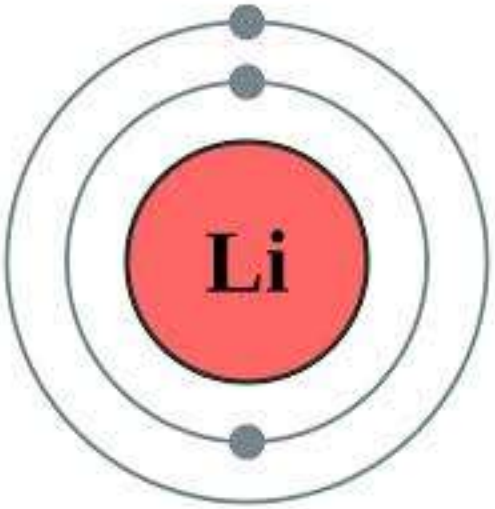
Bohr Diagrams
and
Lewis Dot Structures



What You've Already Learned in Class

- You learned that electrons can exist in different **energy clouds**

- You learned that the number of electrons in an atom are equal to the number of protons.

Learning Objective

1. Use knowledge of the Periodic Table to draw a Bohr Diagram with electron configurations.

2. To be able to determine how many valance electrons an element has.

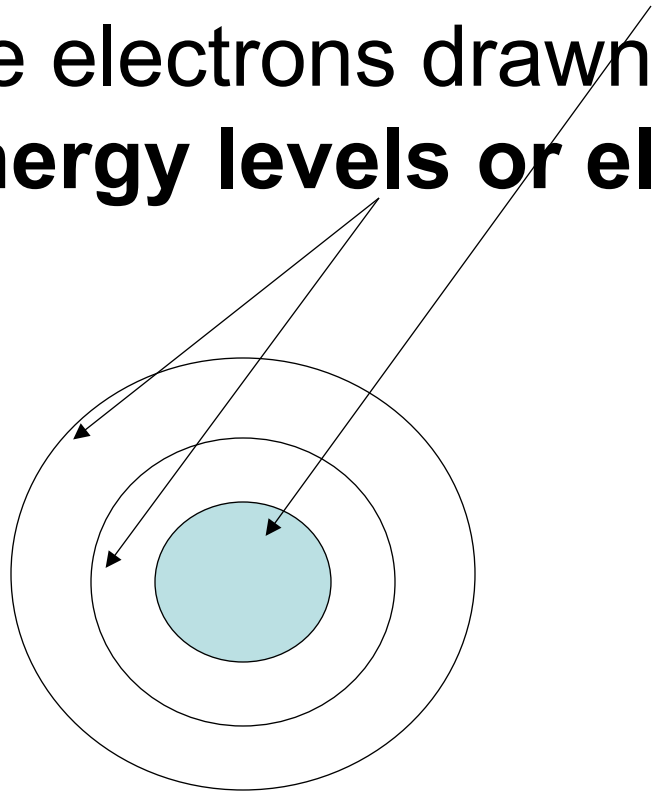
3. Use knowledge of valence electrons to draw a Lewis Dot Structure

Review!

Electron Cloud	Maximum Electrons
1	2
2	8
3	8 (happy with 8, but can hold up to 18)

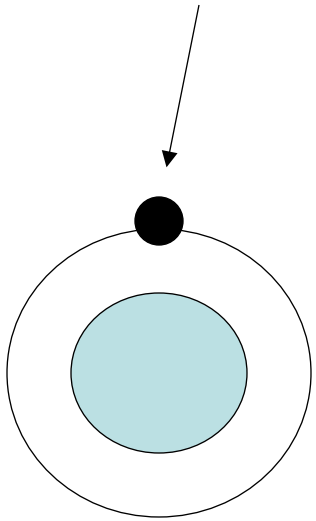
Bohr Diagram

- A model of an atom with the nucleus at the center, and the electrons drawn around it on different **energy levels or electron clouds**.



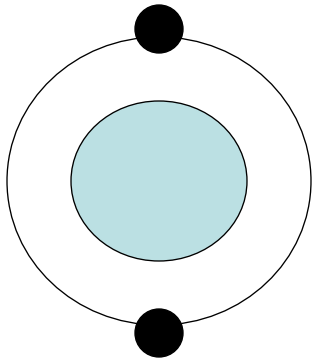
Practice

- For an Atom of **Hydrogen**:
- How many electrons? **1**
- Now, draw the electron

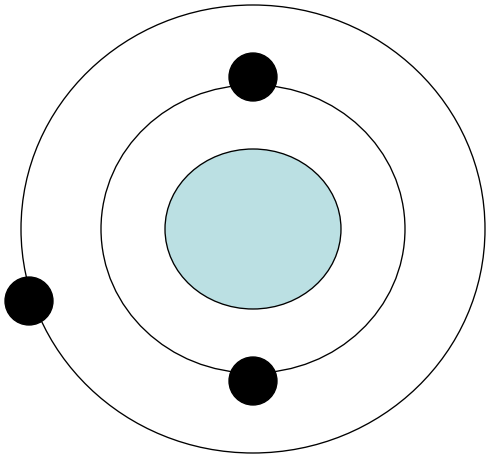


Next

- For an Atom of **Helium**:
- How many electrons? **2**
- Now, draw the electrons



- For an Atom of **Lithium**:
- How many electrons? **3**
- How many electron clouds? **2**
- Now, draw the electrons

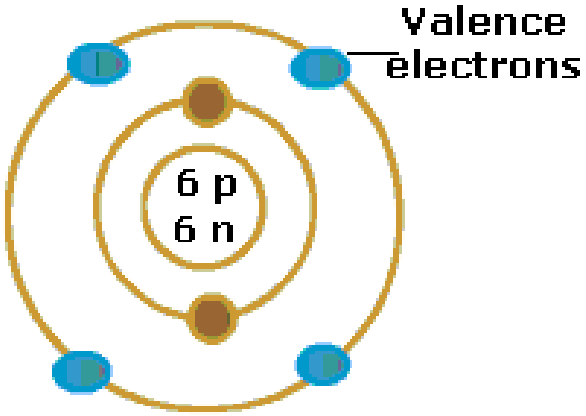


Bohr Diagram Summary

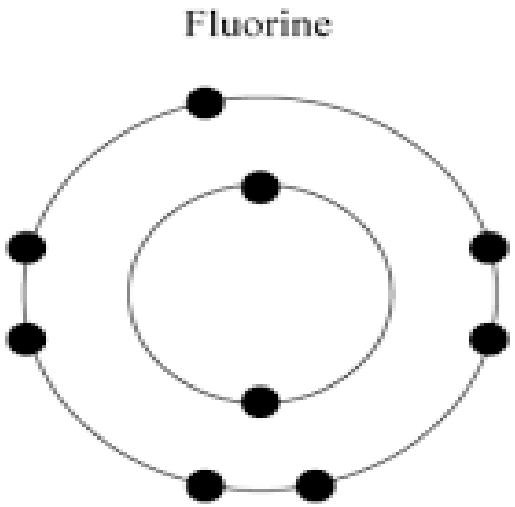
- Draw the nucleus.
- Draw the total number of electrons in the correct cloud arrangement
- Remember:
  - 1^{st} energy level can hold 2 e-
  - 2^{nd} can hold 8 e-
  - 3^{rd} happy with 8 e-

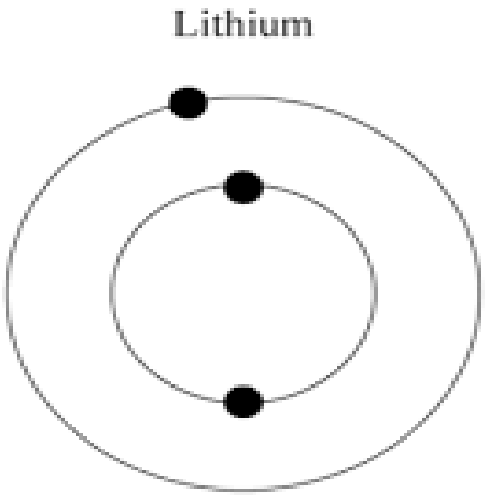
Valence Electrons

- Valence Electrons are the electrons on the outermost electron cloud of an Atom.



4 Valence Electrons





How many valence electrons?

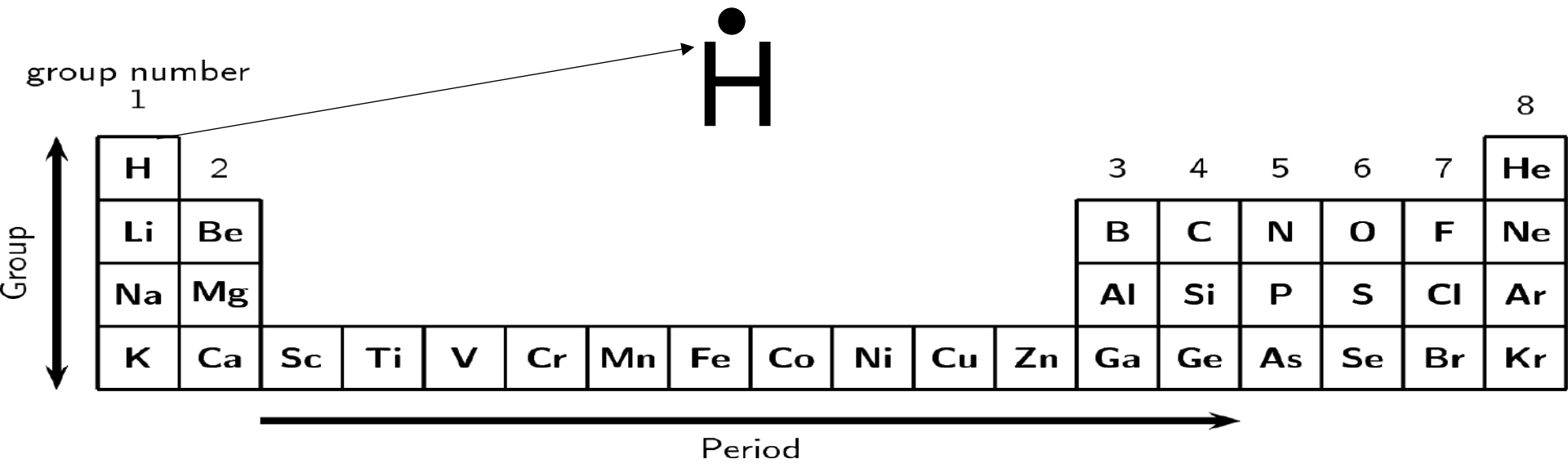
Flourine: _7_ Lithium: _1_

Valence Electrons

- Determined by the elements Group.
- Groups are the Vertical Columns (up and down) on the Periodic Table.

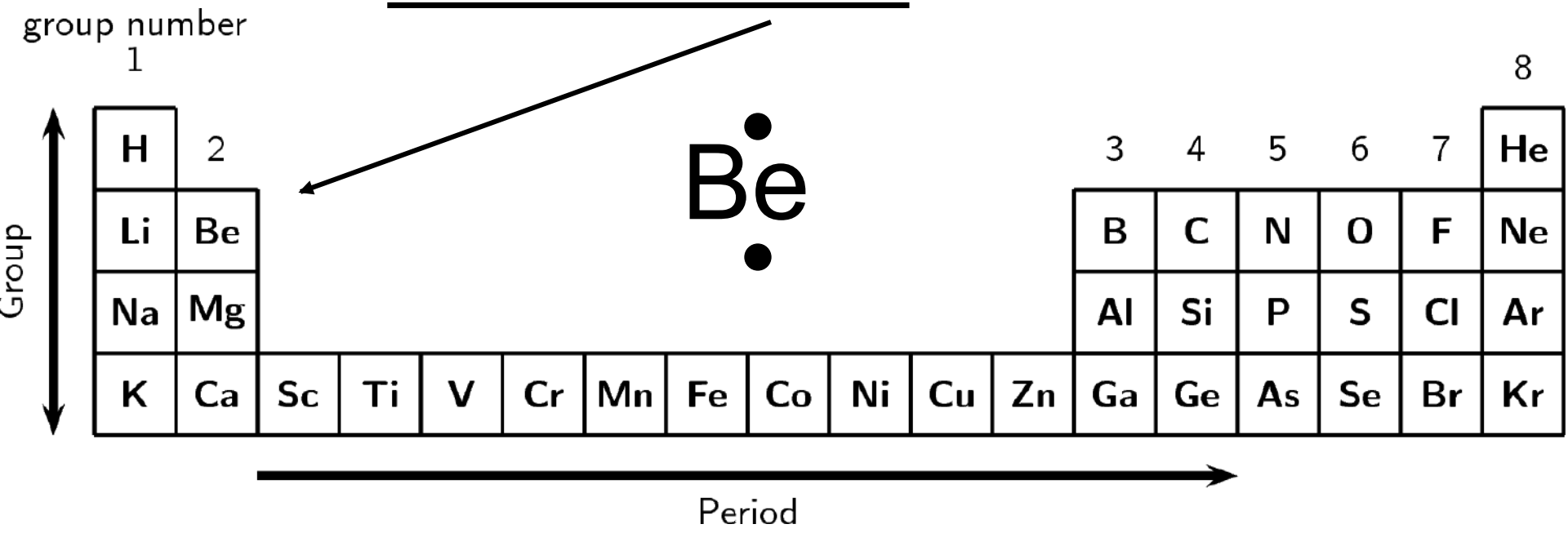
Lewis Dot Structure

- All elements in the 1st group have only 1 valence electron. All elements in the first group have a Lewis Dot Structure like this:

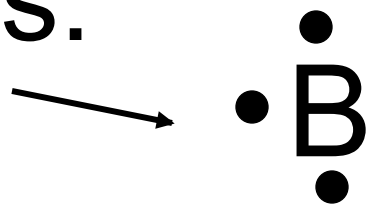


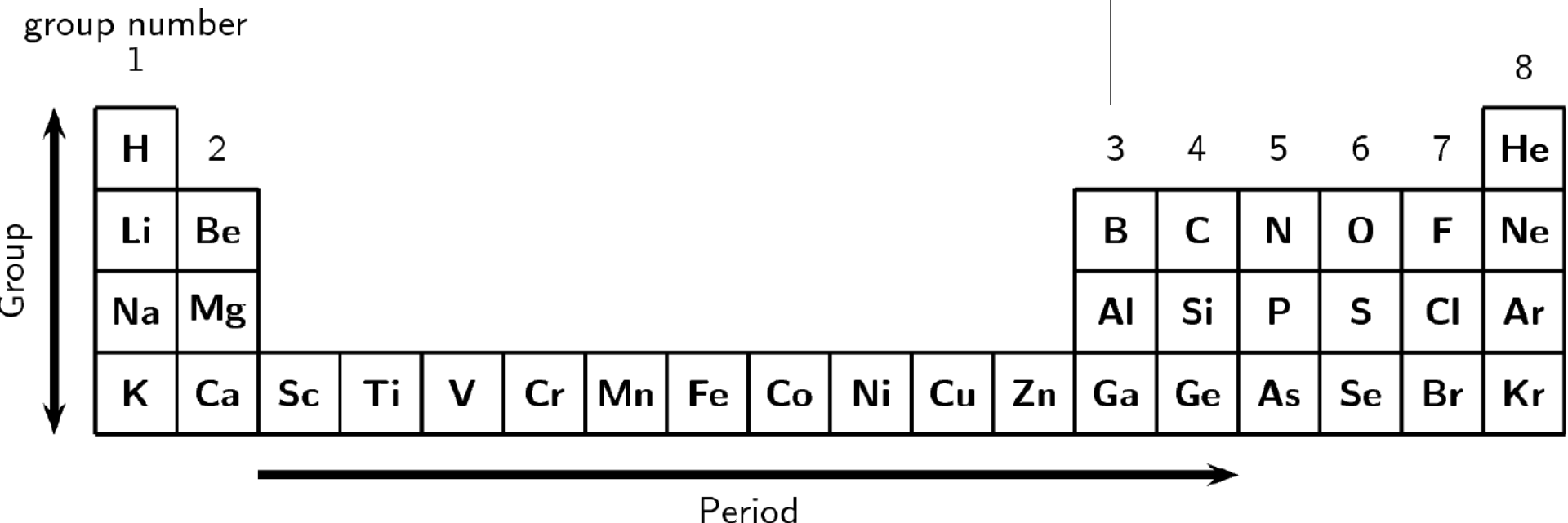
Determining Valence Electrons

- All Elements in the 2nd group have 2 valence e-



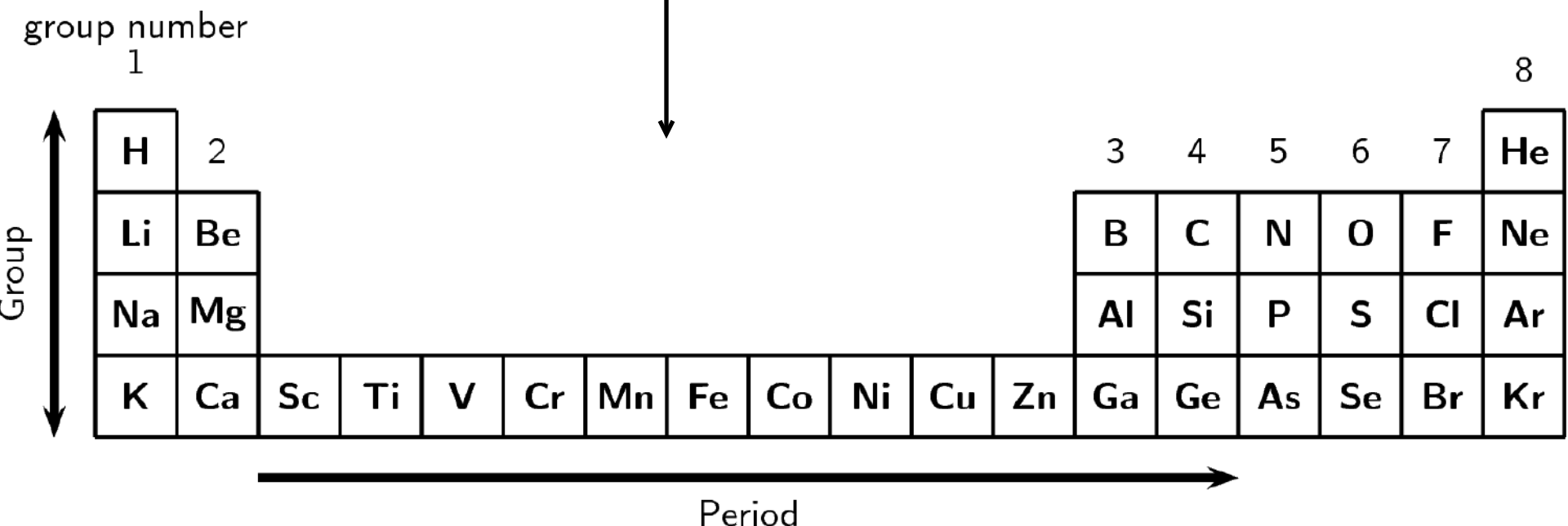
- <u>All elements in the 3rd group have 3 valence e-</u>
- Structure like this:





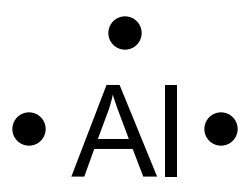
Determining Valence Electrons

Skip the middle section, groups 3-12 , called the transition metals (These don't always follow the rules. You'll learn about these later.)



To find valence electrons in groups 13-18 drop the 1.

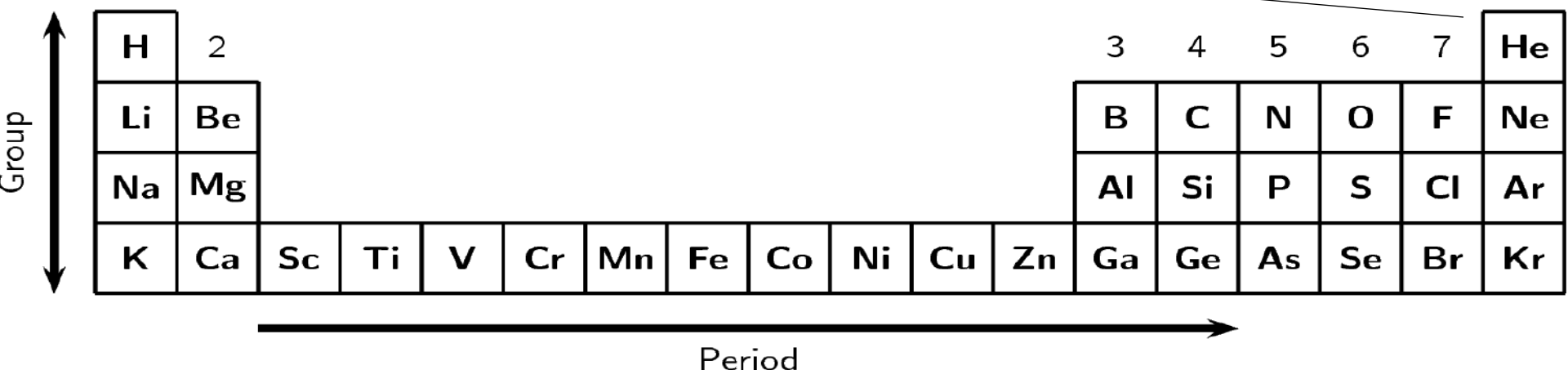
Example:
Al has 3 valence Electrons. Lewis Structure looks like this:



Exception

- Helium (He) is an exception. It's in the 18th group, but only has 2 valence electrons.

•He



Lewis Structure Summary

1. Draw the chemical symbol.
2. Determine valence electrons by atom's group number.
3. Skip the middle when counting groups, and drop the 1 in front of groups 13-18
4. Draw the valence electrons around chemical symbol.

Lewis Structure Practice

Draw the Lewis Structure for a Nitrogen atom.