

8

Lesson Exemplar for Science

Quarter 1
Lesson

5

Lesson Exemplar for Science Grade 8
Quarter 1: Lesson 5 of 5 (Week 7)
SY 2025-2026

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LESSON EXEMPLAR

SCIENCE /QUARTER 1 / GRADE 8

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners learn that photosynthesis and respiration are processes that show how living things obtain energy and nutrients from the environment.
B. Performance Standards	By the end of the Quarter, learners describe the processes of respiration and photosynthesis and plan and record a scientific investigation to verify the raw materials needed. They use flow charts and diagrams to explain cycles in nature. Learners will explain that the classification of living things shows the diversity and unity of living things.
C. Learning Competencies and Objectives	<i>Learning Competency</i> 1. The student will explain the role of plants and animals in the cycles of nature, such as the carbon, oxygen, and water cycles using flow charts and labeled diagrams. 2. The student will describe the process of photosynthesis and respiration, and identify the raw materials needed and products. 3. The student will identify the different parts of the cell where photosynthesis and respiration occur using information from secondary sources. 4. The students will plan a scientific investigation to verify the raw materials needed for photosynthesis. <i>Learning Objectives:</i> Students should be able to: 1. Identify the factors affecting photosynthesis and respiration 2. Identify and categorize the steps involved in the process of photosynthesis. 3. Understand the resultant product of each consecutive stage in the process of photosynthesis. 4. Understand the role of carbon dioxide in photosynthesis and respiration, and how it is produced and utilized by living organisms. 5. Understand the process of cellular respiration by engaging in an activity that involves labeling a diagram. 6. Explain the key components and processes involved in this essential biological process.
D. Content	Topic: Cycles in Nature - Photosynthesis

E. Integration	SDG 13- Climate Action - Photosynthesis plays a crucial role in carbon sequestration, removing carbon dioxide from the atmosphere and mitigating climate change by promoting the conservation and restoration of forest and natural ecosystems. SDG 15- Life on Land - Photosynthesis is the foundation of terrestrial ecosystems providing food and habitat for a diverse array of ecosystem
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II. LEARNING RESOURCES

Admin. (2023, January 23). Photosynthesis - definition, process, and diagrams. BYJUS. Retrieved from: <https://byjus.com/biology/photosynthesis/#:~:text=Photosynthesis%20is%20a%20process%20by,from%20water%20and%20carbon%20dioxide.>

Photosynthesis. Education. (n.d.). Retrieved from: <https://education.nationalgeographic.org/resource/photosynthesis/>

Osmosis - cellular respiration: What is it, its purpose, and more. (n.d.-b). Retrieved from: <https://www.osmosis.org/answers/cellular-respiration>

Khan Academy. (n.d.). Steps of Cellular Respiration. Khan Academy. Retrieved May 25, 2024. Retrieved from: <https://www.khanacademy.org/science/ap-biology/cellular-energetics/cellular-respiration-ap/a/steps-of-cellular-respiration>

Practical Science 8. (2018). 4/F SEDCCO 1 Bldg. 120 Thailand corner Legazpi Streets: DIWA Learning Systems INC.

Practical Science 9. (2018). 4/F SEDCCO 1 Bldg. 120 Thailand corner Legazpi Street: DIWA Learning System.

III. TEACHING AND LEARNING PROCEDURE													NOTES TO TEACHERS			
A. Activating Prior Knowledge	Day 1													The teacher can gamify this activity to enhance engagement, turning it into a lively five-minute game session. See Learning Activity Sheet: <i>Activity # 1: Word Discovery</i>		
	1. Short Review															
	Activity 1. <i>Word Discovery.</i> Ask the students to decode the mystery words. Use the numbers as clues. 1. The process of converting light energy into chemical energy															
	16	8	15	20	15	19	25	14	20	8	5	19	9	19		

2. A light-dependent process in some plants resulting in the oxidation of glycolic acid and release of carbon dioxide under some environmental conditions.

16	8	15	20	15	18	5	19	16	9	18	1	20	9	15	14

3. The green substance in plants that makes it possible for them to make food from carbon dioxide and water.

3	8	12	15	18	15	16	8	25	12	12

4. One of the two crescent-shaped epidermal cells that border and control the opening and closing of a plant stoma

7	21	1	18	4	3	5	12	12

5. Minute openings in the epidermis of a plant organ (as a leaf) through which gaseous interchange takes place

19	20	15	13	1	20	1

Answers:

- 1.photosynthesis
- 2.photorespiration
- 3.chlorophyll
- 4.guardcell
5. stomata
6. photon
- 7.sugar

	6. Pocket of light. <table><tr><td>16</td><td>8</td><td>15</td><td>20</td><td>15</td><td>14</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> 7. End product of photosynthesis. <table><tr><td>19</td><td>21</td><td>7</td><td>1</td><td>18</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> 2. Feedback (Optional)	16	8	15	20	15	14							19	21	7	1	18						
16	8	15	20	15	14																			
19	21	7	1	18																				
B. Establishing Lesson Purpose	1. Lesson Purpose • Show a picture of a person taking care of a plant. • Ask questions such as “Why is it important to take care of plants?” • Inform the class of the objectives of the lesson.  2. Unlocking Content Area Vocabulary PAIR ME. Ask the students to look for the meaning of the following words.	Image Source: medium.com You have the option to turn this activity into a game to enhance interactive learning. You can																						

	Table 1: Internal structure of a leaf adapted to do photosynthesis. <table><tr><th>Words</th><th>Meaning</th></tr><tr><td>Cuticle</td><td>This is a waxy substance covering the upper epidermis. It protects the leaf from dehydration.</td></tr><tr><td>Upper epidermis</td><td>This protects the leaf, and it has no chloroplast.</td></tr><tr><td>Palisade mesophyll cell</td><td>This is a cell containing chloroplast.</td></tr><tr><td>Chloroplast</td><td>This cell organelle contains chlorophyll.</td></tr><tr><td>Xylem</td><td>A type of vascular tissue in plants that is primarily responsible for the transport of water and dissolved minerals from the roots to the rest of the plant.</td></tr><tr><td>Phloem</td><td>A type of vascular tissue in plants responsible for the transport of organic nutrients, particularly the sugars produced through photosynthesis, from the leaves to other parts of the plant.</td></tr><tr><td>Guard cell</td><td>This is one of the two crescent-shaped epidermal cells that open and close a plant stoma (plural: stomata)</td></tr><tr><td>Stoma</td><td>This is one of the openings in the epidermis of a plant organ, before the exchange of gases takes place.</td></tr></table>	Words	Meaning	Cuticle	This is a waxy substance covering the upper epidermis. It protects the leaf from dehydration.	Upper epidermis	This protects the leaf, and it has no chloroplast.	Palisade mesophyll cell	This is a cell containing chloroplast.	Chloroplast	This cell organelle contains chlorophyll.	Xylem	A type of vascular tissue in plants that is primarily responsible for the transport of water and dissolved minerals from the roots to the rest of the plant.	Phloem	A type of vascular tissue in plants responsible for the transport of organic nutrients, particularly the sugars produced through photosynthesis, from the leaves to other parts of the plant.	Guard cell	This is one of the two crescent-shaped epidermal cells that open and close a plant stoma (plural: stomata)	Stoma	This is one of the openings in the epidermis of a plant organ, before the exchange of gases takes place.	hide paper strips under their chairs and let them find the words and meaning and let them paste the strips on the board. Present a diagram showing the internal structure of a leaf.
Words	Meaning																			
Cuticle	This is a waxy substance covering the upper epidermis. It protects the leaf from dehydration.																			
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C. Developing and Deepening Understanding	Day 2 1. Explicitation Let the student watch the video “PHOTOSYNTHESIS” By Dr. Binocs Show https://www.youtube.com/watch?v=D1Ymc311XS8 Guide Questions: 1. What is PHOTOSYNTHESIS? 2. What is the role of photosynthesis in plants?																			

	3. What are stomata? 4. In general, why do plants need photosynthesis to grow and survive? • Big Idea: Photosynthesis comes from the Greek word phos, which means “light” and synthesis, which means “putting together”. Plants get raw materials needed for photosynthesis from the soil, the air and the sun. When it rains, water gets absorbed into the ground. Plants take water along with minerals from the soil through its roots. In the roots, plants have tubes called xylem and phloem, tubes or veins which run throughout the plants’ bodies and bring water and minerals from the soil to the leaves. Leaves take in carbon dioxide through the stomata. It is in the leaves of plants that photosynthesis takes place. 2. Worked Example Activity 2. Sunlight is an important component of photosynthesis. This activity will help you understand its role in photosynthesis. <i>Objective:</i> Identify the factors affecting photosynthesis and respiration <i>Materials:</i> three same-sized jars with lid, desk lamp, distilled water, aluminum foil (approximately 30cm x 30 cm), Elodea plant or any water plant, bromothymol blue (BTB) solution, marker. <i>Procedure:</i> 1. Wash the jars. Number the jars using the marker as 1, 2 and 3 2. Place the water plant (Elodea) in jars 1 and 2 3. Fill the three jars with BTB solution 4. Put the lid on each jar. 5. Cover jar 2 with aluminum foil so that no light can enter it. 6. Place three jars in front of the desk lamp. 7. Check the color of the solution in each jar after an hour. Guide questions: 1. What is the role of the desk lamp in the experiment?	See Learning Activity Sheet: <i>Activity #2: Grandeur of Photosynthesis</i> Note: BTB is blue at pH 7.6 and yellow at pH 6.0. A pH of 7 is neutral. A pH less than 7 is acidic. A pH greater than 7 is basic.
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2. Did the amount of light affect the result? Why do you say so?
3. What is the role of the BTB solution in the setup?
4. What did you prove in this activity?

Activity 4.

Objective: Test the presence of starch in leaves and understand that the presence of starch indicates that the plant has been able to produce food through photosynthesis.

Guide questions:

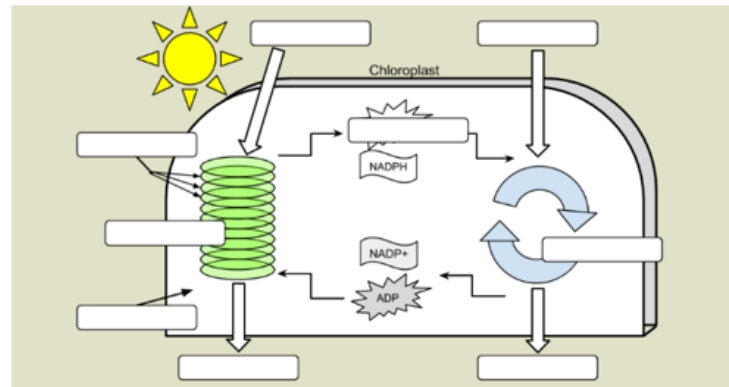
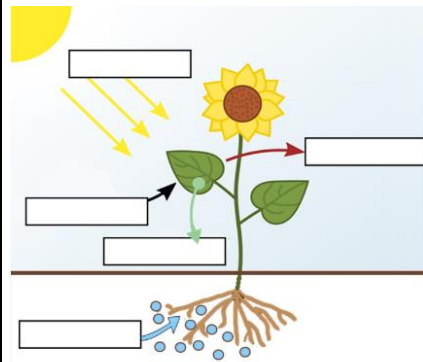
1. What is the role of alcohol in the experiment?
2. Why should the leaves be immersed in boiling water and ethyl alcohol before testing the starch?
3. What happened when iodine solution was added to the boiled leaf?
4. Based on your observations, what can you conclude about this activity?

Day 3

3. Lesson Activity

Activity 3.

Ask the students to examine the diagram provided. Then, allow them to label and identify the stages and byproduct of the photosynthesis process.



Prepare materials and follow the instructions for this Laboratory Activity.

See Learning Activity Sheet:
Activity #3: Presence of Starch in a Leaf

See Learning Activity Sheet:
Activity #4: Deciphering the Green Mystery: The Magic of Photosynthesis

Present a diagram showing the process of photosynthesis. Highlight the byproducts of each stage.

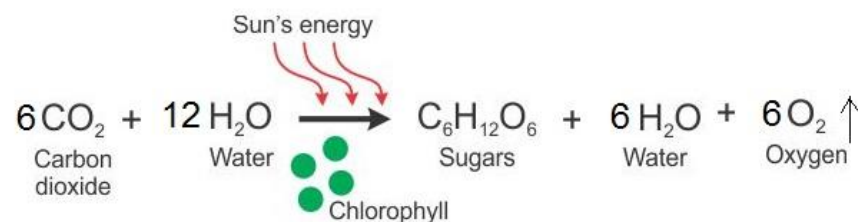
Image Source:
biologycorner.com

	What Goes IN	What comes OUT	Where it Occurs
Light Dependent			
Light Independent (Calvin Cycle)			

Guide Question:

1. What are the two sequential stages of Photosynthesis?
2. What are the end products of Light-dependent reactions?
3. What are the end products of Calvin cycle?

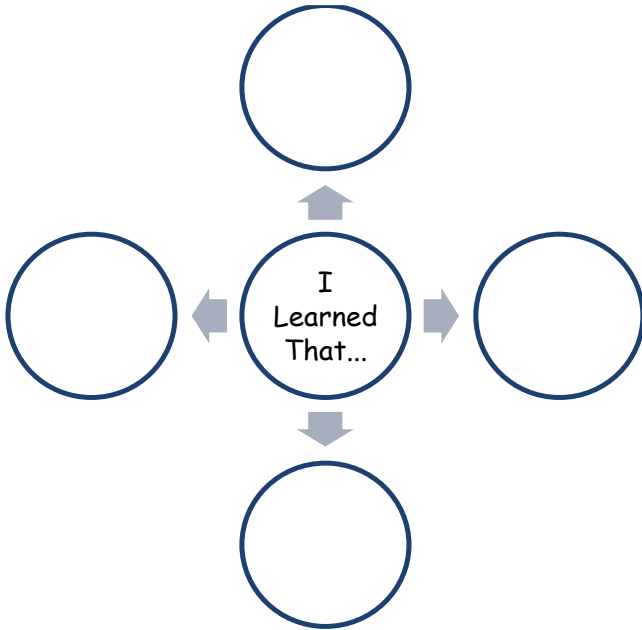
Shown here is the simplified chemical equation that represents photosynthesis. It shows that photosynthetic organisms such as plants need six molecules of carbon dioxide CO₂ and six molecules of water H₂O with the presence of sunlight to produce one molecule of sugar (glucose) and six molecules of oxygen O₂



Photosynthesis is the process of yielding sugar from carbon dioxide and water. The process involves two fundamental steps: light-dependence reactions and the Calvin Cycle. The light- dependent reactions produce ATP and NADPH needed for the Calvin cycle to produce sugar.

You can present these videos for deeper understanding.

1. How Photosynthesis takes place in plants & Process of Photosynthesis (animated)
https://www.youtube.com/watch?v=xEF8shaU_34
2. Nature's smallest factory: The Calvin cycle - Cathy Symington
<https://www.youtube.com/watch?v=0UzMaoaXKaM>
3. Photosynthesis (UPDATED)
<https://www.youtube.com/watch?v=CMiPYHNNg28>

D. Making Generalizations	1. Learners' Takeaways Let the students supply this concept map to capture their takeaways.  2. Reflection on Learning In their notebook, the students will write a journal entry consisting of 3-4 Sentences. • <i>Answer ANY of the following questions.</i> a. What did I learn about this lesson that I did not know before? b. Which topic was easy for me? c. Which topic was challenging to learn? d. Do I understand it now?	Allow the students to record their key insights within the provided diagram. The teacher may propose other activities for the learners to describe their understanding of a concept, idea, and skill covered in the previous topic. The teacher should allow the learners to document their ways on how they think about their learning (metacognition).
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IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		NOTES TO TEACHERS
A. Evaluating Learning	1. Formative Assessment Choose the letter of the correct answer. 1. Which of the following is a product of the light-dependent reactions of photosynthesis? a. Glucose b. Oxygen c. Carbon Dioxide d. Water 2. Where does the light-dependent reaction of photosynthesis primarily take place? a. stroma b. Thylakoid membrane c. Outer membrane of the chloroplast d. Mitochondria 3. Which pigment is primarily responsible for capturing light energy during photosynthesis? a. chlorophyll b. green pigment c. carotenoids d. Phycobilins 4. What is the primary function of the Calvin cycle in Photosynthesis? a. Absorbing light energy b. Producing oxygen c. Converting carbon dioxide into glucose d. Releasing energy from glucose 5. Which of the following cellular organelles does photosynthesis occur? a. Ribosome b. Chloroplast c. Chlorophyll	Assessment will be given at the end of the lesson. Answer 1. B 2. B 3. A 4. C 5. B 6. A 7. D 8. C 9. B 10. C

	d. Mitochondrion 6. Where does the Calvin cycle occur? a. Stroma b. Thylakoid c. Matrix d. Granum 7. Which of the following is the first stable product of photosynthesis? a. pyruvic acid b. Phosphoglyceric acid c. Phosphoglyceraldehyde d. Ribulose-1,5-biphosphate 8. What is the primary purpose of photosynthesis in plants? A) To produce oxygen B) To produce carbon C) To produce glucose D) To absorb sunlight 9. What is the primary source of carbon used by plants in photosynthesis? A) Carbon monoxide B) Carbon dioxide C) Carbonate D) Methane 10. What is the primary energy source used by plants in photosynthesis? A) Heat B) Electricity C) Sunlight D) Chemical energy 11-15 Imagine you're a plant scientist studying photosynthesis. Explain, in your own words, how plants use sunlight, water, and carbon dioxide to produce food and oxygen. Additionally, describe one real-life example of how photosynthesis benefits both plants and animals. 2. Homework (Optional)	The teacher may give homework for extended deliberate practice.
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A. Teacher's Remarks	<i>Note observations on any of the following areas:</i>	Effective Practices	Problems Encountered	This lesson design component prompts the teacher to record relevant observations and/or critical teaching events that he/she can reflect on to assess the achievement of objectives. The documenting of experiences is guided by possible areas for observation including teaching strategies employed, instructional materials used, learners' engagement in the tasks, and other notable instructional areas. Notes here can also be on tasks that will be continued the next day or additional activities needed.
	<i>strategies explored</i>			
	<i>materials used</i>			
	<i>learner engagement/interaction</i>			
	<i>Others</i>			
B. Teacher's Reflection	<i>Reflection guide or prompt can be on:</i> ▪ <u>principles behind the teaching</u> <i>What principles and beliefs informed my lesson?</i> <i>Why did I teach the lesson the way I did?</i> ▪ <u>students</u> <i>What roles did my students play in my lesson?</i> <i>What did my students learn? How did they learn?</i>			This lesson design component guides the teacher in reflecting on and for practice. Entries on this component will serve as inputs for the LAC sessions, which can center on sharing the best practices discussing problems encountered and

	▪ <u>ways forward</u> <i>What could I have done differently?</i> <i>What can I explore in the next lesson?</i>	actions to be taken; and identifying anticipated challenges and intended solutions. Guide questions or prompts may be provided here.
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