Ch: 6 The Periodic Table

**6.1 Organizing the** [**Elements**](http://www.youtube.com/watch?v=Uy0m7jnyv6U)**:** [**ASAP Sci- PT**](https://www.youtube.com/watch?v=rz4Dd1I_fX0)  [Tom Leher PT](https://www.youtube.com/watch?v=zGM-wSKFBpo)

[**Periodic table ppt**](file:///\\swain.local\storage-ns\homes\high\staff\kgray\Kgray%20folder\Chemistry\chapter%206-%20periodic%20table\THE%20PERIODIC%20TABLE%203%20B.pptx)

[**Mendeleev**](http://ed.ted.com/lessons/the-genius-of-mendeleev-s-periodic-table-lou-serico) **(1869 Russian Chemist, Teacher):**

* 1st Periodic Table – 1st to recognize periodic law (periodic repetition)
* Arranged elements - increasing atomic **mass**

**Modern Periodic Table:**

* Arranged elements- increasing atomic **#**
* Period (rows) – properties vary as you go across within

a period

* Group (column)- elements within a group have similar

chemical and physical properties

[**Metals, Nonmetals and Metalloids:**](file:///H:\Kgray%20folder\Chemistry\chapter%206-%20periodic%20table\metals%20nonmetals%20and%20metalloids%20table%20notes.flipchart)

* Less metallic as you go across the table

|  |  |  |
| --- | --- | --- |
| **Metals** | **Non Metals** | **Metalloids** |
| * 80% of elements | * Upper right corner of table | * Stair-step pattern between Metals and Nonmetals |
| * Good conductors- heat/electricity | * Poor conductors   (exception – C) | * Semi-conductors |
| * Solids at room temp. (except Hg) | * Gases at room temp.   (exceptions – S, P =  solids; Br= liquid) | * Solids at room temp. |
| * High luster | * Dull luster | * Similar properties   to both metals and nonmetals |
| * Ductile/Malleable | * Brittle |
| * Loses electrons (forms + ions) | * Gains electrons (forms – ions) or shares electrons | * Lose or share electrons |

**6.2 Classifying the Elements:**

[Fill in periodic table](\\\\swain.local\\storage-ns\\homes\\high\\staff\\kgray\\Kgray folder\\Chemistry\\chapter 6- periodic table\\Fill in Periodic table.flipchart)

**The s-block elements (Group 1 (1A) + 2 (2A): (Representative elements)**

[**Alkali Metals:**](https://www.youtube.com/watch?v=uixxJtJPVXk)

* Group 1 (1A)
* Soft, silvery
* Very reactive (never found alone in nature)
* ns1 (ex. 1s2 **2s1**)

**Alkaline Earth Metals:**

* Group 2 (2A)
* Harder, denser, stronger than alkali metals
* Reactive (never found alone in nature)
* ns2  (ex. 1s2 **2s2**)

**The p-block elements: Groups 13 (3A) –18 (8A): (Representative elements)**

**Main-group elements:**

* Includes:
  + Metalloids, nonmetals, metals
  + Halogens (group 17 (7A)) –react with most metals to form salt compounds
  + [Noble gases](https://www.youtube.com/watch?v=QLrofyj6a2s) (group 18 (8A))- inert gases (not reactive) both s and p sublevels for the highest energy level = full (8 electrons) (ex. 1s2**2s22p6**)
* ns2 np1-6 (ex. 1s22s22p6**3s23p4**)

**The d-block elements: Groups 3-12 (Group B):**

**Transition elements:**

* Typical metallic properties
* Less reactive than group 1,2
* ns2 (n-1)d1-10 (ex. 1s22s22p63s23p6**4s23d8**)

**The f-block elements: Lanthanides and Actinides:**

**Inner Transition elements:**

* Occur b/w the 3-4 groups (3B-4B) in periods 6, 7
* lanthanides- shiny metals, similar in reactivity to the alkaline earth metals
* actinides-radioactive, mostly lab made
* ns2(n-2)f1-14 (ex. [Xe] 6s2**4f7**)

**6.3** [**Periodic Trends**](file:///H:\Kgray%20folder\Chemistry\chapter%206-%20periodic%20table\Periodic%20Trends.pptx)**:** [fill in periodic table](H:\\Kgray folder\\Chemistry\\chapter 6- periodic table\\Fill in Periodic table.flipchart)

**Nuclear Charge:**

* charge of the atom (# of protons)
* Periods –**↑** across
* Groups - **↑** down

**Shielding:**

* Lower energy levels “shield” higher energy levels from full nuclear charge
* Periods – no change
* Groups – **↑** down

[**Atomic Radius**](http://education-portal.com/academy/lesson/atomic-and-ionic-radii-trends-among-groups-and-periods-of-the-periodic-table.html#lesson) **(size):**

* ½ the distance b/w the nuclei of 2 atoms of same element
* Period - **↓** across
* Group- **↑** down

**Ions:**

* An atom or group of atoms that have a positive and negative charge
* Form when electrons are transferred b/w atoms

**Cations:**

* Positively charged ion
* Form by losing electron(s)
* Smaller than original atom
* Metals

**Anions:**

* Negatively charge ion
* Form by gaining electron(s)
* Larger than original atom
* Non-metals

**Ionic Radius (size):**

* Size of the ion
* Periods – **↓** across (cations smaller than anions- trend restarts with NM)
* Groups – **↑** down

[chapter 6- periodic table\atomic and ionic radius periodic tables.flipchart](file:///\\swain.local\storage-ns\homes\high\staff\kgray\Kgray%20folder\Chemistry\chapter%206-%20periodic%20table\atomic%20and%20ionic%20radius%20periodic%20tables.flipchart)

[**Ionization energy**](http://education-portal.com/academy/lesson/ionization-energy-trends-among-groups-and-periods-of-the-periodic-table.html#lesson)**:**

* Energy required to remove an electron (what metals want to do)
* Period - **↑** across
* Group - **↓** down
* 1st ionization energy = 1 + charge ion
* 2nd ionization energy = 2 + charge ion
* 3rd ionization energy = 3 + charge ion.

[**Electronegativity**](http://education-portal.com/academy/lesson/electronegativity-trends-among-groups-and-periods-of-the-periodic-table.html#lesson)**:**

* Ability of an atom to attract electrons (what non-metals want to do)
* Periods – **↑** across
* Groups- **↓** down
* Nobel gases – non electronegative

**Reactivity:**

**Metals**

* give up electrons to become more reactive
* Periods – **↓** across
* Groups – **↑** down

**Nonmetals**

* take on electrons to become more reactive
* Periods- **↑** across
* Groups- **↓** down