

## Section 5.3 Notes

Families of Elements  
Metals

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What are the different metallic groups on the periodic table?

### TYPES OF ELEMENTS

- A. Metals –Left Side of the PT
- B. Nonmetals – Right Side of the PT
- C. Metalloids – Along the *Staircase*.

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#### Representative Elements:

- + Name given to the first 2 columns (H & Be) and the last 6 columns (B, C, N, O, F, He)

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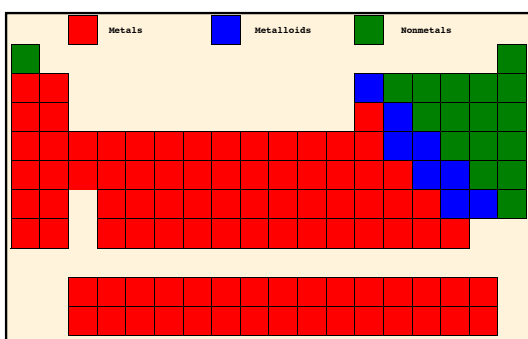
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What are the different metallic groups on the periodic table?

### REGIONS ON THE PERIODIC TABLE




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What are the different metallic groups on the periodic table?

### PROPERTIES OF METALS

**Metals:** Most elements are metals. Metals are in solid state, except Mercury (it is in the liquid state at room temperature).

**I. Properties of Metals**

- A. Good conductors of heat and electricity
- B. Malleable (can be hammered into sheets)
- C. Ductile (can be pulled into wires)
- D. Lustrous (shiny appearance)
- E. Ion Formation - Lose electrons; Form cations (positively charged ions)

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What are the different metallic groups on the periodic table?

### GROUP NAMES

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### ALKALI METALS

**A. Alkali Metals (Group 1)**

- 1) Examples: Li, Na, K, Rb, Cs, An Exception: H (a nonmetal) an alkali metal even though it has similar chemical properties
- 2) Soft – can be cut with a knife
- 3) Very reactive
- 4) Valence electrons? 1
- 5) Form ions with a charge of  $1+$ .
- 6) Uses: Detergents, fertilizer, explosives, water softening, research

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### ALKALINE EARTH METALS

#### B. Alkaline Earth Metals (Group 2)

- 1) Examples: Be, Mg, Ca, Sr, Ba
- 2) Less reactive than Alkali metals
- 3) Valence electrons? 2
- 4) Form ions with a charge of  $2+$
- 5) Uses: construction (Ca: marble & limestone; Mg: airplanes), body function (Mg activates enzymes) & skeletons (Ca: bones), medicines (Ba: the "GI cocktail")

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### TRANSITION METALS

#### C. Transition Metals (Groups 3–12)

- 1) Examples: Cu, Fe, Ag, Pt, Au
- 2) Fairly Unreactive
- 3) Form Colored Compounds
- 4) Forms Cations with  $1+$  to  $7+$  Charge
- 5) Uses: Jewelry (Pt, Au, Ag), body chemistry (Fe, Co, Cu, & Mn), plumbing & electrical wiring (Cu), thermometers (Hg), light bulb filaments (W)

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### RARE EARTH METALS

#### D. Rare Earth Metals

- 1) Examples: Lanthanides (58 - 71)  
Actinides (90 - 103)
- 2) Most have Radioactive Isotopes
- 3) Elements with  $Z > 92$  are Man-Made (Synthetic)
- 4) Forms Cations with  $2+$  to  $6+$  Charge
- 5) Uses: Glow-in-dark paint (Pm), nuclear reactors (U), strong magnets & lasers (Nd), smoke detectors (Am), portable x-ray machines (Sm)

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**RARE EARTH METALS**

**HUNTING THE ELEMENTS  
(NEODYMIUM)**

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**ALLOYS**

III. Alloys

A. Definition: A homogeneous mixture of two or more elements, at least one of which is a metal, and where the resulting material has metallic properties.

B. Examples:

- 1) Brass (Copper & Zinc)
- 2) Bronze (Copper & Tin)
- 3) Steel (Iron & Carbon)
- 4) Gold [Bonus Example]:
  - a) Yellow Gold: Gold & Copper
  - b) White Gold: Gold & Silver
  - c) Rose Gold: Gold & Nickel

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What are the different metallic groups on the periodic table?

**ORES**

IV. Ores

**+** Definition: Minerals containing metal compounds.

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