5E Lesson Plan

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| **Teacher:**  |
| **Date:** |
| **Subject / grade level:** Science, Grade 7, Lesson # |
| **Topic:** Photosynthesis in Plants |
| **Materials:**Computer, COSMOS Technology Toolkit, Carbon dioxide sensor, 2 identical potted plants, 1 transparent container, 1 totally opaque container, water   |
| **Essential Question(s):**How do environmental changes and adaptive characteristics of a species affect survival? Why are cells considered the smallest units of life?   |
| **New York State P-12 Science Learning Standards (NGSS):** **MS-LS1-8**. Gather and synthesize information that sensory receptors respond to stimuli, resulting in immediate behavior and/or storage as memories.

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| **Science & Engineering Practices (SEPs)** | **Disciplinary Core Ideas (DCIs)** | **Crosscutting Concepts (CCs)** |
| **Developing and Using Models**Modeling in 6–8 builds on K–5 and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. **Obtaining, Evaluating, and Communicating Information**Obtaining, evaluating, and communicating information in 6-8 builds on K-5 and progresses to evaluating the merit and validity of ideas and methods. **Constructing Explanations and Designing Solutions**Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students’ own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-LS1-3) | **LS1.D: Information Processing**(NYSED) Plants respond to stimuli such as gravity (geotropism) and light (phototropism). (MS-LS1-8) | **Cause and Effect**Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8)**Scale, Proportion, and Quantity**Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1)**Systems and System Models**Systems may interact with other systems; they may have subsystems and be a part of larger complex systems. (MS-LS1-3)**Structure and Function**Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures and/or systems can be analyzed to determine how they function.(MS-LS1-2)  |

**Common Core State Standards (CCSS):****SL.8.5** Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. **RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.  |
| **Lesson Topic:** Photosynthesis in Plants **Learning Target:** I will: * Perform an experiment to show that the removal of any 1 of the input factors of photosynthesis will cause the process to be terminated
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| **Differentiation strategies to meet diverse learner needs:*** **Bodily kinesthetic learners** - Local and Express demonstration hands-on activity
* **Audio and Visual learners** – Slide show, Visual representation of activity using computer, transmitter and receiver, The observations/data collected throughout the activity
* **ELL/Low reader** - Guided notes printed for those who require them
* **Technology**- Utilizing COSMOS Technology Tool Kit
* **Extended time** for those who require it
* **Small groups** according to levels, behavioral needs, and activity requirements
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| **ENGAGEMENT** Discussion QuestionsHow do plants make their own food?  |
| **EXPLORATION** **DAY 1**1. Students will view a short slide show to introduce the lesson. Materials & equipment are set up on student’s desks. The 2 plants are set up: 1 by the window to get plenty of sunlight, and the other is placed away from the window and away from sunlight. CO**2** sensors are placed close to each plant and remotely connected to the COSMOS Technology Toolkit. The plant by the window is covered with the transparent container with a hole in the top. The other plant is covered with a totally opaque container with a hole at the top.
2. Activity:
3. Students will observe the initial reading for CO**2** in both containers with the plants on the COSMOS Technology Toolkit and record it in the table entitled **“Carbon Dioxide (CO2) Levels”**
4. Students will then record readings of the CO**2** levels for both plants every 2 hours until the end of the school day. They will then calculate the average CO**2** levels for both plants throughout the day.
5. Students will then answer questions 6, 7 & 8 on their handouts.

**DAY 2** 1. Students will take both plants from under their containers and observe them. They will then answer questions 1 – 5 & 9 on their handouts.
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| **EXPLANATION**After students complete their experiment there will be a discussion/share out with their observations and comments about their activities - facilitated by the teacher. Analyzing information collected on their handout and identifying any misconceptions they might have had and correct them. Vocabulary words: *photosynthesis, chlorophyll, glucose, carbohydrate, humidity*.  |
| **ELABORATION**Students will extend their knowledge of photosynthesis in plants by discussing/answering the following questions: * Why are plants in a hospital room taken out at nights but left in the room during the day time
* Which kind of plants feed on other plants & animals for food?
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| **EVALUATION** 1. Teacher Observation
2. Correctly following procedures
3. Students complete the questions on their handouts
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| **HOMEWORK** Write 1 paragraph to explain how plants without chlorophyll get their food? |