

Lesson 4: Organization and History of the Periodic Table.

Dmitri Mendeleev:

- grouped elements according to increasing mass and chemical/physical properties of the known elements.
- He discovered the periodic nature of elements when they are arranged by mass. (i.e., common properties of elements would occur at regular intervals)

Oral:

Q – What is the problem with ordering elements by mass?

- Mendeleev's table could not predict the correct order of all elements based on mass (e.g., Ar-argon gas and K-potassium), and as a result atomic number is used to arrange elements (i.e., when atomic number is used the elements align into groups where the properties match).
- He arranged elements in periods (i.e., rows) and groups (i.e, columns). These columns are also designated family names.
- Elements that occur in the same group would have very similar properties while elements in a given column would increase in mass.
- He left gaps for the next heaviest elements when the properties did not match the group. He used the masses and properties within a group to predict the existence and characteristics of elements that had not yet been discovered.
- The P.Table is also organized into 3 sections:
 - 1) Metals on the left of the “staircase”: properties are - Shiny, good conductors of heat and electricity, usually solids, malleable and ductile.
 - 2) Non-metals on the right side of “staircase”: properties are – Usually gases, brittle, dull but very colourful
 - 3) Semi-metals are in the staircase: properties are intermediate to metals and non-metals.

Some family names

Group 1 (alkali metals) – soft solids that react violently with water. (never found pure in nature) e.g., sodium in table salt

https://www.youtube.com/watch?v=t2uwzNZAp-s&ab_channel=smcblackburn

Group 2 (Alkaline earth metals) – react less violently than group 1, but easily react when burned. e.g., calcium found in antacids

Group 17 (Halogens) – the most reactive non-metals. Not found pure in nature. e.g., chlorine found in table salt or Fluorine found in toothpaste (NaF)

https://www.youtube.com/watch?v=tbPxDiX1NU&ab_channel=koen2all

Hydrogen is usually considered a nonmetal but has characteristics of both metal and non. Sometime H is found above group 1 elements and group 17 because of its unique properties. It is extremely flammable! It is the most abundant element in the universe. e.g., found in water and is the main fuel for fusion reactions in stars.

https://www.youtube.com/watch?v=zQaYLbsl33g&ab_channel=BBCEarthLab

Group 18 (noble gases) – non-reactive gases. (which is why they were difficult to discover)

Uses: Helium balloons, Neon in neon lights, Argon in welding, Krypton lasers

If time allows: Show the video on periodic table.

https://www.youtube.com/watch?v=fPnwBITSmgU&ab_channel=TED-Ed

Assignment:

Text: page 113 “Before you leave this page...” #2, 3

Text: page 115 Check your understanding topic 2.2 # 3, 4, 6, 7, 9, 10