

1. Elements
2. Periodic Table
3. Properties of Elements

## Elements

Elements are...

- The basic \_\_\_\_\_ of \_\_\_\_\_
- Made up of one type of \_\_\_\_\_ (cannot be broken down further)
- About \_\_\_\_\_ elements occur naturally (carbon, silver, oxygen)
- Some elements are \_\_\_\_\_ in labs
- Have varying \_\_\_\_\_

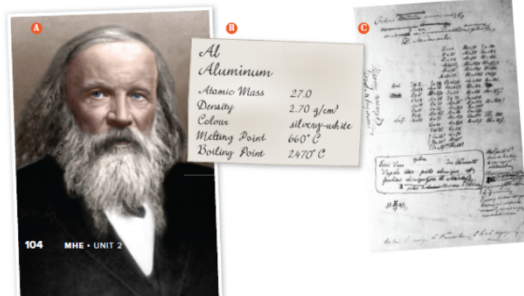
Each element has a

- **Chemical** \_\_\_\_\_
  - Based on \_\_\_\_\_ words, countries, names of famous \_\_\_\_\_
- **Chemical** \_\_\_\_\_
  - One or two \_\_\_\_\_ (first letter is capitalized)
  - Synthetic or unnamed elements have placeholder names or three-letter symbols

## Mendeleev's Periodic Table

1860s: Dmitri Mendeleev

- Looked at different ways to \_\_\_\_\_ the elements
- Wrote \_\_\_\_\_ of elements on cards so that he could rearrange them and \_\_\_\_\_ properties ("chemical solitaire")
- Properties included \_\_\_\_\_ (average mass of an atom of an element), \_\_\_\_\_, and \_\_\_\_\_.



Mendeleev's periodic table:

- Ordered the elements by \_\_\_\_\_ atomic \_\_\_\_\_.
- Grouped elements into "\_\_\_\_\_ " based on similar properties (density, melting point)
- Left gaps in his periodic table to \_\_\_\_\_ the existence of elements not yet found yet
  - These missing elements would have properties similar to other elements in the same families.

Mendeleev's periodic table was ordered by increasing \_\_\_\_\_:

- Did not work perfectly – some elements were \_\_\_\_\_ so they would fit in a family that had similar properties

**Mendeleev's Table**

Al	Si
?	?
In	Sn

**Properties of Gallium**

Property	Mendeleev's Prediction	Actual Data
Atomic mass	68	69.72
Density (g/cm <sup>3</sup> )	6.0	5.904
Melting point (°C)	low	29.78

**Properties of Germanium**

Property	Mendeleev's Prediction	Actual Data
Atomic mass	72	72.61
Density (g/cm <sup>3</sup> )	5.5	5.32
Melting point (°C)	high	947

# Modern Periodic Table

Modern periodic table is ordered by increasing \_\_\_\_\_.

- Henry Moseley: scientist that determined an element's atomic number (the number of protons in an atom)
- When elements are arranged according to \_\_\_\_\_ atomic number, the \_\_\_\_\_ fit perfectly and do not require re-ordering

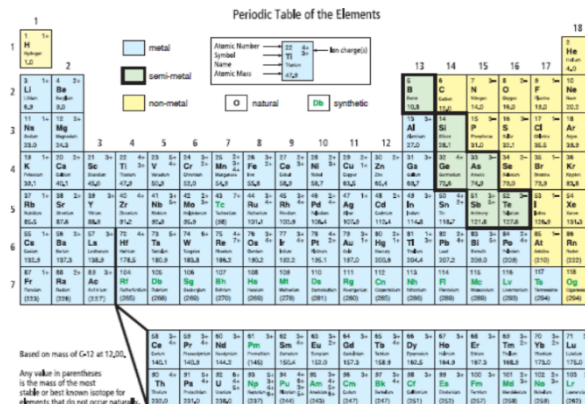
Atomic Number	→	8	2-	←	Ion charge
Chemical Symbol	→	O			
Chemical Name	→	Oxygen			
Atomic Mass	→	16.0			

We can use the information from the periodic table in order to find information about subatomic particles.

Name	Charge	Location	To find the number of particles for each elements, look at the...
Proton			
Neutron			
Electron			

On the periodic table, there are three categories shown on the periodic table:

- \_\_\_\_\_ :
  - \_\_\_\_\_ and hard (typically)
  - \_\_\_\_\_ and ductile
  - \_\_\_\_\_ electricity and heat
  - Found to the left of the \_\_\_\_\_ line on the periodic table
- \_\_\_\_\_ :
  - Not shiny, malleable, or \_\_\_\_\_
  - \_\_\_\_\_ conductor of electricity and heat
  - Found to the \_\_\_\_\_ of the zigzag line on the periodic table
  - Generally \_\_\_\_\_ or brittle, dull solids.
- \_\_\_\_\_ (**Metalloids**):
  - Have physical and chemical properties of \_\_\_\_\_ metals and non-metals
    - \_\_\_\_\_ (like metals)
    - \_\_\_\_\_ and *not* ductile (like non-metals)
    - Poor conductors of heat and \_\_\_\_\_ (like non-metals)



The modern periodic table can also be organized into:

- \_\_\_\_\_ (**Family**) (1-18): A vertical column of elements
- \_\_\_\_\_ (1-7): A horizontal row of elements

Some important groups/families to know:

- \_\_\_\_\_ (Group 1):
  - Shiny and soft
  - Highly reactive with water and oxygen (often stored in a non-reactive liquid such as oil)
- \_\_\_\_\_ (Group 2):
  - Shiny and soft (but not as soft as alkali metals)
  - Highly reactive (but not as reactive as alkali metals)
- \_\_\_\_\_ (Group 17):
  - Highly reactive (therefore usually found in nature as part of compounds)
- \_\_\_\_\_ (Group 18):
  - Odourless, colourless gases
  - Least reactive of all of the elements
    - Helium and neon never form compounds
    - Other noble gases form compounds with great difficulty