

Dmitri Mendeleev: Father of the **Table**

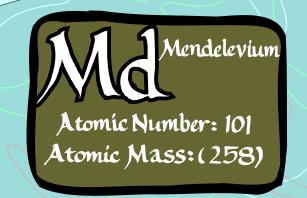
HOW HE PUT IT TOGETHER...

- He wrote each element's name and properties on a separate card.
- What does this tell us? that could be used to Protons + Neutrons they and keen inform He then tried to and keep information about them organized in a logical manner.

HOW HIS WORKED...

 Put elements in rows by atomic mass.

ients in columns



The Current Periodic Table

- Mendeleev wasn't too far off.
- Now the elements are put in rows by increasing

ATOMIC NUMBER!!

- What does this tell us? e called periods and are labeled
 - ng atomic number.
 - e called groups or families are

mar physical and chemical properties.

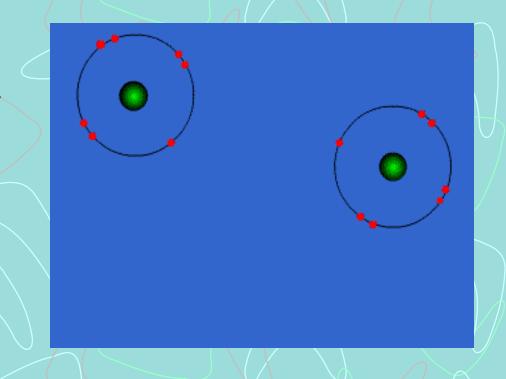
Groups...Here's Where the Periodic Table Gets Useful!!

Why do groups have similar properties??

They have the same number of valence electrons.

Electrons in the outermost energy level.

This tells us how they will combine with other elements to form compounds.



What does it mean to be reactive?

- We will be describing elements according to their reactivity.
- Elements that are reactive bond easily with other elements to make compounds.
- Some elements are only found in nature bonded with other elements.
- What makes an element reactive?
 - An incomplete valence electron shell.
 - All atoms (except hydrogen) want to have 8 electrons in their very outermost energy level (This is called the rule of octet.)
 - Atoms bond until this level is complete. Atoms with few valence electrons lose them during bonding. Atoms with 6, 7, or 8 valence electrons gain electrons during bonding.

IN GENERAL...(but not always!)

- With the exception of HYDROGEN, the elements on the left side of the periodic table are METALS.
- Elements on the right side of the periodic table are NONMETALS.

What's the difference?

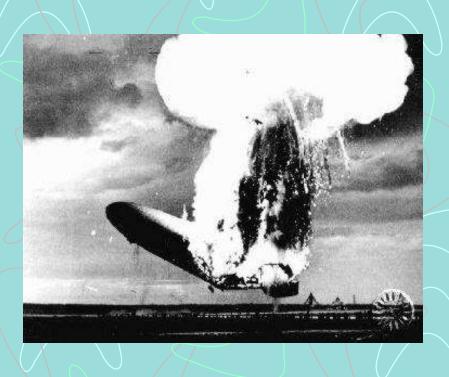
Properties of Metals	Properties of Nonmetals
Solid at room temperature, except Mercury (liquid).	Most are gases, except Bromine (liquid)
Malleable and ductile – can be shaped and drawn into wire	Are brittle in the solid phase
Have luster – are shiny	Have a tendancy to be dull, not shiny and bright
Have high conductivity – are good conductors of heat and electricity	Are poor conductors of heat and electricity
Tend to LOSE electrons in chemical reactions	Tend to GAIN electrons in chemical reactions

Families on the Periodic Table

- Columns are also grouped into families.
- Families may be one column, or several columns put together.
- Families have names rather than numbers. (Just like your family has a common last name.)



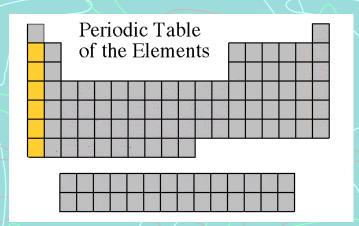
The Hydrogen Family – the bachelor



- Hydrogen belongs to a family of its own.
 - It's properties are different from all other elements.
 - However, it's still in GROUP 1
 because it has 1 valence electron.
- Hydrogen is very reactive gas.
 - It's in A LOT of compounds!
- Hydrogen was involved in the explosion of the Hindenberg.
- Hydrogen is promising as an alternative fuel source for automobiles

Alkali Metals

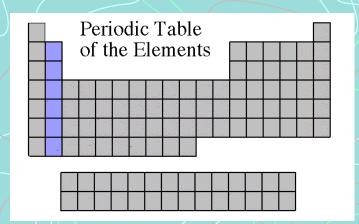
- 1st column on the periodic table (Group 1) not including hydrogen.
- Most reactive metals
 - They have one valence electron, so they can combine with other elements very easily.
 - always combined with something else in nature (like in salt).
- Soft enough to cut with a butter knife





Alkaline Earth Metals

- Second column on the periodic table. (Group 2)
- Slightly reactive metals that are always combined with nonmetals in nature.
 - They do not combine as easily as the alkali metals (less reactive) and are harder.
- Several of these elements are important mineral nutrients (such as Mg and Ca)

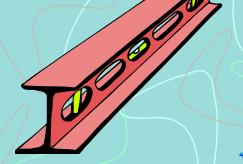


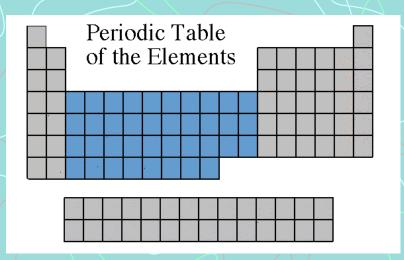


Transition Metals

- Elements in groups 3-12
- Are generally hard metals with high melting points.
- Includes metals used in jewelry and construction.
- Metals used "as metal."

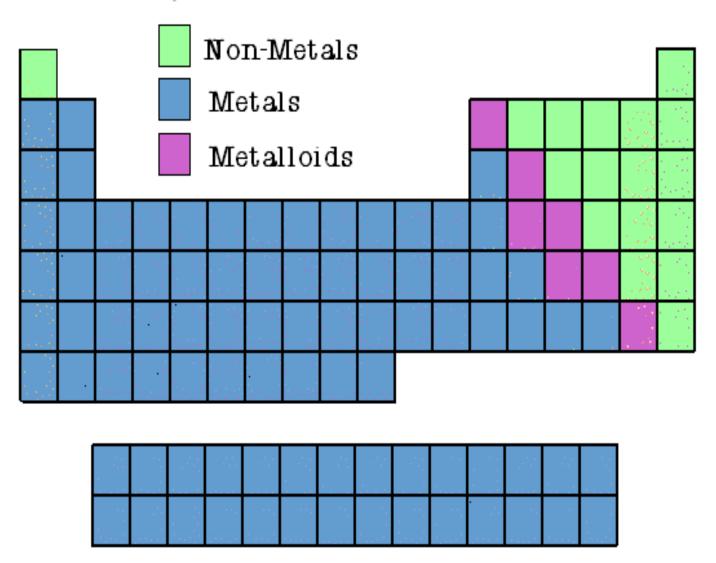






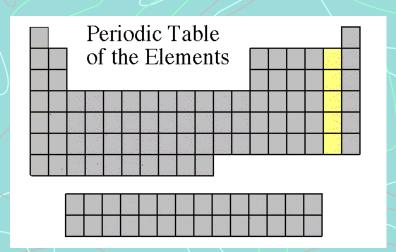


The elements of the periodic table can be divided into three main categories: Metals, Non-Metals, and Metalloids.



Halogens

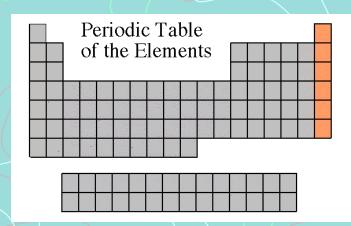
- Elements in group 17
- Most reactive and volatile nonmetals
 - In nonmetals, reactivity increases as atomic number decreases.
- Always found combined with other element in nature.
- The Halogen family has all three states of matter!
- Used as disinfectants and to strengthen teeth.





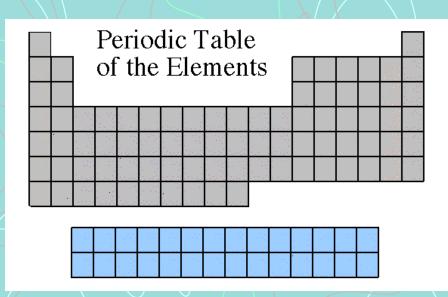
The Noble Gases

- Elements in group 18
- VERY un-reactive gases
 - Once thought to be inert
 (unable to react chemically)
- Used in lighted "neon" signs
- Used in blimps to fix the Hindenberg problem (He).
- Have a full valence shell.





Rare Earth Elements



- The thirty rare earth elements are composed of the lanthanide and actinide series.
- Most Rare Earth
 Metals are synthetic
 or man-made.