Chapter 3 homework due Monday, 5:00 pm
Chapter 1 and 2 keys posted later today.
Chem and Environment news
  – Brittany Daley
Monday (info by 8:00 pm today)
  – Brian Kolb
Exam I next Wednesday

How many outer shell (bonding) electrons in a molecule of ammonia NH₃?

| 38% | 1 | 3 |
| 0%  | 2 | 5 |
| 82% | 3 | 8 |
| 0%  | 4 | 10 |
| 0%  | 5 | 11 |

How many outer shell (bonding) electrons in a molecule of methane CH₄?

| 0%  | 1 | 4 |
| 0%  | 2 | 6 |
| 100%| 3 | 8 |
| 0%  | 4 | 10 |
| 0%  | 5 | 12 |

General behavior of IVA, VA, VIA, VIIA elements
The best way to see the bonds due to sharing electrons is through some examples:
– H₂O
  Carbon has 4 bonds (shares 4 pair of e⁻)
  Oxygen has 2 bonds (shares 2 pair of e⁻)
  Hydrogen has 1 bonds (shares 1 pair of e⁻)
  Nitrogen has 3 bonds (shares 3 pair of e⁻)
– NH₃
  Carbon has 4 bonds (shares 4 pair of e⁻)
  Oxygen has 2 bonds (shares 2 pair of e⁻)
  Hydrogen has 1 bonds (shares 1 pair of e⁻)
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– CH₄
  Carbon has 4 bonds (shares 4 pair of e⁻)
  Oxygen has 2 bonds (shares 2 pair of e⁻)
  Hydrogen has 1 bonds (shares 1 pair of e⁻)
  Nitrogen has 3 bonds (shares 3 pair of e⁻)
General behavior of IVA, VA, VIA, VIIA elements

- The best way to see the bonds due to sharing electrons is through some examples:
  - $H_2O$
  - $NH_3$
  - $CH_4$
  - $O_2$

  **Carbon** has 4 bonds (shares 4 pair of e-)
  **Oxygen** has 2 bonds (shares 2 pair of e-)
  **Hydrogen** has 1 bond (shares 1 pair of e-)
  **Nitrogen** has 3 bonds (shares 3 pair of e-)

Not all covalent bonds are the same (sec 3.14)

- Electrons in a covalent bond between two of the same atoms are shared equally. This is a *non-polar bond*.
  - $Cl_2$, $O_2$, $N_2$, etc.
- Electrons in a covalent bond between two different atoms are not shared equally. “elements that lie to the upper right of the periodic table exert a greater attraction for shared electrons” p.51. This is a *polar bond* and is most important if one of the atoms is $Cl$, $F$, $N$ or $O$.
  - $HCl$, $NH_3$, $H_2O$
- The three dimensional arrangement of polar bonds in a molecule will determine if the overall molecule is polar.

3D model vs. 2D Lewis

- Build the following molecules and sketch them in your notebook. Each group member build at least one model. Compare to Lewis structure - include all valence electrons in the drawing,
  - $CH_4$ (or $CH_3OH$)
  - $H_2O$
  - $NH_3$
  - $CH_4$
  - $O_2$
  - $CO_2$

  **Carbon** - black
  **Oxygen** - red
  **Hydrogen** - yellow
  **Nitrogen** - blue
  **Sticks** - single bonds
  **Springs** - double bonds

Why is polarity important??

- Many important physical and chemical properties are influenced by molecular polarity.
- Why is methane a gas that does not dissolve in water and methanol a liquid that easily dissolves in water?
- Why does sodium chloride dissolve and conduct electricity while sugar dissolves but does not conduct electricity?
- Why do oil and water not mix well?
- Whether or not a compound easily dissolves in water is significant in terms of how it moves through the environment and how it can be monitored and detected.