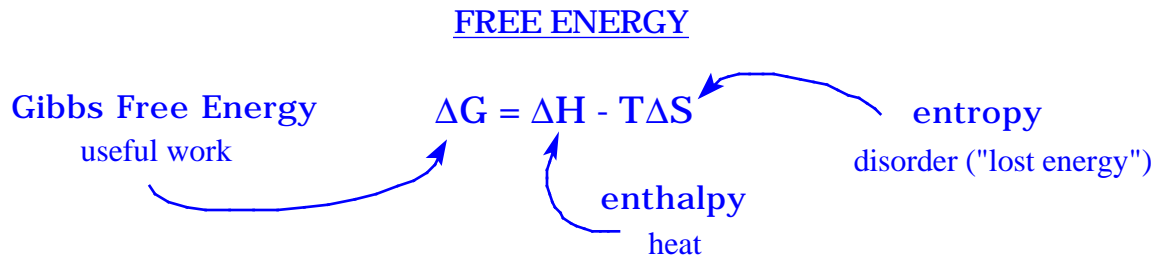


BIOENERGETICS EQUATIONS



When adding reactions, add ΔG° 's.

When writing a reaction in the other direction, change sign on ΔG° '.

$$1 \text{ kcal} = 1 \text{ Cal} = 4.184 \text{ kJ}$$

The general equation for Gibbs Free Energy is:

$$\Delta G = \Delta G^{\circ} + RT \ln Q$$

$$R = 1.987 \times 10^{-3} \text{ kcal/mol}\cdot\text{K}$$

T = temperature in kelvins

$$Q = \frac{[\text{products}]^j}{[\text{reactants}]^i}$$

(But be careful when H^+ is in the reaction.)

ΔG° comes from measuring the equilibrium constant.

at equilibrium
 $\Delta G = 0$

so $\Delta G^{\circ} = -RT \ln K_{eq}$ or $K_{eq} = e^{\frac{-\Delta G^{\circ}}{RT}}$

Free Energy for Oxidation-Reduction

$$\Delta G = -nFE$$

n is the number of moles of electrons transferred

F is the Faraday constant (23.06 kcal/V·mol)

E is the electrical potential (Voltage)