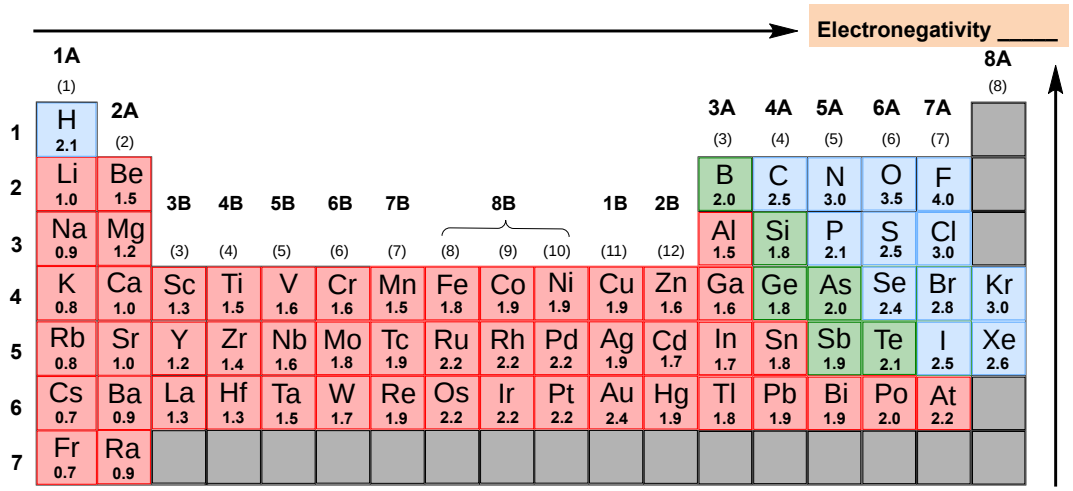
CONCEPT: DIPOLE MOMENT (SIMPLIFIED)

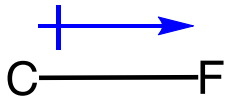
- **Electronegativity (EN)**: Measurement of an element's ability to attract electrons to itself.
  - □ In 1932, the American chemist Linus Pauling proposed electronegativity values for the elements.
  - □ **Periodic Trend:** Electronegativity _____ moving from left to right across a period and going up a group.



EXAMPLE: Which of the following represents the most electronegative alkaline earth metal?

a) Cs b) Li c) H d) Be e) Al

- **Dipole Moment**: *Polarity* that arises when elements in a bond have a significant difference in their *electronegativities*.
  - □ **Polarity:** _____ sharing of electrons between bonding atoms.
  - □ A difference in electronegativity greater than _____ is considered significant.
    - Difference in Electronegativity (ΔEN) = ____ electronegativity value – ____ electronegativity value.
  - □ The dipole moment is illustrated by a *dipole arrow* that points towards the _____ electronegative element.



EXAMPLE: Calculate the difference in electronegativity values between carbon and fluorine.

a) 0.5 b) 2.0 c) –1.5 d) 1.5 e) 0.0

PRACTICE: Arrange the following molecules in order of decreasing dipole moment.

H–I H–F H–Br H–Cl

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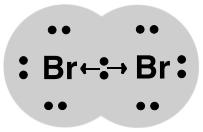
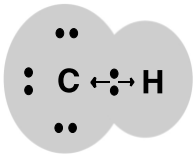
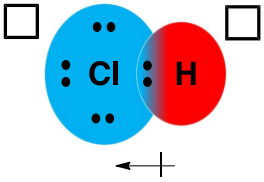
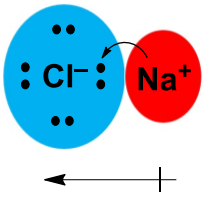
Further Chemical Bond Classifications

- The difference in electronegativities between two elements can determine the type of chemical bond present.
  - □ The ____ difference in electronegativity then ____ the polarity of the bond.

Bond Classifications

Electronegative Difference (△EN)	Bond Type	Bond Illustration
Zero (0.0)	_____	
Small 0.1 – 0.4)	_____	
Intermediate (0.5 – 1.7)	_____	
Large (> 1.7)	_____	

EXAMPLE: For those listed below, which has the most polar bond?

a) S–Se b) S–H c) Cl–F d) S–F e) S–O

PRACTICE: Which of the following correctly identifies the chemical bond between a carbon and oxygen atom?

a) Polar Covalent b) Pure Covalent c) Nonpolar Covalent d) Ionic

CONCEPT: DIPOLE MOMENT (SIMPLIFIED)

PRACTICE: Arrange the following elements in order of decreasing electronegativity: P, Na, N, Al

a) P > Na > N > Al b) N > P > Na > Al c) Na > Al > P > N d) N > P > Al > Na e) P > N > Na > Al

PRACTICE: Between which two elements is the difference in electronegativity the greatest?

a) C and Si b) Li and I c) Na and P d) K and F e) Br and Cl

PRACTICE: Which of the following correctly identifies the chemical bond between two bromine atoms?

a) Polar Covalent b) Pure Covalent c) Nonpolar Covalent d) Ionic