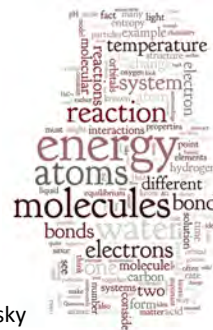


# Molecular Shape, Polarity, and Properties



Chemistry, Life, the Universe &amp; Everything – Cooper &amp; Klymkowsky

# electronegativity

- Ability of an element to **attract electrons to itself in a bond**.
- Depends on effective nuclear charge
- Trend is same as effective nuclear charge (excepting noble gases)
- Electronegativity **increases** across the periodic table
- Electronegativity **decreases** down the periodic table

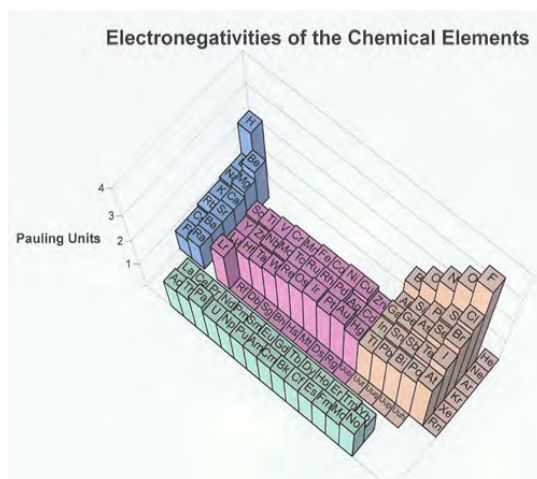
Which is more electronegative?

- A. F
- B. Cl
- C. Br
- D. I

Which is more electronegative?

- A. C
- B. N
- C. O
- D. F
- E. Ne

# Electronegativities



## Polar Bonds

When two atoms of different electronegativities bond - the electrons are not shared equally.

Results in a **dipole**



## Which bonds are polar?

- |        |  |
|--------|--|
| 1. H-F | 1. Yes   |
| 2. H-O | 2. Yes   |
| 3. H-C | 3. No (OK a bit – but not enough to bother with) |
| 4. C-C | 4. No  |

## Shape of molecule important!

- Bond dipoles are vector quantities
  - They have magnitude and direction
- Must take both into account
- Download [Molecule Polarity](#)

## Which molecules are polar?

- |                      |        |
|----------------------|--------|
| 1. CH <sub>4</sub>   | 1. No  |
| 2. CH <sub>3</sub> F | 2. Yes |
| 3. CO <sub>2</sub>   | 3. No  |
| 4. H <sub>2</sub> O  | 4. Yes |
| 5. SO <sub>3</sub>   | 5. No  |

Up through here for Exam II

## Questions

- Why do you think that the trends in effective nuclear charge, ionization energy and electronegativity are correlated? What does correlated mean?
- Draw a graph for the trends of each property
  - Across a row
  - Down a group