

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 _____

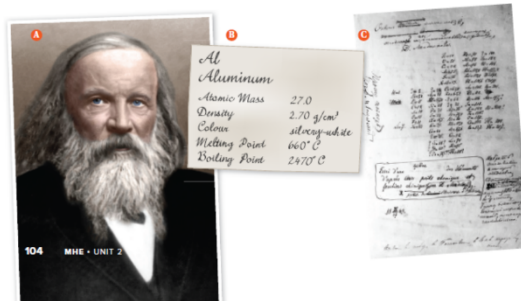
Each element has a

- **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 _____:

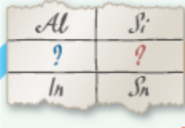
- Did not work perfectly – some elements were _____ so they would fit in a family that had similar properties


Mendeleev's Table



Properties of Gallium

Property	Mendeleev's Prediction	Actual Data
Atomic mass	68	69.72
Density (g/cm ³)	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 ³)	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

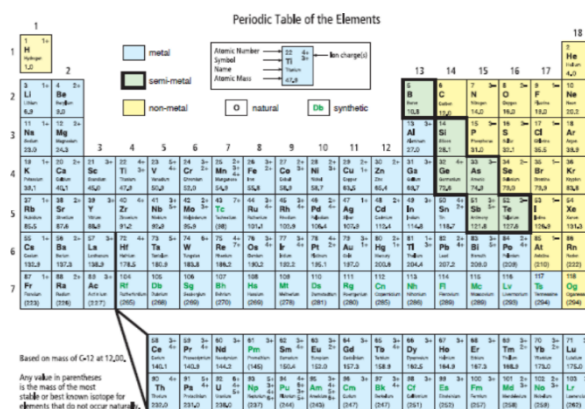
Atomic Number	→	8	2-	←	Ion charge
Chemical Symbol	→	O			
Chemical Name	→	Oxygen			
Atomic Mass	→	16.0			

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