Lesson 1: What Do Chloroplasts Do?

1. In this lesson, you will use evidence to create and revise a model for the function of chloroplasts.

2. Before you start this lesson, read the paragraph on chloroplasts in your textbook on page 281.

3. You will use four pieces of evidence to develop an initial model of the function of chloroplasts.

    Evidence #1 – Elodea Experiment – Hands-on experiment

    Evidence #2 – Bacteria Experiment – Research report

    Evidence #3 – Where are chloroplasts found? – Computer simulation

    Evidence #4 – Starch Experiment – Computer simulation

4. You will use two more pieces of evidence to revise your initial model.

    Evidence #5 - What makes chloroplasts work? – Research report

    Evidence #6 – Chloroplasts and Gases – Computer simulation

5. You will then discuss 2 or 3 student models in class.

6. Finally, your teacher will show you a new model, and you will evaluate it and revise it to make it better.

Evidence #1 – Elodea Experiment

1. In pairs, complete Evidence #1. You will view elodea cells through a microscope and observe the chloroplasts inside the plant cells. The procedure for this experiment can be found next to the microscopes.

2. In the box provided below, individually write/draw your observations.

3. Individually, answer this question: What do you conclude from this experiment?

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Evidence #2 – Bacterial Experiment

4. In pairs, read Evidence #2. This evidence is a research report that your teacher will give you. After you have read through this evidence, answer questions 5 and 6.

5. Which of the following statements about the research report is correct? Circle the best answer.

A. The plant cell the scientists used is called *Pseudomonas*.

B. The bacteria try to get away from oxygen.

C. The bacteria go to places where there is a lot of oxygen.

D. The scientist used a magnifying glass to make his observations.

6. What can you conclude about chloroplasts from this experiment? Circle the best answer.

A. Shining light on cells causes oxygen to be used up near the chloroplasts.

B. Shining light on cells causes oxygen to be produced near the chloroplasts.

C. Shining light on cells does not affect oxygen around chloroplasts.

D. The bacteria used in this study need oxygen in order to stay alive.

Evidence #3 – Where are Chloroplasts Found

7. In groups, complete Evidence #3. Evidence #3 is on the computer. Follow the directions on the computer. Write down things that have many chloroplasts, few chloroplasts, and no chloroplasts in the table below.

Many chloroplasts	Few chloroplasts	No chloroplasts

8. What do you conclude from this experiment?

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Evidence #4 – Variegated Leaves

9. In groups, complete Evidence #4. Evidence #4 is on the computer. Follow the directions on the computer.

10. Circle each part of the plant where the scientists tested for starch in this experiment. <u>You will want to circle more than one of these plant parts.</u>

the green part of the leaf

the white part of the leaf

the part of the leaf covered by the paper

the part of the leaf not covered by the paper

the stem

11. What do you conclude from this experiment?

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12. In pairs, using what you have learned so far (from Evidence #1 through Evidence #4), make a model showing the function of chloroplasts in the space below. Then, individually write an explanation of your model.

Individually write an explanation of your model.

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13. In groups, explain your models to each other. Then discuss:
How well do your models fit your class's criteria for good models?

Evidence #5 – What makes chloroplasts work?

14. In pairs, read Evidence #5. This evidence is a research report that your teacher will provide you. After you have read through this evidence, answer questions 14 and 15.

15. What do you conclude from this research report?

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16. What new information about the function of chloroplast did you learn from this piece of evidence?

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Evidence #6 – Chloroplasts and Gases

17. In pairs, complete Evidence #6 on the computer. Follow the instructions on the computer. Be sure to discuss everything that the computer asks you to discuss, and always give reasons for your ideas.

18. In pairs, discuss this question and write your best answer: What do you conclude from the results of this study?

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19. In pairs, using what you have learned thus far from all 6 pieces of evidence make changes, if needed, to your initial model.

Individually write your reasons for the changes you made.

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20. In groups, explain your models to each other. Then discuss:
How well do your models fit your class's criteria for good models?
Are there changes you could make to make your models fit the criteria even better?

21. Individually, explain why your model is a good model. Explain what evidence supports your model, and explain in detail how the evidence supports your model.

22. Class discussion. Be prepared to present and discuss your model with the rest of the class.