TITLE OF LESSON

Biology Unit 1 Lesson 16 – Making and Releasing Energy: Chloroplasts and Photosynthesis

How does energy move in and out of a cell?

TIME ESTIMATE FOR THIS LESSON

One class period

ALIGNMENT WITH STANDARDS

California – Biol CB 1f, g,& i

MATERIALS

Teacher's Notes Lesson 16 – Teacher Page
overhead projector
overhead transparency
overhead pen
slides or overheads of photosynthesis and respiration

LESSON OBJECTIVES

- To learn how energy cycles between chloroplasts and mitochondria
- To learn the constituents and functions of chloroplasts
- To understand the principles of photosynthesis

EXPLANATION OF LESSON

Normally this section (lessons 15-20) is taught with photosynthesis first and then mitochondria second, since energy is passed from sunlight via photosynthesis to mitochondria via aerobic respiration. I've changed the order because I find that students have a more difficult time understanding the harvesting complex and electron transport system if it is presented before the cycles. Therefore, this lesson will contain first a comparison of chloroplasts and mitochondria followed by a description of anaerobic and aerobic respiration before photosynthesis.

It is important for students to understand complex systems. Photosynthesis and cellular respiration are complex as well as interconnected. They allow the flow of energy between organisms. In these lessons (15-20) the students will be required to absorb and understand complex material. They will have to answer questions about this material and complete laboratory experiments. They will need to use their comprehension and analytical skills to understand the topic.

FOCUS AND MOTIVATE STUDENTS – WARM-UP ACTIVITY

1) Homework Check – Hand back all binders. Collect their reading homework from last night.
2) Agenda – Have students copy the agenda you have posted.
3) Group Questions – Ask students to take out a piece of paper and write the questions below on it. Tell students they will have 5 minutes to answer the questions. At the end of 5 minutes, tell them you will be calling on each group to present their ideas, randomly choosing the person in the group to present. So every person in the group should be prepared to answer. Have the students work in assigned groups to answer the following questions:
    a. What do you think the sun really is?
    b. What is it made out of?
    c. Why is it important to have the sun?
    d. What can the sun do?
    e. What would our world be like without the sun? Would our world exist?

4) Present – At the end of five minutes call time. Randomly call on a student from each group to present the answers their group came up with.

ACTIVITIES – INDIVIDUAL AND GROUP

1. Review – Have students look at their notes from yesterday. Ask students what the main ideas were. Review with them the important concepts from lecture/discussion.

2. Lecture – The teacher explains this section to the students while they take careful notes (see **Teacher's Notes Lesson 16**). Have students take out a sheet of paper and prepare to take notes on Chloroplasts and Photosynthesis. Have them title their notes accordingly. Collect these notes at the end of the class. Choose a student to take notes on the overhead. Make sure to put that student's name in your grade book.

3. Applaud/ Critique – When you have finished your lecture, Applaud/Critique your notetaker for the day. Make sure each student gives at least one praise and one suggestion for improvement.

4. Vocabulary – Post target vocabulary (photosynthesis, chlorophyll, pigment, light reactions, dark reactions, electron transport, Calvin cycle) and have students define each of the terms. Tell them they may work together in their groups to come up with the definitions, but each student should be writing them on their own sheet of paper. Tell them they have until the end of the period to finish.

5. Homework Review – Collect notes and vocabulary and remind them of their homework for the evening.

HOMEWORK

1) Read Starr's Biology Concepts and Applications chapter 6, pp. 92-101. If you are using another textbook have the students read about the following topics: wavelengths of light and photosysnthesis, an overview of photosynthesis including leaf and chloroplast structure, pigments, the light-dependent reactions and ATP formation, and the light-independent reactions. Write up the key points.
2) Study vocabulary to date.

GROUP ROLES

None

DOCUMENTATION FOR PORTFOLIO

Lab Report #1