1a. Temperature: As water becomes warmer, its ability to hold oxygen decreases.

1b. Light & Photosynthesis: In bright light, aquatic plants are able to produce more oxygen.

1c. Decomposition & Respiration: As organic material decays, microbial processes consume oxygen.

1d. Mixing & Turbulence: Wave action, waterfalls, and rapids all aerate water and increase the oxygen concentration.

1e. Salinity: As water becomes more salty, its ability to hold oxygen decreases.

2a. Primary Productivity: How often plants produce organic compounds, such as oxygen.

2b. Gross Productivity: The sum of all production of organic compounds in an ecosystem.

2c. Net productivity: The remaining amounts of organic matter after organisms have used the rest of the produced material.

3. Why do we use dissolved oxygen as a measure of productivity? Does productivity include more than oxygen?

We use dissolved oxygen as a measure of productivity because it is the easiest product of photosynthesis and respiration to measure; yes, productivity includes more than oxygen.

4a. How does putting a sample of pond water and algae/freshwater plants in the light enable us to measure gross productivity?

This enables us to measure productivity by measuring the O2 levels in the water, since photosynthesis occurs in the sunlight.

4b. How does putting a sample of pond water and algae/freshwater plants in the dark enable us to measure respiration?

We can measure respiration by monitoring O2 consumption by the plant, because plants undergo respiration in the dark.

4c. How does subtracting the two enable us to indirectly measure net productivity?

Subtracting the two enables us to find net productivity because net productivity=gross productivity - respiration.

5a. The amount of carbon dioxide used

5b. The rate of sugar formation

5c. The rate of oxygen production

B6. What is the relationship between water temperature and dissolved oxygen?

Cooler temperatures of water are capable of holding more oxygen than higher temperature water.

B7. Explain why this relationship exists.

This relationships exists because cold water molecules move slower, thus trapping more air inside.

B8. So, now explain why the fish in the aquarium (on the LabBench Web site) above the radiator died?

The fish died because the heat emitted from the radiator heated the water in the tank to the point where there wasn’t enough oxygen for the fish to survive.

C9. Why do we take an initial reading of dissolved oxygen? What purpose does this serve in the experiment?

We take initial oxygen readings so we can compare changes that happen during the experiment.