

GENERAL CHEMISTRY

STANDARD 4.3

4.3: Define valence electrons and determine the number of valence electrons for any main group elements

VALENCE ELECTRONS

- **Valence Electron:** An electron located in the outermost shell of an atom
 - Valence electrons are the only electrons involved in chemical bonding between atoms
 - Atoms can only have a maximum of eight valence electrons
 - Valence electrons are only located in the *s* and *p* orbitals
- Simple to count valence electrons in main group elements
 - Elements in Group 1A – one valence electron
 - Elements in Group 2A – two valence electrons
 - Elements in Group 3A – three valence electrons
 - And so on...

VALENCE ELECTRONS EXAMPLES

- Determine the number of valence electrons in the following main group elements:
 - Boron
 - Element is in Group 3A – three valence electrons ($2s^22p^1$)
 - Silicon
 - Element is in Group 6A – six valence electrons ($2s^22p^4$)