Photosynthesis: What affects the rate of photosynthesis? PowerPoint Guide

- 1) What were some strengths of the way you planned or carried out your investigation? (What made it scientific?)
- 2) What were some weaknesses of the way you planned and carried out your investigation? (What made it less scientific?)
- 3) What rules should we make in order to ensure that our next investigation is scientific?
- 4) The rate of photosynthesis was higher than anticipated. Is this an observation or inference?
- 5) The use of a heat sink would have resulted in the anticipated rate of photosynthesis. Is this an observation or inference?
- 6) What does the equation below mean in words? $6CO_2 + 12H_2O \text{ Light} \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$
- 7) What type of molecule coats the epidermis of a plant?
- 8) Why was a surfactant needed to draw water into the leaf disk?
- 9) Why did the leaf discs sink?

- 10) Why did the leaf discs float after a few minutes?
- 11) Do all plant cells have chloroplasts?
- 12) Explain your reasoning to the question above.
- 13) Do plant cells have mitochondria?
- 14) Explain why the estimated time for 50% of floating leaf disks was a measurement of net photosynthetic rate rather than photosynthetic rate
- 15) Describe the absorption spectrum of chloroplast pigments
- 16) Explain what the absorption spectrum means
- 17) Explain the behavior of the bacteria



18) Describe the relationship between distance from a light source and light intensity



Bipyridyliums are a class of chemical herbicide that take electrons from ferredoxin, the electron carrier that shuttles electrons from the primary electron acceptor of photosystem I to NADP⁺ reductase

- 19) Predict, with reasoning, the short term effects of bipyridyliums on the following:
 - 1. Photosystem I
 - 2. Photosystem II
 - 3. NADPH production
 - 4. Oxygen production
 - 5. ATP production
 - 6. pH of the stroma
 - 7. Glyceraldehyde-3-phosphate production
 - 8. Carbon fixation
- 20) If the pH of the thylakoid space decreased, predict what would happen to ATP synthesis
- 21) Give a reason for your prediction

22) Determine the ET₅₀

Disks floating Disks floating

 .

.. ..

Disks floating

23) Describe the data below

25) Describe the change in net rate of photosynthesis from 0 to 1200 FT-C





24) Suggest an explanation for the data

Crosscutting concepts in science

Cause and effect: Mechanism and Prediction

How was the following demonstrated in this lab?

- 26) Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.
- 27) Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system.

Energy and matter: Flows, Cycles, and Conservation

How was the following demonstrated in this lab?

- 28) Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system.
- 29) Energy drives the cycling of matter within and between systems.

Structure and Function

How was the following demonstrated in this lab?

30) The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials.