativity

Reactivity of metals?

Reactivity of nonmetals?

Why?

Same group means same...

*Lant

**Ac

Metals:

- ___ I.E.
- ___ electronegativity
- _____ e-
- Form _____ ions
- _____ conductors
- _____ (shiny)
- _____ (bendy)
- _____ (stretchy)
- _____ ionic radius

Nonmetals:

- _____ I.E.
- _____ electronegativity
- _____ e-
- Form _____ ions
- _____ conductors
- _____ (not shiny)
- _____ (not bendy)
- _____ ionic radius

Phases at STP:
Gases: ___, ___, ___, ___, ___, ___, ___, ___, ___, ___, ___, ___
Liquids: ___ and ___
Solids: Everything else