

# Announcements

- Turn on the Clicker (the red LED comes on).
- Push “Join” button followed by “20” followed by the “Send” button (switches to flashing green LED if successful).
- Suggested reading and problems for Kinetics and Smog section have been e-mailed and posted.
- Quiz will be just on entropy, free energy, macronutrients and DNA. None of the kinetics & smog material covered today will be on it.
- My office hours tomorrow (Wed) will be shifted to 8-9A from their normal time.

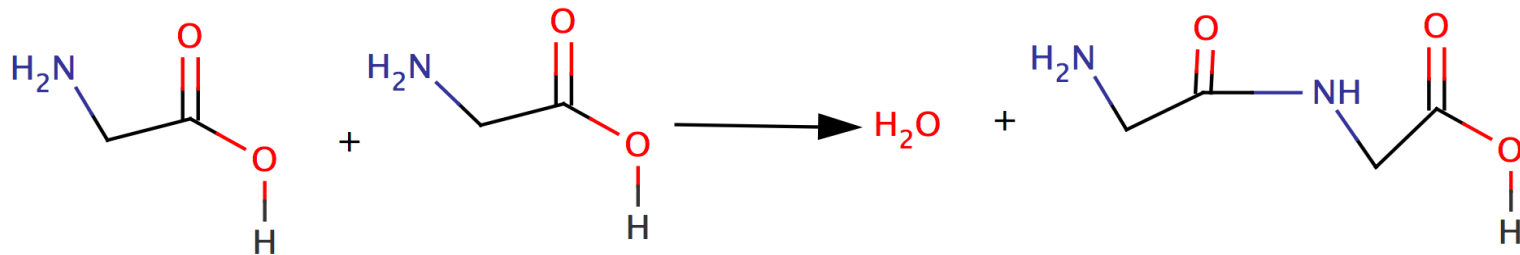
# Review

- Calculating  $\Delta G$

- From  $\Delta H_f^\circ$  and  $S^\circ$ .  $\Delta G = \Delta H_{\text{sys}} - T\Delta S_{\text{sys}}$
- From  $\Delta G_f^\circ$ .  $\Delta G_{\text{RXN}}^\circ = \sum \Delta G_f^\circ(\text{prod}) - \sum \Delta G_f^\circ(\text{reac})$
- $\Delta G < 0$  spontaneous,  $\Delta G > 0$  nonspontaneous

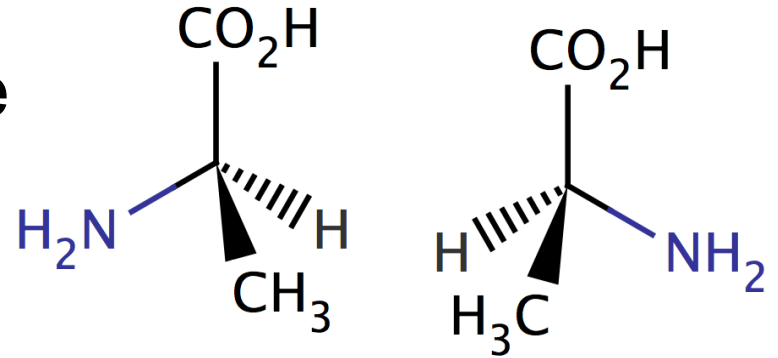
- Carbohydrates, Proteins, Lipids

- Carbohydrates = starch, cellulose & sugars
- Proteins made of chains of  $\alpha$ -amino acids coupled by condensation reactions to form peptide bonds:



# Review

- Stereoisomerism of proteins
  - 4 different groups on C make a **chiral** center.
  - Called **stereoisomers** or **enantiomers**.



- Lipids
  - Fatty acids bound to glycerol in a condensation reaction.



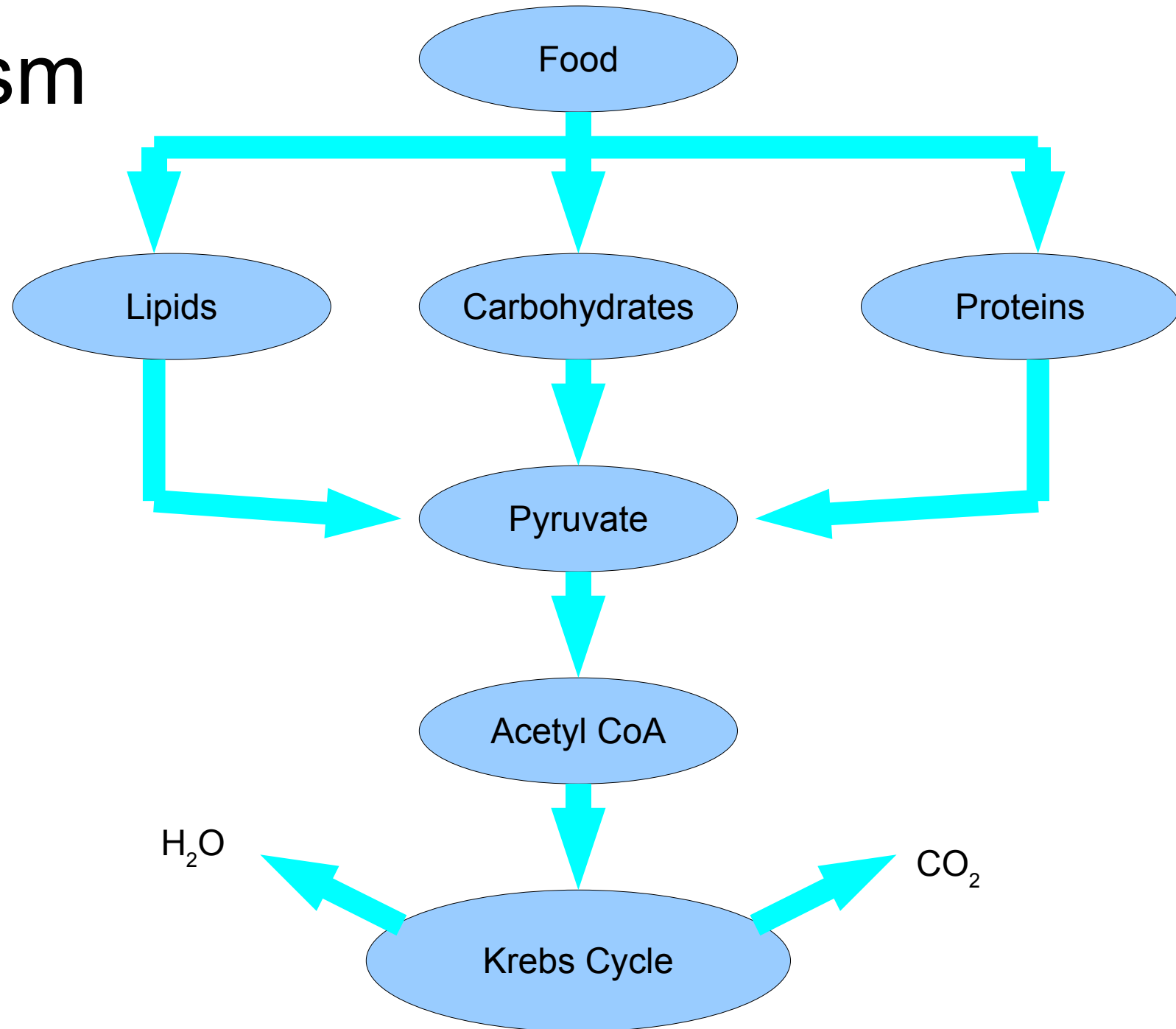
- Saturated have no double bonds in chains
- Unsaturated have double bonds in chains

# Review

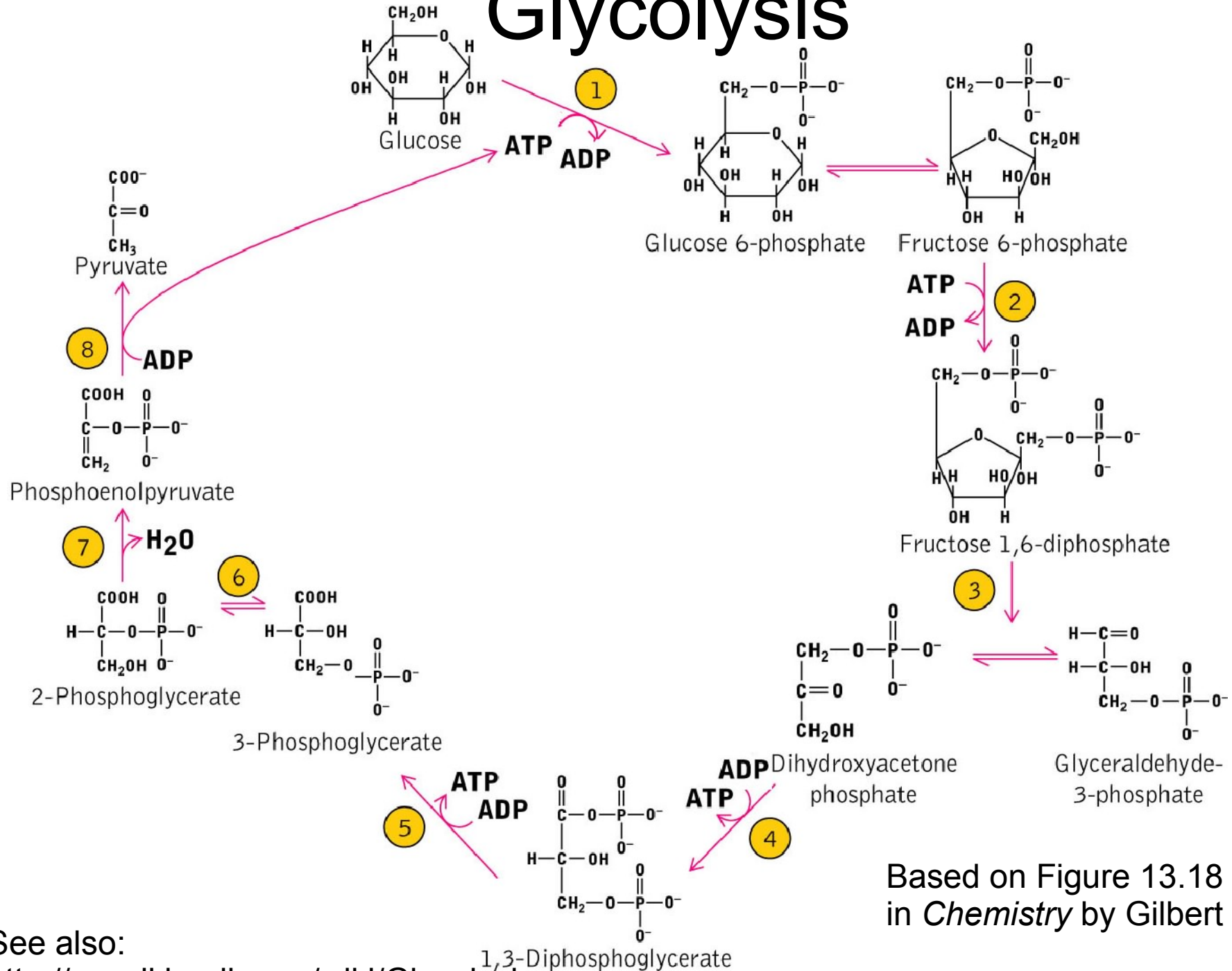
## Results of Food Value Calculations

	Energy Available (kJ/g)	Food Value (Cal/g)
glucose (carbohydrate)	15.98	3.820
Alanine (amino acid)	18.57	4.440
Steric Acid (common saturated fatty acid)	39.09	9.344
$\text{CH}_3\text{CH}_2\text{OH}$ (ethanol)	28.18	6.74

# Catabolism



# Glycolysis



Based on Figure 13.18  
in *Chemistry* by Gilbert *et al.*

See also:  
<http://en.wikipedia.org/wiki/Glycolysis>

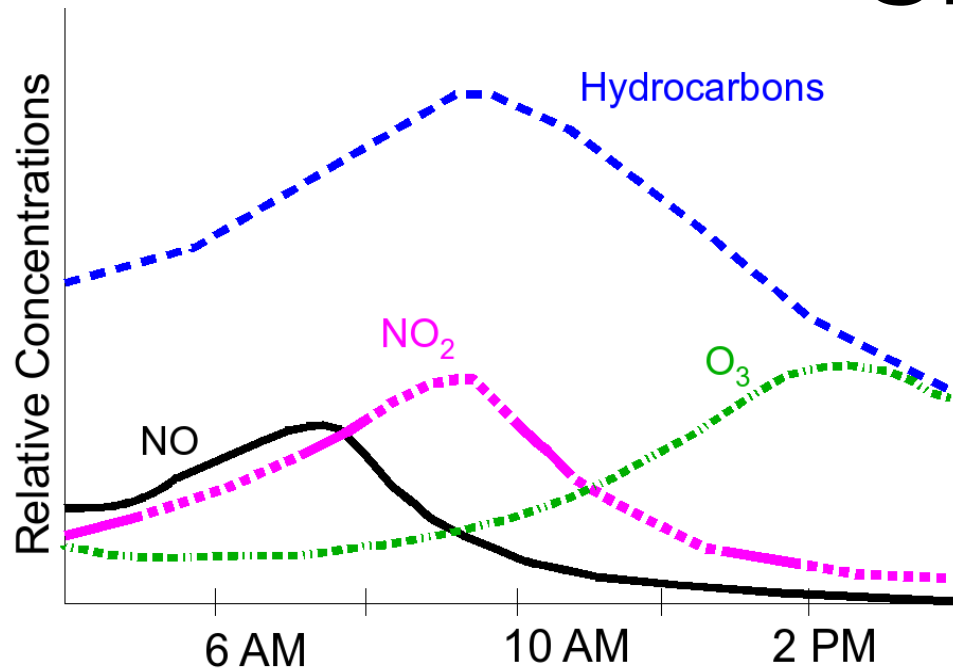
# DNA (Chang 22.17)

# Chapter 14- Kinetics and Air Pollution

- Smog
- Reaction Rates
- Concentration effects (reaction order, rate laws, rate constant, initial rate method, pseudo-order method, integrated rate laws)
- Reaction Mechanisms (elementary steps, molecularity, rate-determining steps, steady-state assumption).
- Temperature effects (activation energy, Arrhenius equation, transition state)
- Catalysis (homogeneous, heterogeneous).



# Smog



Changes in concentration versus time are the result of competing chemical reactions.

