

# NOTES: CHEMICAL BONDING AND OCTET RULE

## OCTET RULE

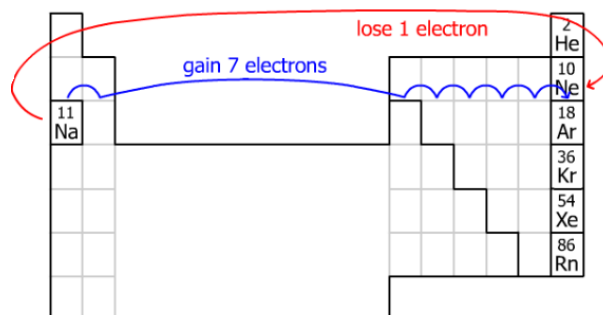
- Atoms will gain, lose or share electrons to be like a noble gas
  - Because noble-gas electrons configurations are stable due to full valence shell
  - All noble gases (except He) have 8 valence electrons

## CHEMICAL BONDS

- Attractive forces that hold atoms or ions together
  - Atoms, ions, etc bond according to the octet rule (achieve a full valence shell)
- Two types:
  - Covalent bonding: atoms share valence electrons
    - Atoms, mostly nonmetals, with similar electronegativity values ( $\Delta EN < 1.7$ )
  - Ionic bonding: atoms transfer electrons
    - atoms lose or gain electrons and form ions
    - Ions held together by electrostatic forces between the opposite charges
    - Atoms, usually one metal and one nonmetal, with very different electronegativity values ( $\Delta EN > 1.7$ )

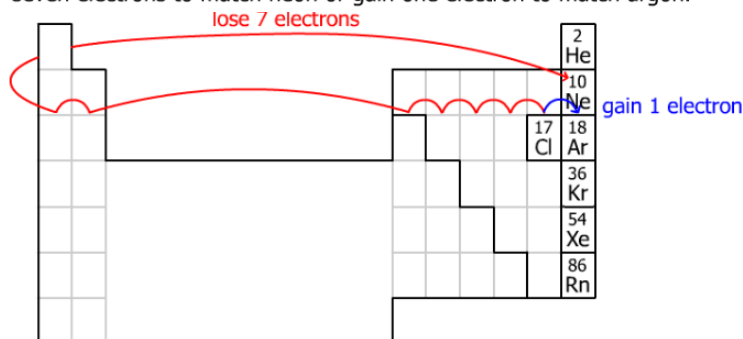
## TO LOSE OR GAIN? ... THAT IS THE QUESTION

For sodium to match the number of electrons of a noble gas it will either have to lose one electron so that it has ten, or gain seven electrons to have eighteen.



Of these two options, it is much easier to lose one electron than it would (due to sodium's low electronegativity).

Since a neutral chlorine atom has 17 electrons, it will either have to lose seven electrons to match neon or gain one electron to match argon.



Of these two options, it is much easier to gain one electron than it would be to lose seven (due to Chlorine's high electronegativity).