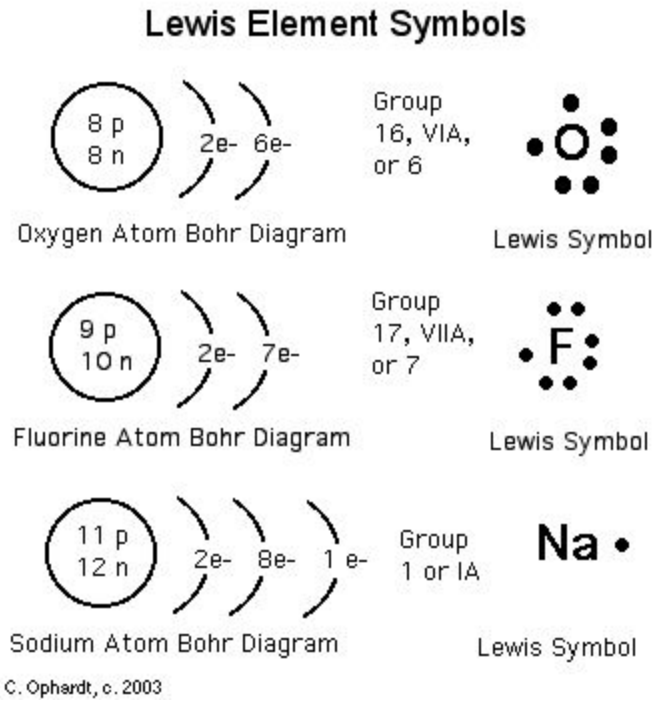
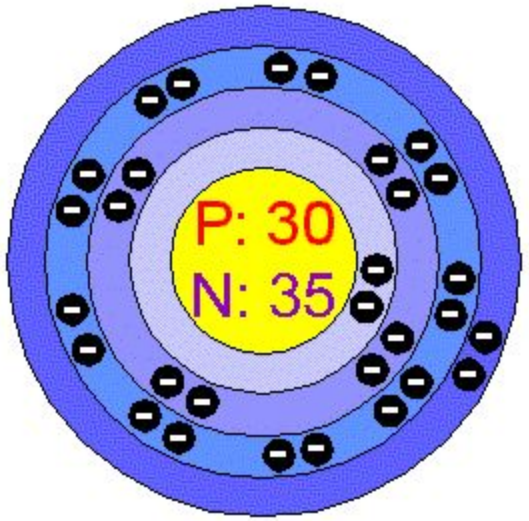
Bohr Diagrams
and
Lewis Dot Structures





What you've already learned in class and from readings

- You learned that Electrons can exist in different **energy levels**
- You learned that the # of Electrons in an atom are equal to the # of Protons in an atom

What You're about to learn

1. Electrons in the outershell are called valence electrons
2. How to draw the Electrons around an Atom in a Bohr Diagram
3. How many Electrons are found in any Element's Valence Shell
4. How to draw a Lewis Structure

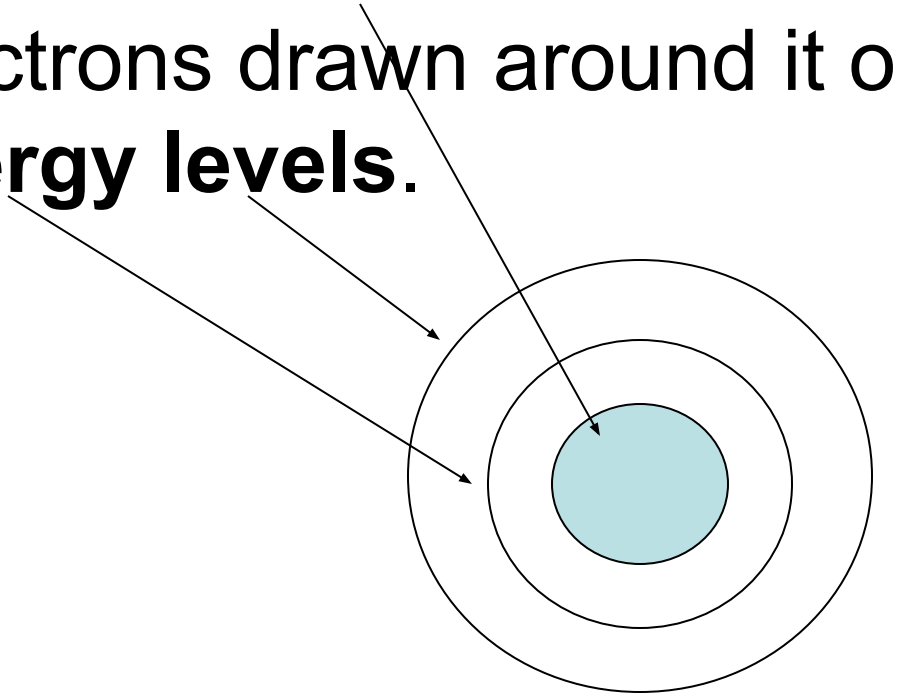
Electrons per shell

Energy Level #	Maximum Capacity
1	2 electrons
2	8 electrons
3	18 electrons
4	32 electrons

The electrons in the outer most shell are called valence electrons or the valence shell is the outer shell.

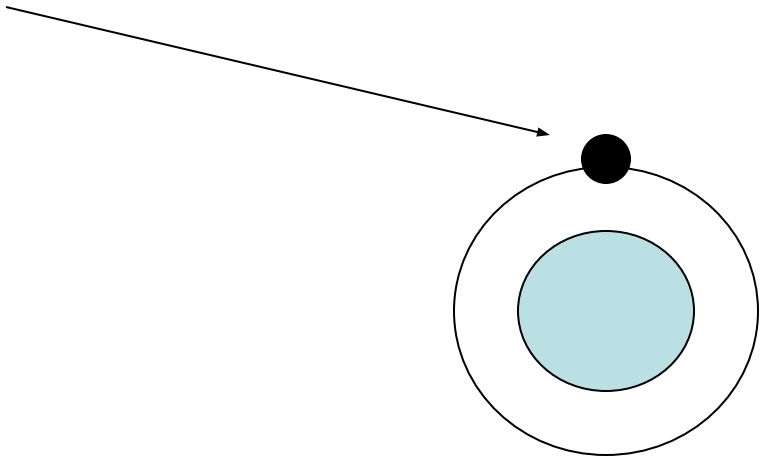
Notes

- A Bohr Diagram is the model of an atom with the Nucleus at the center, and the Electrons drawn around it on different **energy levels**.



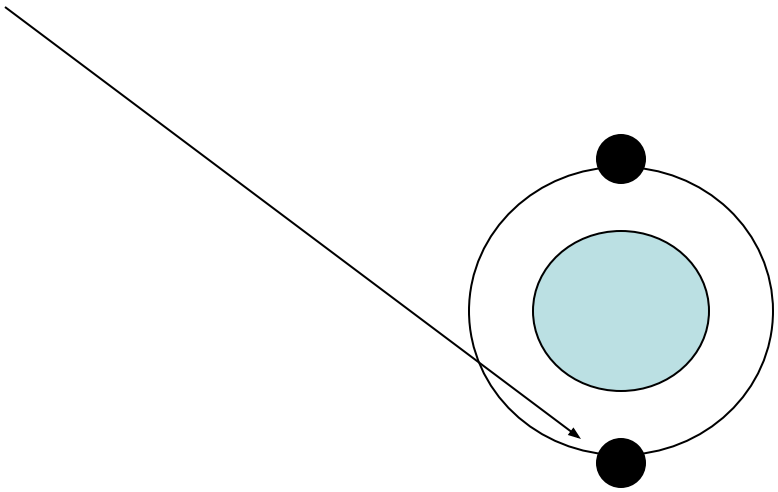
Now for some practice

- For an Atom of **Hydrogen**:
- 1 Electron!
- Simple, you just draw the first Electron here



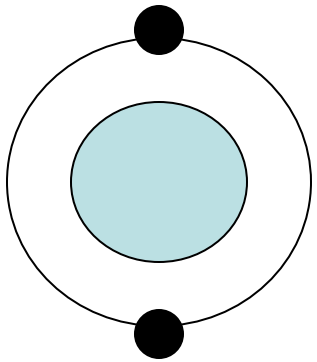
Next

- For an Atom of **Helium**:
- 2 Electrons!
- Simple, you just draw the second Electron here



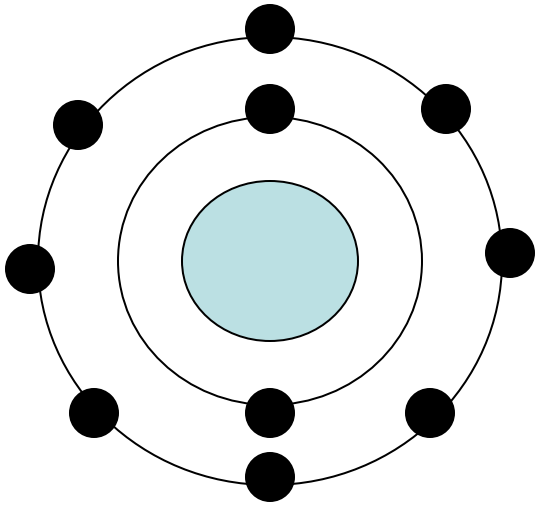
More

- For an Atom of **Lithium**:
- 3 Electrons!
- But wait a minute…We said that only 2 Electrons can fit into the first level
- So What do we do when it's full????



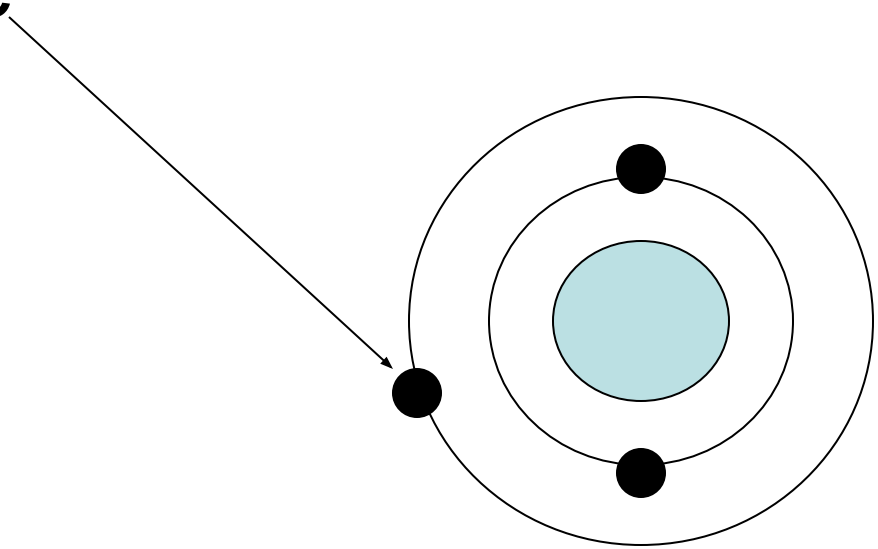
WE ADD ANOTHER LEVEL!!!

- That's right, the first energy level is full
- Now we add another level!!!
- This new level can hold up to 8 Electrons!!!



So

- For an Atom of **Lithium**:
- 3 Electrons!
- Simple, you just draw the third Electron here



Then What?

- When you run out of room on the second level, **you add a third** that can hold **another 18 Electrons**, then a **fourth** that can hold another **32 Electrons**, (but we won't worry about that level right now)

You should Know by Now

- How to draw a Bohr Diagram
- That the
  - 1^{st} energy level can hold 2 e-
  - The 2^{nd} can hold 8 e-
  - The 3^{rd} can hold 18 e-

Finally: Lewis Structures

- **All you have to do for a Lewis Structure is draw Dots around an Element's Symbol**
- But How Many????

What you are about to learn

1. How many Electrons are found in any Element's Valence Shell
2. How to draw a Lewis Structure

So…

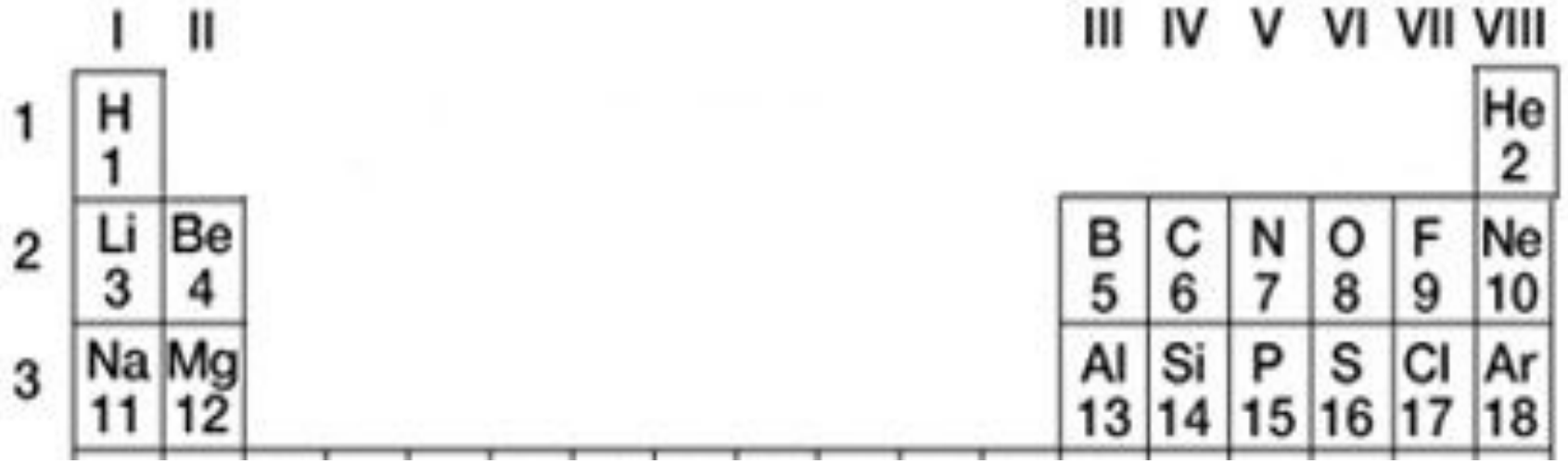
- The amount of dots you draw for a Lewis Structure (LS for short) is equal to the # of Valence Electrons in an Atom

Valence Electrons

- The # of Valence e- an atom has is dictated by the Group the Element is in
- Groups are the Vertical Columns on the Periodic Table!!! ***It's So Simple!!!!***

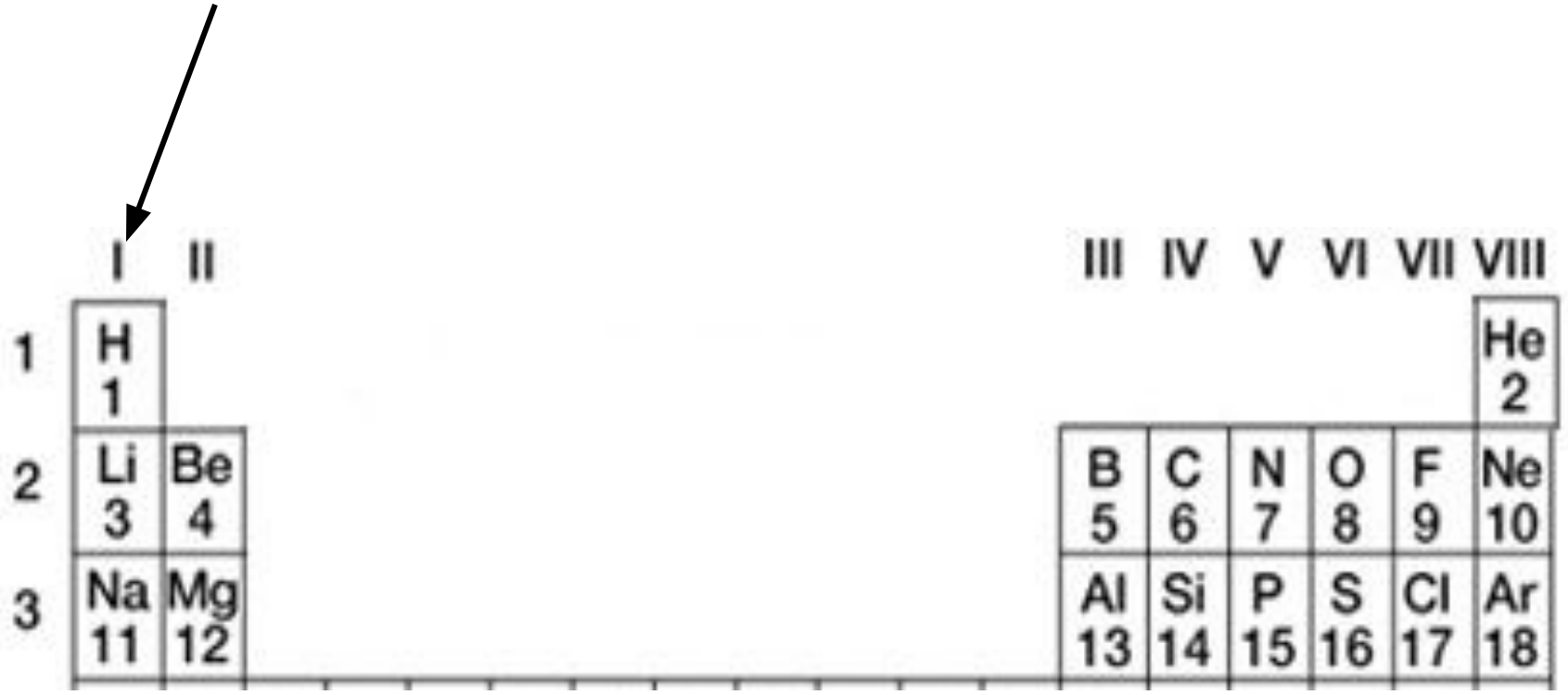
Practice:

- ***The First Two Are Tricky so pay attention***



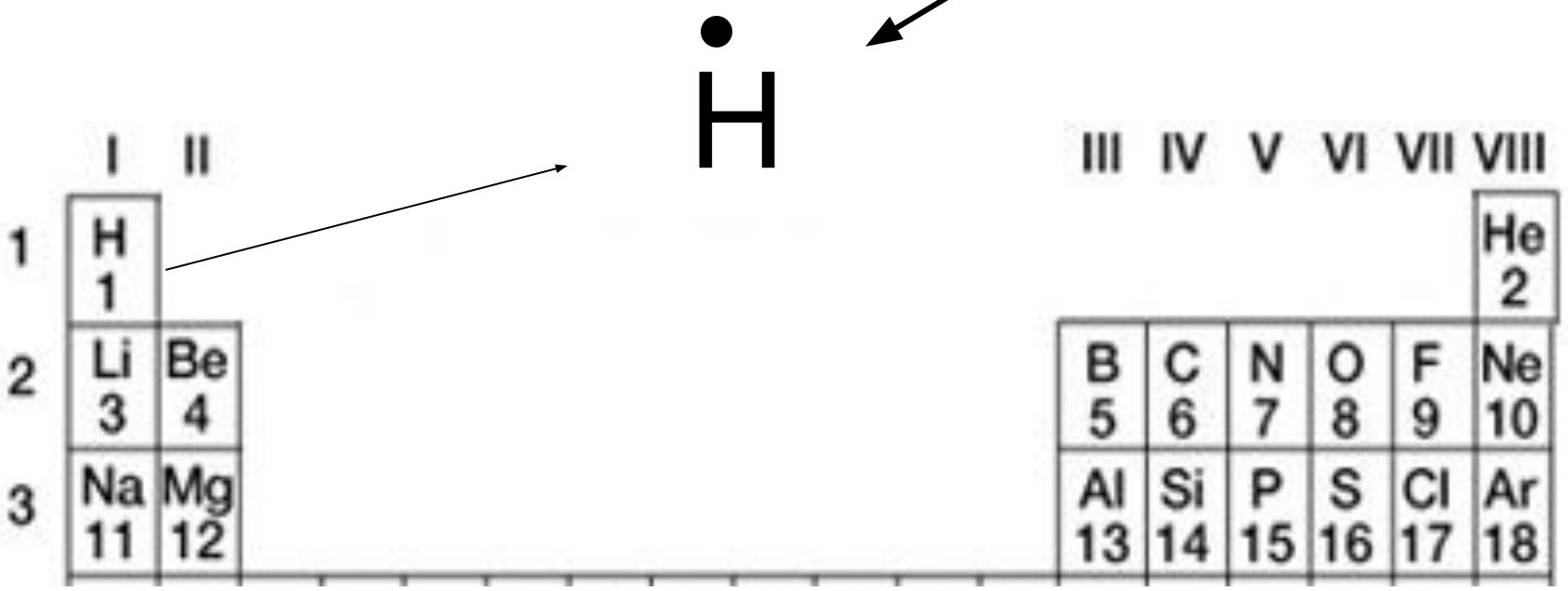
Practice:

- All Elements in the <u>first group</u> have only <u>1 Valence e-</u>



Practice:

- All Elements in the first group would have a LS like this:



Practice:

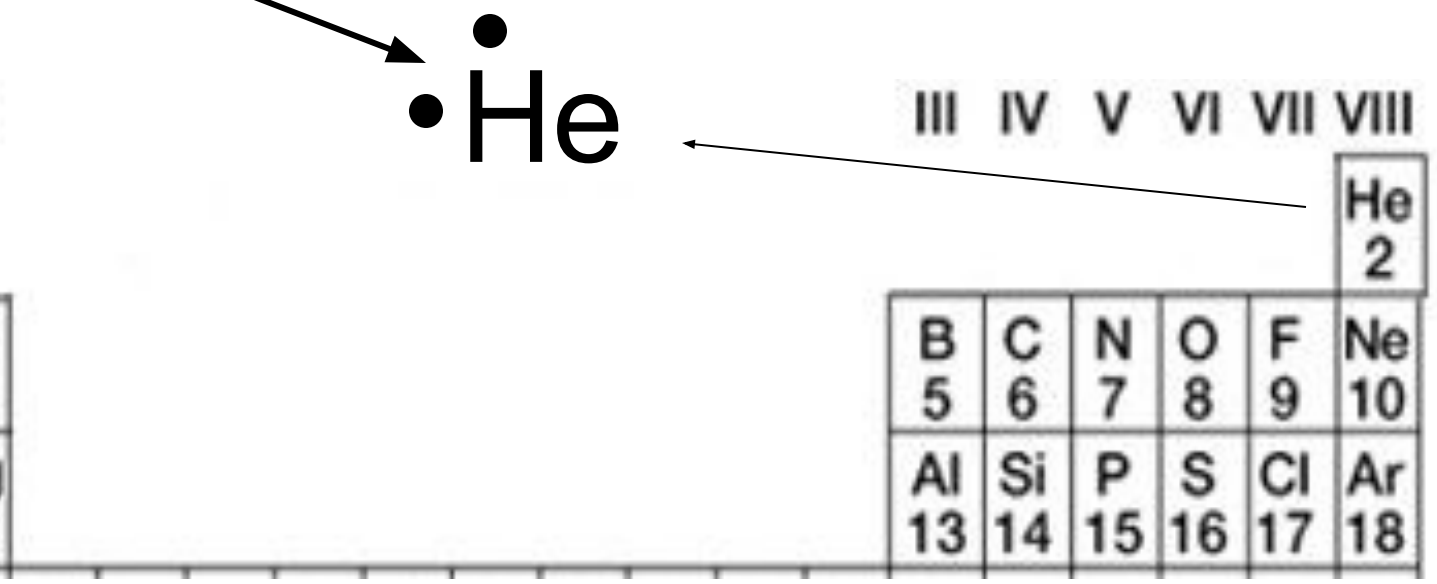
- All Elements in the <u>second group</u> have only <u>2 Valence e-</u>

Practice:

- But what about Helium!!!
- It only has 2 e- so it can only have 2 e- in its Valence Shell

Practice:

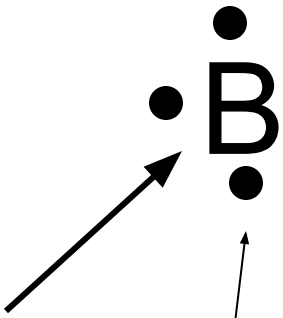
- All Elements in the second group would have a LS like this



	I	II									III	IV	V	VI	VII	VIII
1	H 1															He 2
2	Li 3	Be 4									B 5	C 6	N 7	O 8	F 9	Ne 10
3	Na 11	Mg 12									Al 13	Si 14	P 15	S 16	Cl 17	Ar 18

So…

- Group 3
- 3 Valence e-
- Structure like this:



Now you should know

1. How to draw the Electrons around an Atom in a Bohr Diagram
2. How many Electrons are found in any Element's Valence Shell
3. How to draw a Lewis Structure