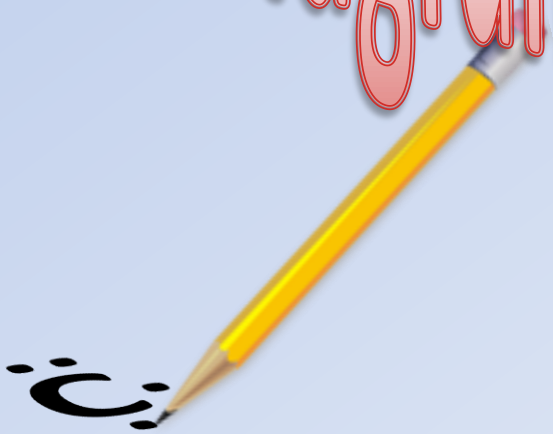
Drawing Electron Dot Diagrams

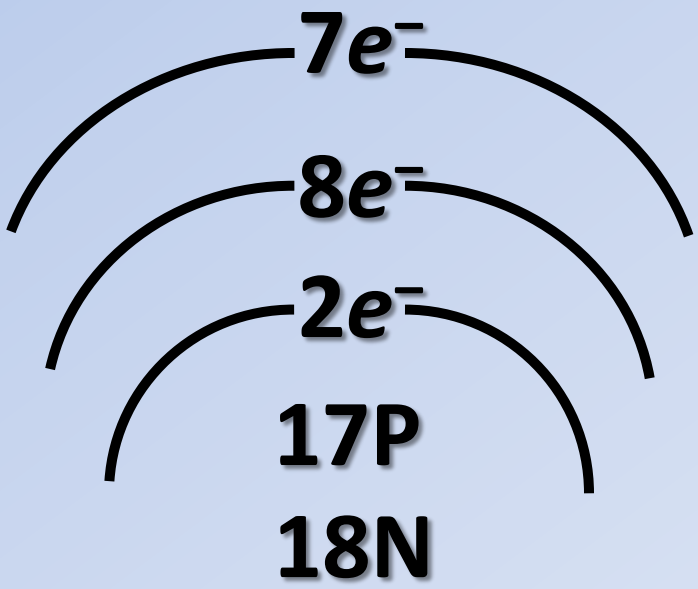


Draw a Bohr Diagram of Chlorine

- Gather the data:

A	Z	N	Electron Configuration
35	17	18	2–8–7

- Draw the diagram:



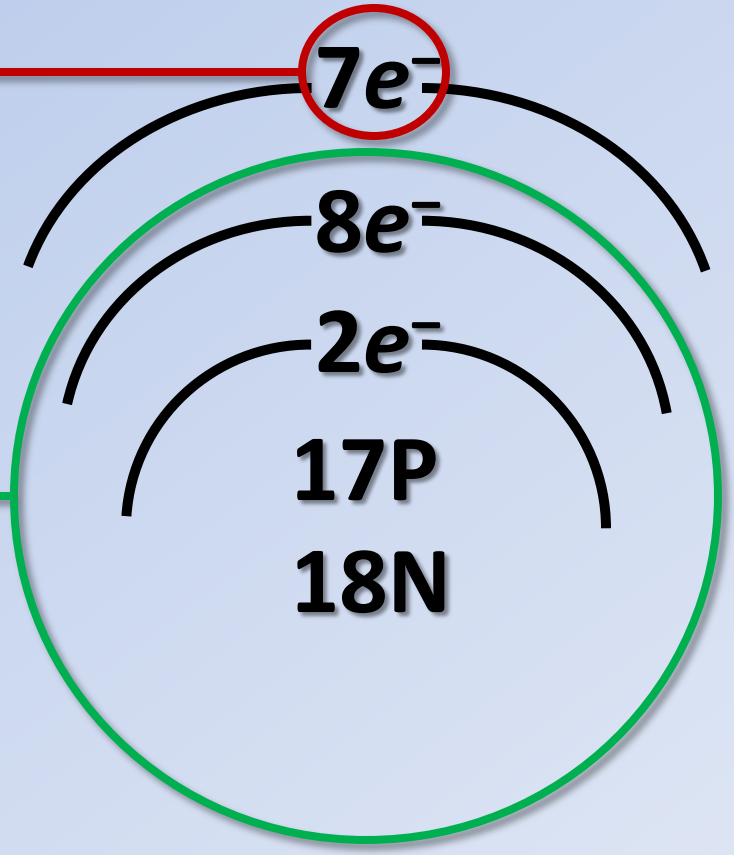
Emphasizing Valence Electrons

- Only the outer electrons or valence electrons are involved in bonding.

valence electrons

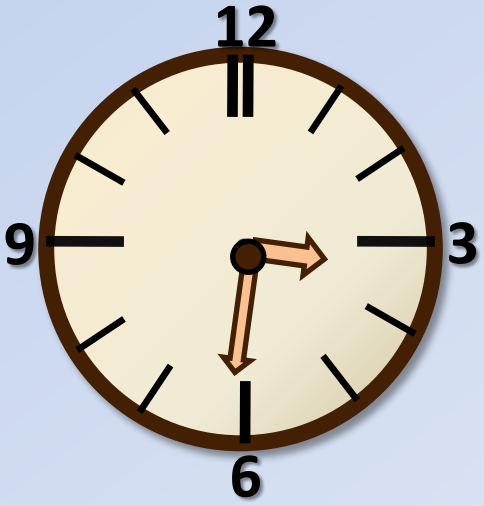
- The rest of the atom is called the ***kernel***.

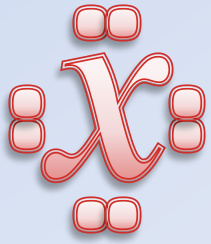
kernel



Parts of an Electron Dot Diagram

- The kernel of an atom, in an electron dot diagram, is represented by the element's symbol.
- The valence electrons are represented by dots.
  - The valence electrons are in 4 orbitals, 1 *s* orbital and 3 *p* orbitals.
  - The location of these orbitals is represented by the four clock positions at 12 o' clock, 3 o' clock, 6 o' clock, and 9 o' clock.
  - Up to 2 electrons can be placed in each orbital.





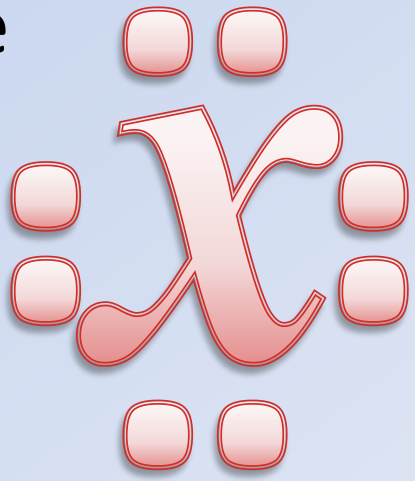
An Analogy for Placing Electrons

- Imagine a bus with 1 two person bench down below, and 3 two person benches upstairs. Seating is limited.
  - If you enter and find a seat below, you take it, even if the bench is occupied.
  - If there are no seats below, you go upstairs.
    - ✓If you have a choice, you take a seat in the first available empty bench rather than sit with a stranger.
    - ✓If there are no empty benches, you sit with a stranger.

- Electrons go into orbitals around the kernel in a very similar fashion.

Rules for Placing Electrons

- The electrons are placed in orbitals in the four clock positions around the kernel.
- The first two electrons go into the *s* orbital because it is lowest energy.
- The remaining electrons go into the three *p* orbitals without pairing until all the *p* orbitals are occupied.



Chlorine: An Example

- The symbol for chlorine is *Cl*.
- Chlorine has seven valence electrons.

- There is one unpaired electron.

A Refinement

- It is not necessary to start with the *s* orbital at 12 o' clock. It can be at the other three clock positions.
- It is not necessary to go in a clockwise direction from the *s* orbital to the *p* orbitals.
- It is necessary, however, to be consistent. Once a clockwise or counterclockwise direction is selected, you must stick wit it.