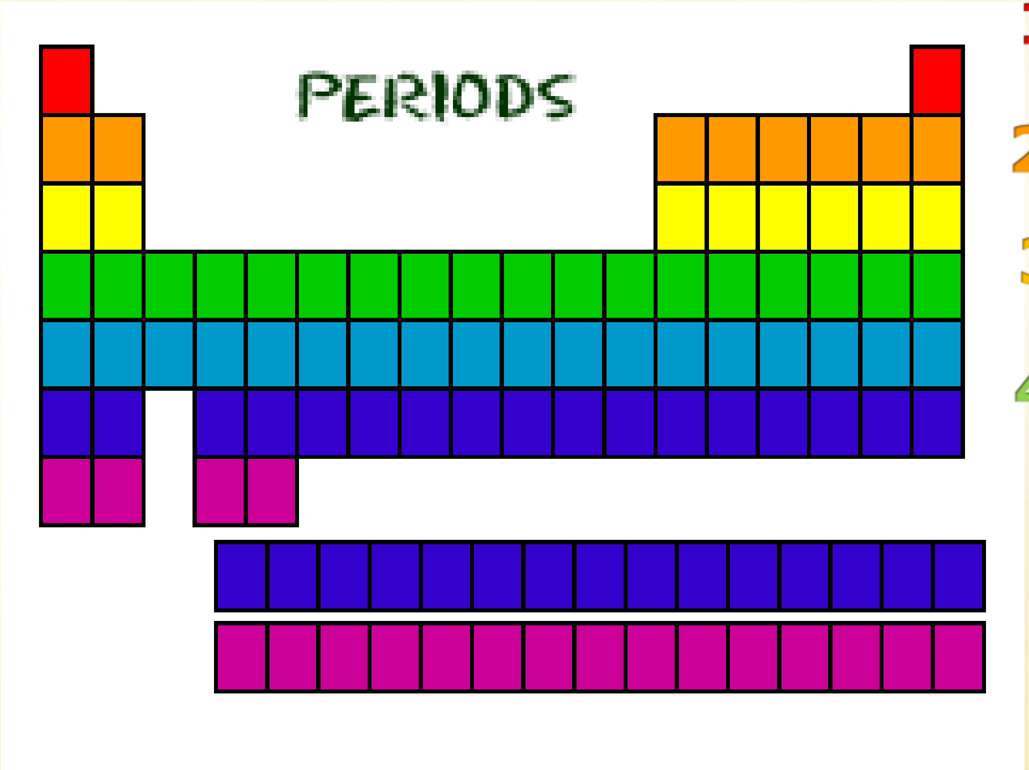
Periods

- Each row is called a "period"
- The elements in each period have the same number of shells



1st Period = 1 Shell

2nd Period = 2 Shells

3rd Period = 3 Shells

4th Period = 4 Shells

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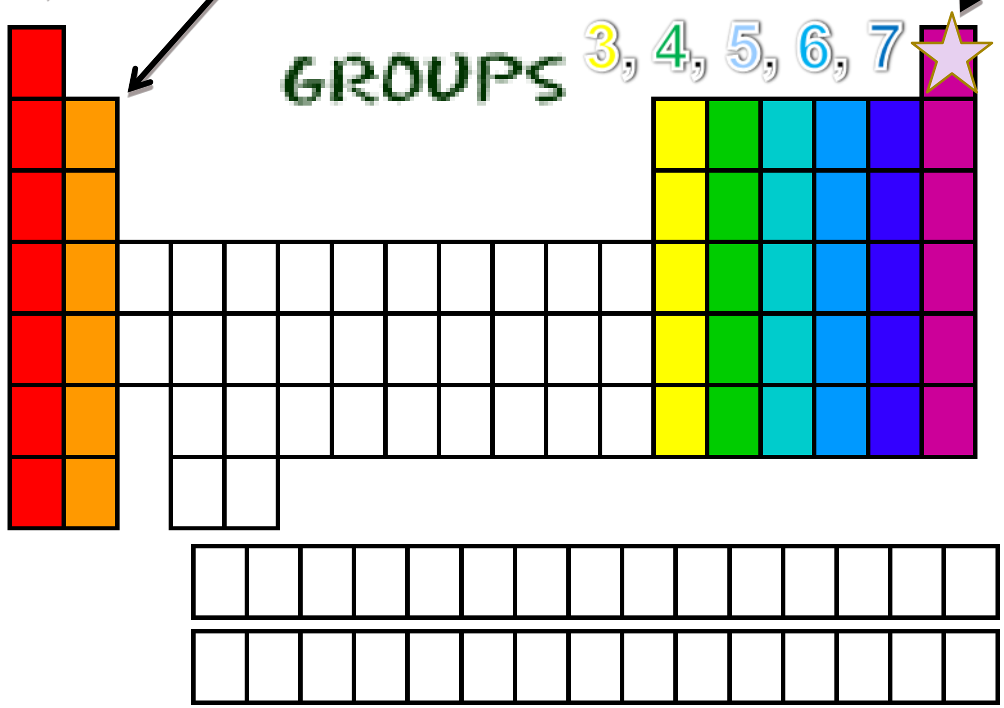
Groups

Group 8 = 8 electrons

Group 1 = 1 electron

Group 2 = 2 electrons

☆ **Except for He, it has 2 electrons**



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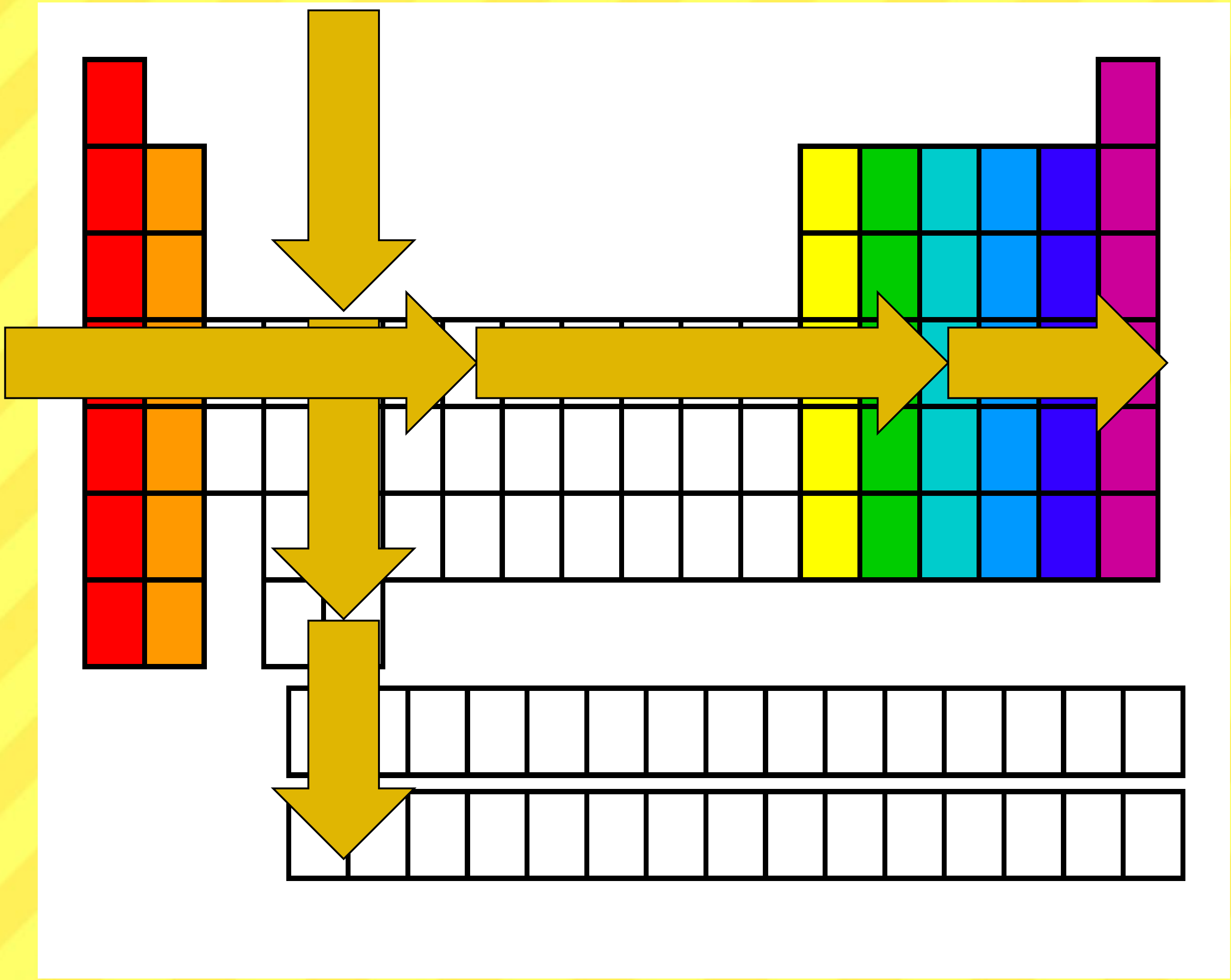
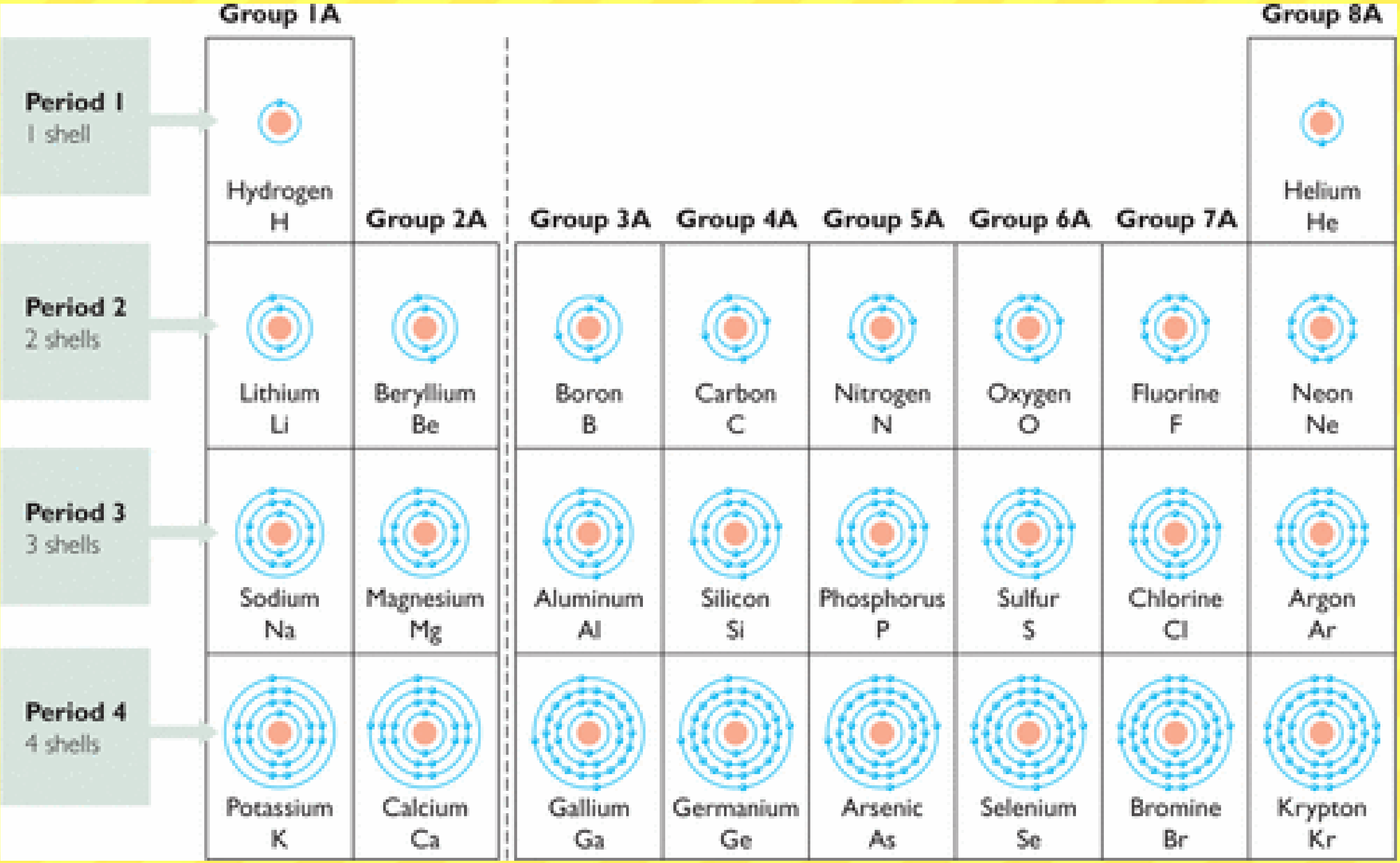
- **Each column is called a “group”**
- **Each element in a group has the same number of valence electrons”.**
- **The electrons in the outer shell are called “valence electrons”**



Increasing atomic mass as you go across the periods left to right
&
increasing atomic mass as you down the groups.

NOTE:

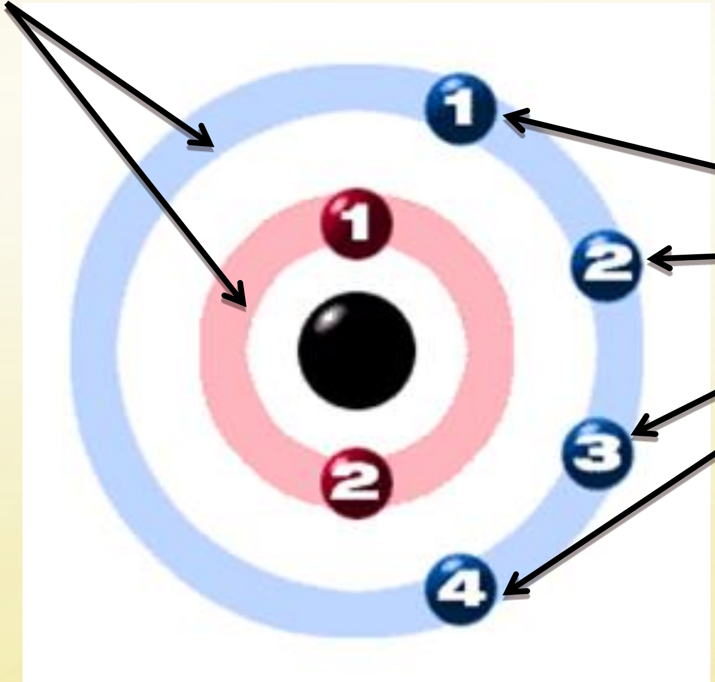
- **Each PERIOD has the same number of electrons shells.**
- **Each GROUP has the same # of outer valence electrons.**



Determine the number of shells and the number of valence electrons for:

Carbon - C

2^{nd} Period = 2 shells



4^{th} Group = 4 valence electrons

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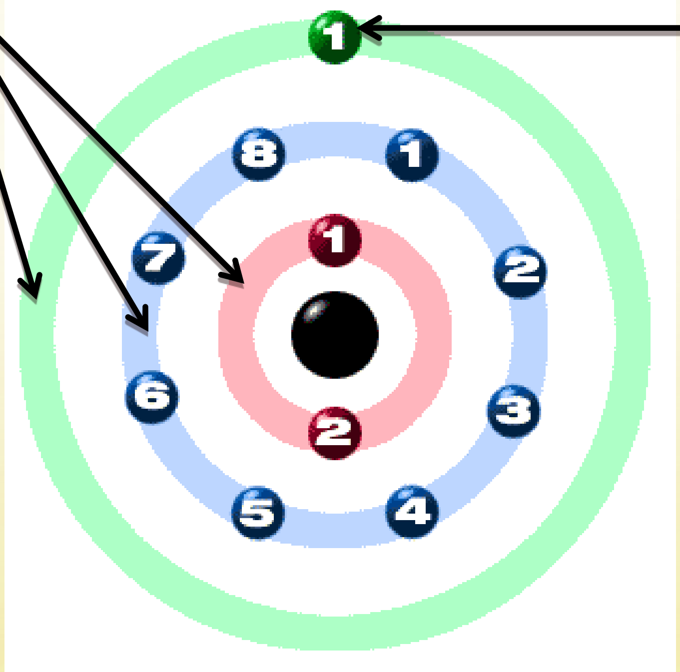
Determine the number of shells and the number of valence electrons for:

Sodium - Na

3rd Period = 3 shells

1st Group = 1 valence electron



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Write your answers on your handout.

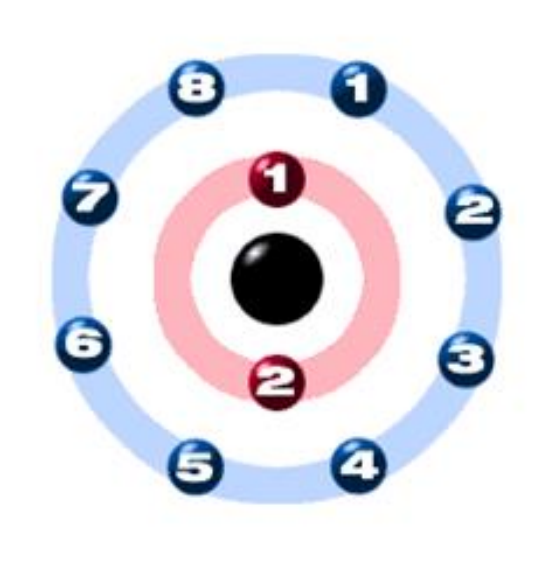
Ne

Name the element.
Number of shells ?
Valence electrons ?

Write your answers on your handout.

Ne

Name the element.
Number of shells ?
Valence electrons ?



Neon

2nd Period = 2 shells

8th Group = 8 valence electrons

Write your answers on your handout.

H

Name the element.
Number of shells ?
Valence electrons ?

Write your answers on your handout.

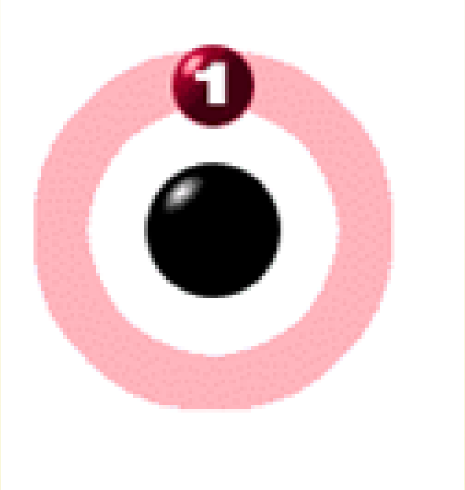
H

Name the element.
Number of shells ?
Valence electrons ?

Hydrogen

1st Period = 1 shell

1st Group = 1 valence electron



Write your answers on your handout.

Be

Name the element.
Number of shells ?
Valence electrons ?

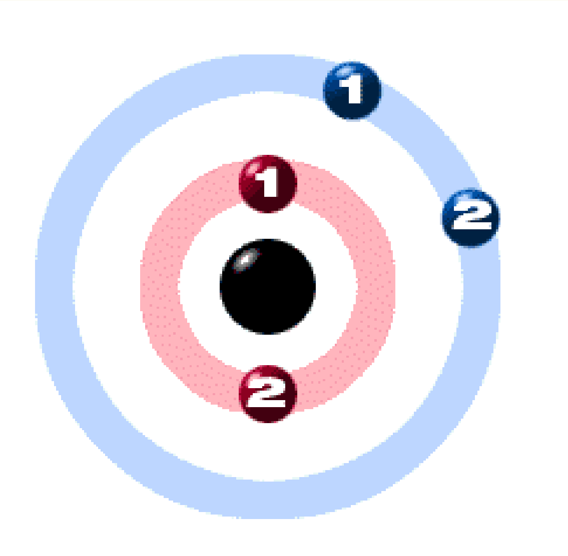
Write your answers on your handout.

Be

Name the element.

Number of shells ?

Valence electrons ?



Beryllium

2nd Period = 2 shells

2nd Group = 2 valence electrons

Write your answers on your handout.

He

Name the element.
Number of shells ?
Valence electrons ?

Write your answers on your handout.

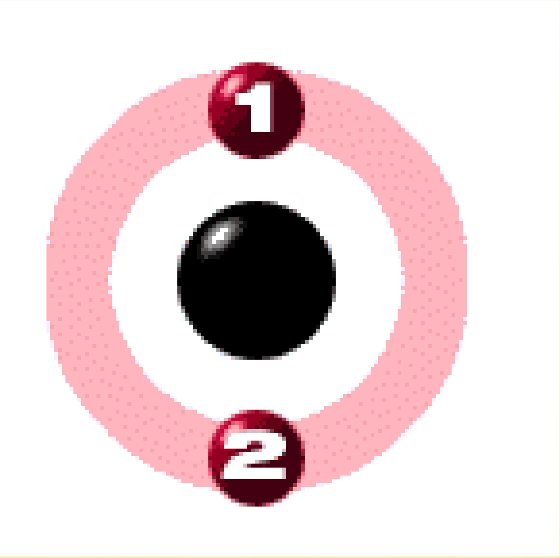
He

Name the element.
Number of shells ?
Valence electrons ?

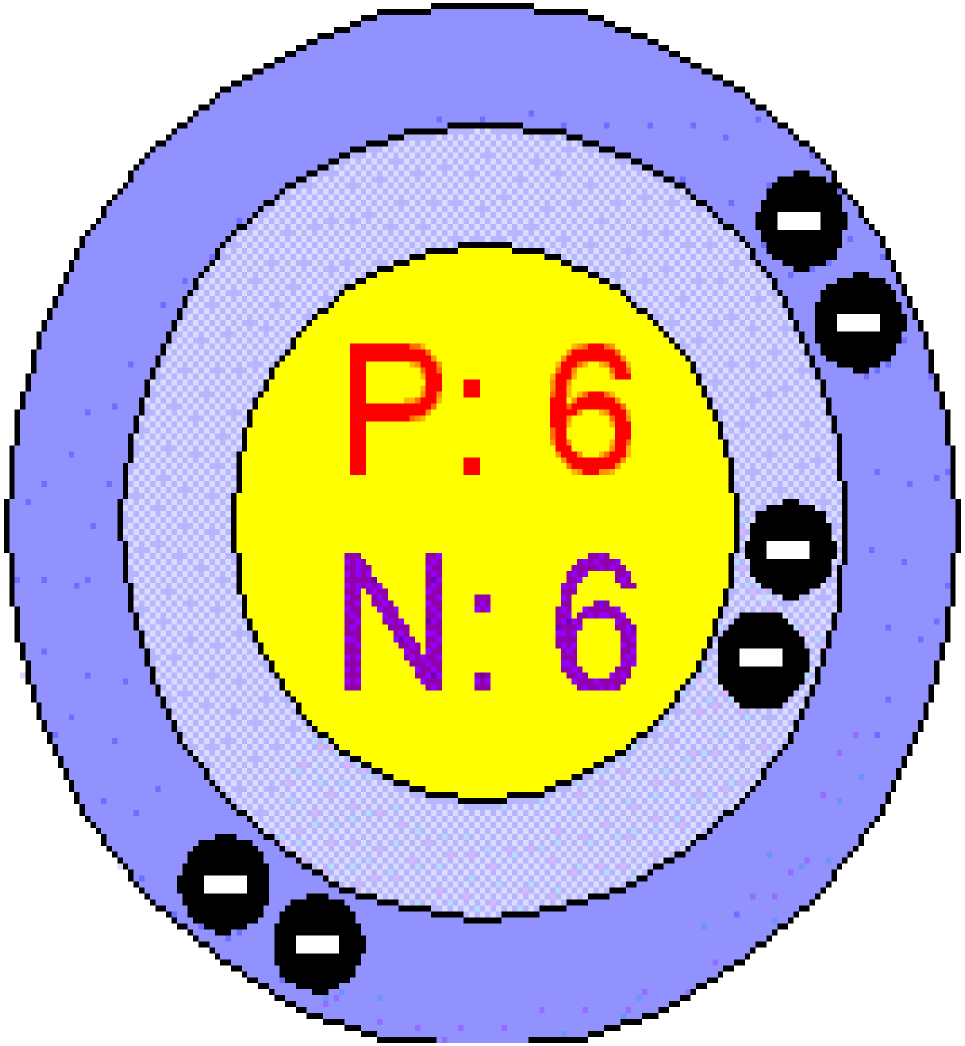
Helium

1st Period = 1 shell

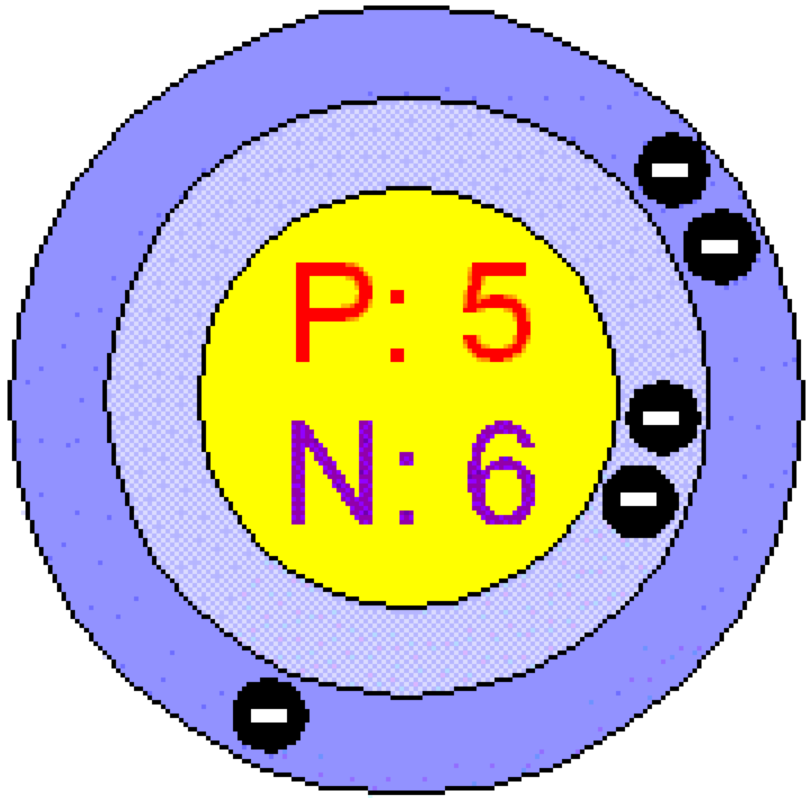
8th Group = 2 valence electrons



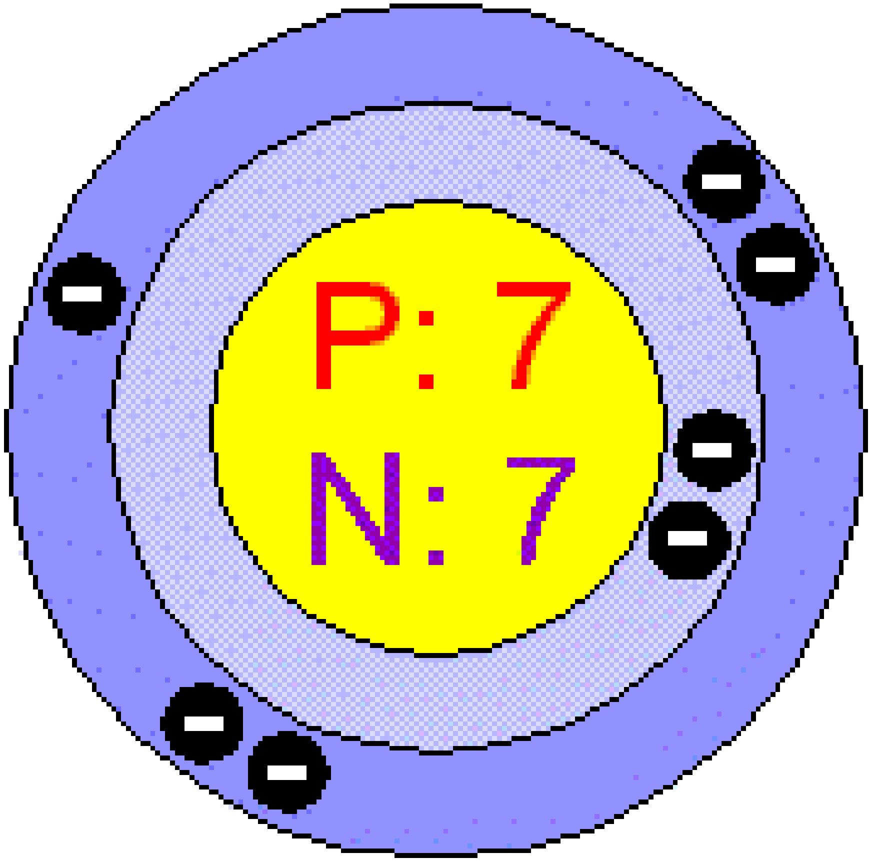
- Helium is the exception in Group 8.
- Since it has just one shell, that shell can only fit 2 electrons instead of 8.
- It is in this group because all the elements have a full outer shell.



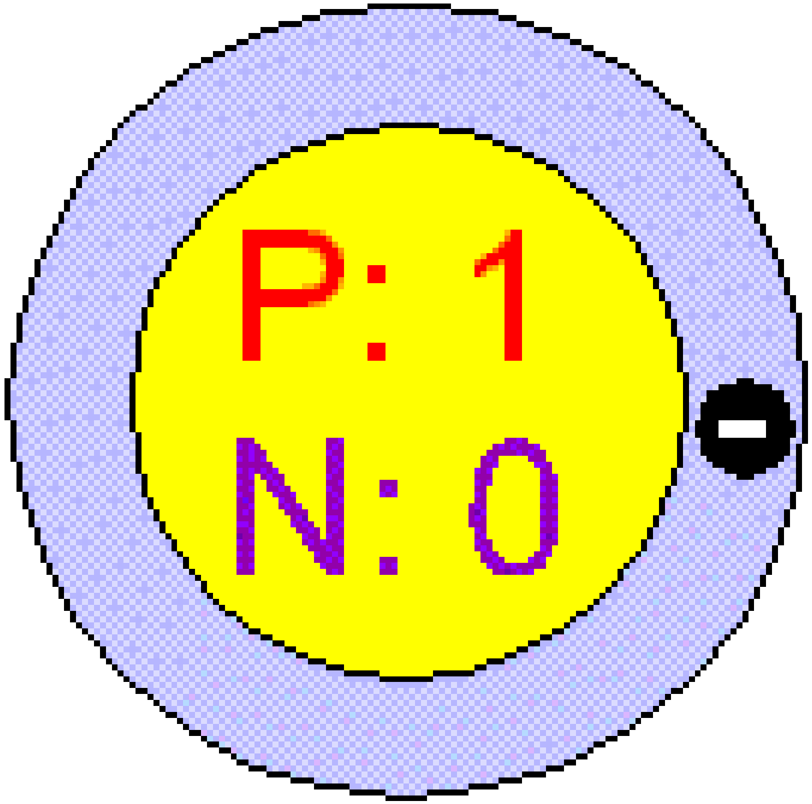
- How many valence electrons?
- What group is this element in? Period?



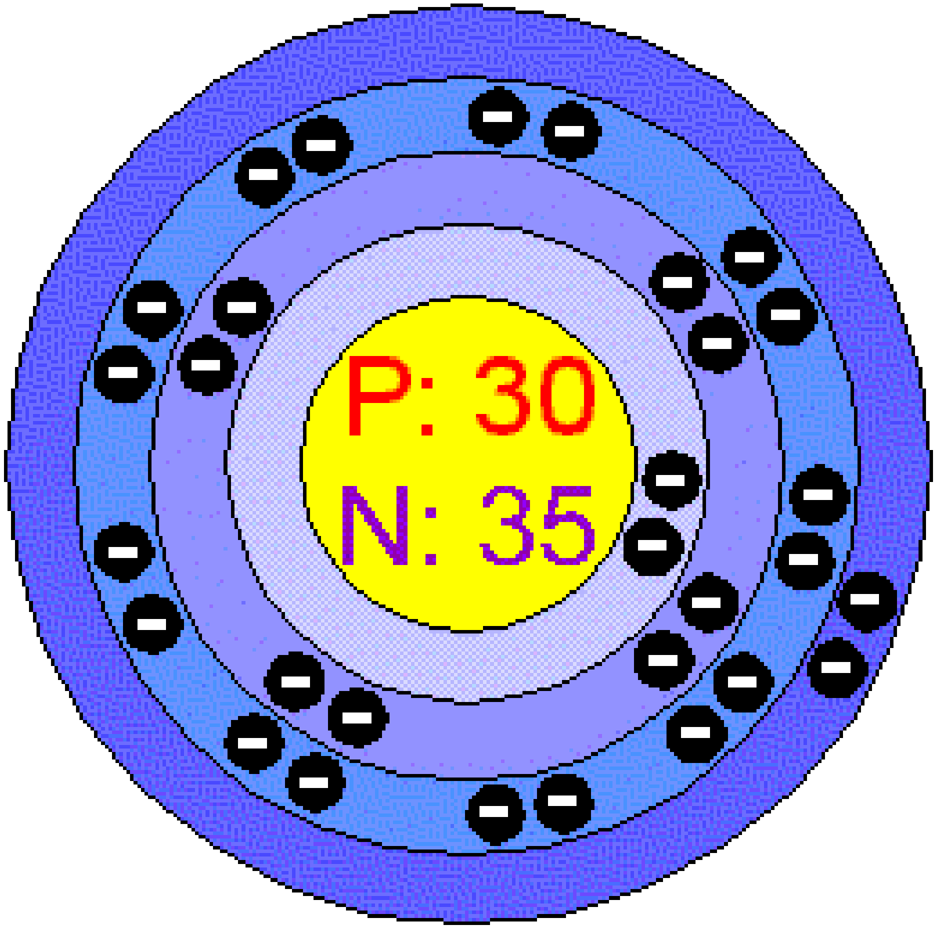
- How many valence electrons?
- What group is this element in?
  Period?



- How many valence electrons?
- What group is this element in?
  Period?



- How many valence electrons?
- What group is this element in? Period?



- How many valence electrons?
- What group is this element in?
  Period?

What does it mean to be reactive?

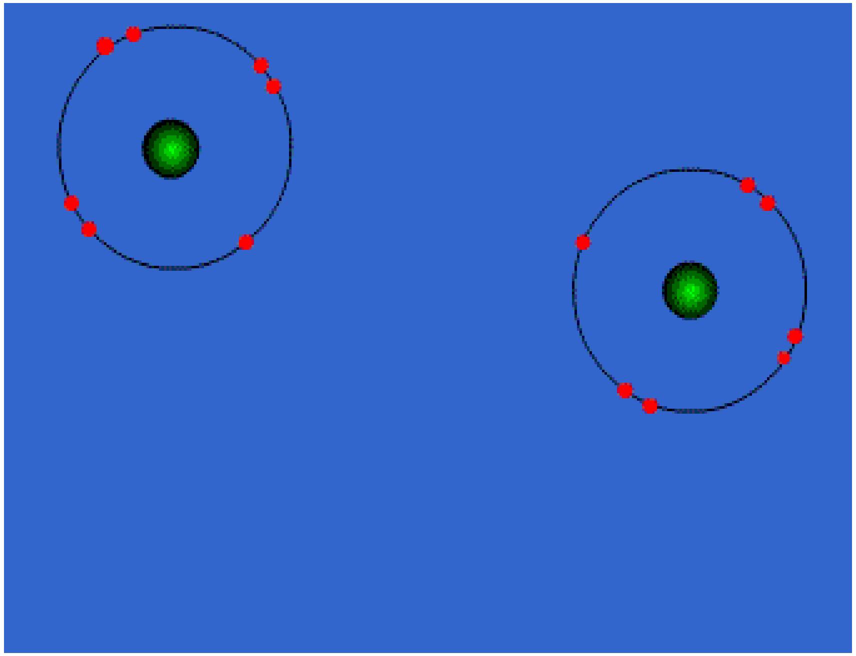
Elements that are reactive bond easily with other elements to make compounds.

What makes an element reactive?

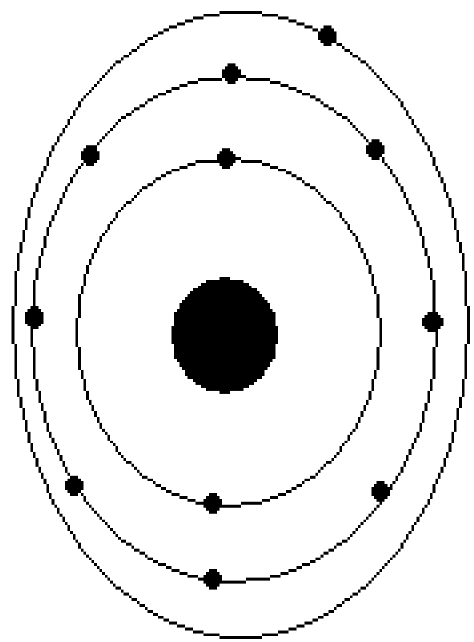
- An incomplete valence electron level.
- All atoms (except hydrogen and helium) want to have 8 electrons in their very outermost energy level (This is called the rule of octet.)
- Atoms bond until this level is complete. Atoms with few valence electrons lose them during bonding. Atoms with 6, 7, or 8 valence electrons gain electrons during bonding.

Valence Electrons

- Valence electrons are the electrons in the outer energy level of an atom.
- These are the electrons that are transferred or shared when atoms bond together.

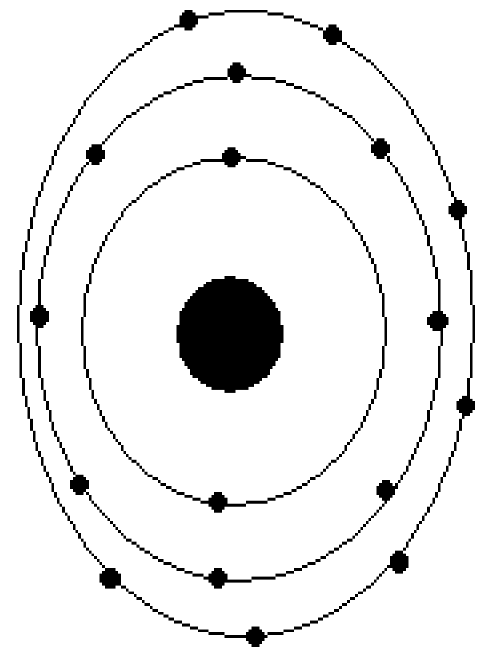


Sodium

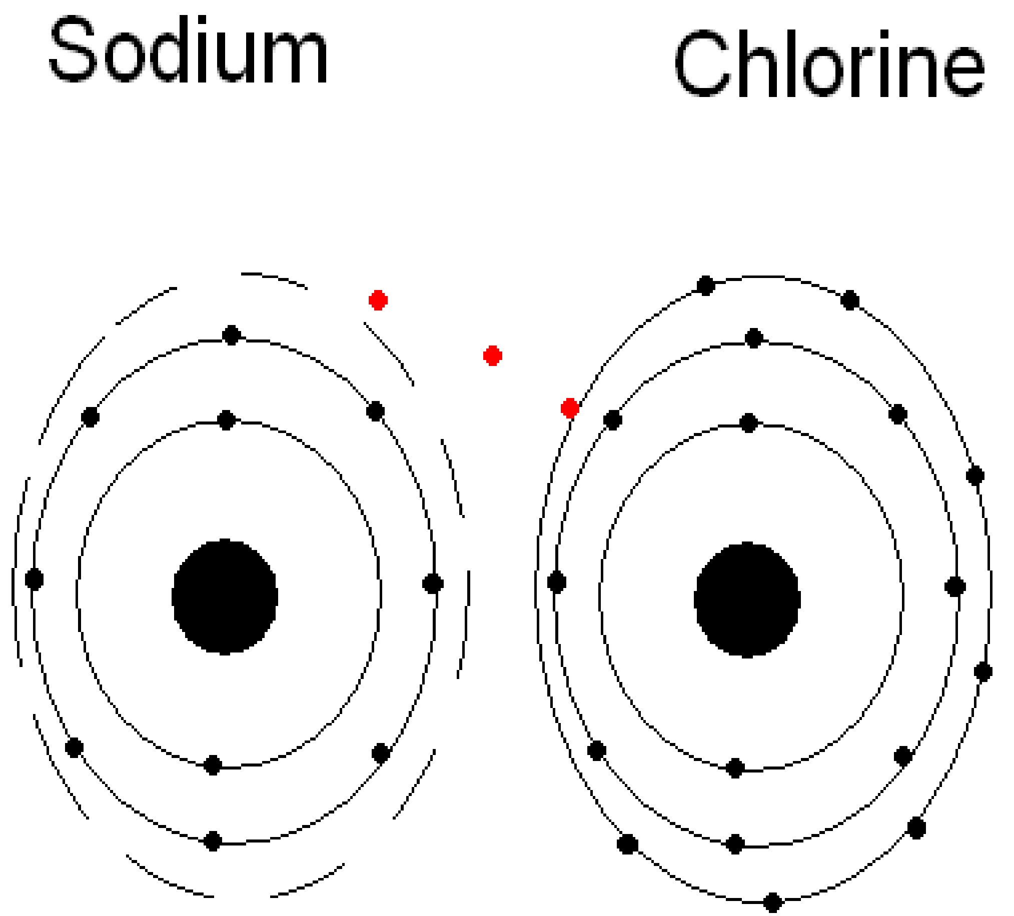


1 valence electron

Chlorine

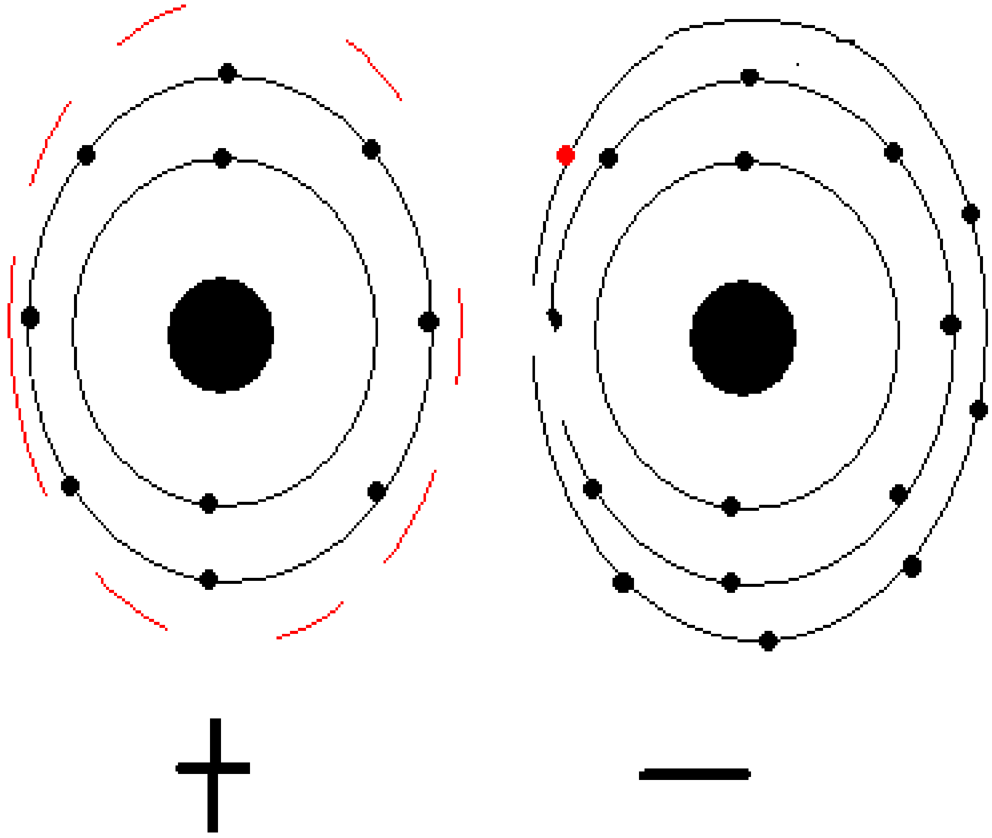


7 valence electrons



Sodium loses one electron.
Chlorine gains one electron.

Sodium Chloride

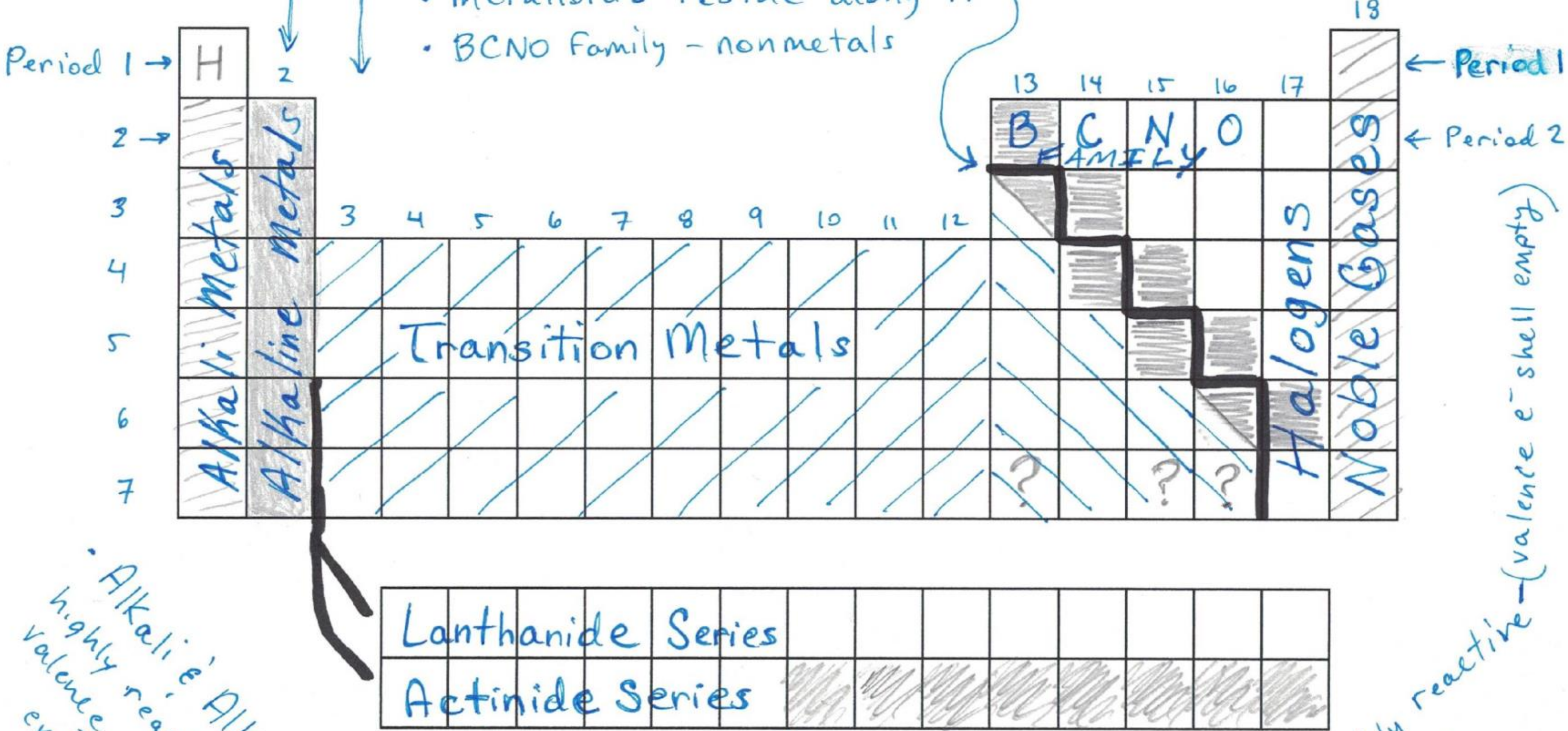


See next slide

Your notes:
filled in Periodic Table
should look something
like this.

Periodic Table

- Periods - increasing atomic # Left → Right
- Groups - elements with similar properties
- Metal & non-metal boundary
- Metalloids reside along it
- BCNO Family - nonmetals



Actinides - radioactive

Synthetic (manmade)

- Alkali & Alkaline highly reactive valence e^- shell empty ex: ^{11}Na Sodium 2 8 1
- Halogens - highly reactive (valence e^- shell empty)
- Noble Gases - inert (Nonreactive) Full valence e^- shell ex: ^{2}He Helium 2