***Possible Photosynthesis Free Response***

**1.** Membranes are important structural features of eukaryotic cells because they allow for the localization (*compartmentalization*) and specialization of organelles. **Describe** how membranes are important to the structure and function of the chloroplast with a focus on a **detailed explanation** the role membranes and membrane proteins play in the synthesis of ATP in photosynthesis.

**2.** Photosynthesis can be described as an energy-capturing process that reduces carbon dioxide.

**(a) Trace** the path of a carbon dioxide molecule from the point at which it enters a plant to its

incorporation into a glucose molecule.

*(Include leaf anatomy and biochemical pathways in your response)*

**(b)** **Explain** the roles NADP+ and rubisco play in the reduction of CO2 into C6H12O6.

**(c)** **State** the two major biochemical differences between C3 and C4 photosynthesis and the

evolutionary advantages of both.

**3.** **Trace** the pathway water moves in Angiosperms (*flowering plants*) from the soil through the tissues

of the root, stem, and leaves to the atmosphere. **Explain** the physical/chemical properties of water and mechanisms involved in conducting water through these tissues along with the role water potential plays in this process.

**4.** The opening and closing of the stomata are associated with the changing osmotic relationships existing

between the guard cells and the surrounding epidermis and mesophyll.

**(a)** **Describe** the structure of a guard cell and **discuss** the osmotic relationships (*changes in water potential*) that result in stomata opening and closing.

**(b)** **Explain** how guard cells function in homeostasis by describing the environmental conditions under which guard cells open and close and how this response is beneficial to the plant.

**5.** **Graph**, **Calculate** and **Compare** the Rate(s) of Photosynthesis.

**6.** **Graph**, **Calculate** and **Compare** the Rate(s) of Transpiration