

LESSON PLAN TEMPLATE

Lesson Title	Energy of Life: The Symbiosis of Photosynthesis and Respiration
Learning Area/s	Science
Name of Teacher/s	DEPED TAMBAYAN PH (Visit www.depedtambayanph.net for more downloads.)
Grade Level and Section	Grade 8
No. of Sessions	4 Sessions
References	None specified
Declaration of AI use	This lesson plan was co-created using Gemini AI to assist with unpacking competencies into a 4-session learning design, structuring activities, and assessment formulation.

Intentions.

Meaningful learning experiences are anchored in how we frame them. Start by deciding what you want learners to master by the end of the lesson – keep it clear and simple.

Learning Competency and Curriculum Standards:	Learning Competency: - Describe the process of photosynthesis and respiration, and identify its raw materials needed and products. Content Standards: - Organ systems work together for the growth and survival of the organism. - Inherited traits passed from parents to offspring are governed by the rules on the patterns of inheritance. - Classification of living things shows life's diversity. - Photosynthesis and respiration are processes that show how living things obtain energy and nutrients from the environment. - The use of timeline and charts can illustrate scientific knowledge of the structure of the atom has evolved over time. - The current structure of the atom includes subatomic particles, their symbol, mass, charge, and location. Performance Standards: By the end of the Term, learners demonstrate the use of models, flow charts, and diagrams to illustrate how body systems work together for the growth and survival of an organism. They represent patterns of inheritance and predict simple ratios of offspring. They explain that the classification of living things shows the diversity and unity of living things. They describe the processes of respiration and photosynthesis
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	and plan and record a scientific investigation to verify the raw materials needed. They use flow charts and diagrams to explain cycles in nature. They demonstrate an understanding of the structure of the atom and how our understandings have changed over time. They draw models of the atom and use tables to represent the properties of subatomic particles.			
	Session 1	Session 2	Session 3	Session 4
Learning Objectives:	- Identify the raw materials and products of photosynthesis. - Describe the process of the light-dependent reaction. - Explain the importance of sunlight and chlorophyll in energy conversion.	- Identify glucose and oxygen as products of photosynthesis. - Describe the process of the light-independent reaction (Calvin Cycle). - Summarize the overall chemical equation of photosynthesis.	- Define cellular respiration and its purpose in living organisms. - Identify the raw materials (glucose and oxygen) and products (CO₂, water, ATP) of respiration. - Explain the role of the mitochondria as the 'powerhouse' of the cell.	- Compare and contrast photosynthesis and cellular respiration. - Identify the relationship between the two processes as a continuous cycle. - Create a visual representation showing the interdependence of plants and animals.
Learner Context:	Learners show strong interest in local agriculture and gardening, particularly with crops like rice and coconut. They possess varying reading levels, with some struggling to interpret complex chemical symbols like CO ₂ and H ₂ O. Most students are highly responsive to visual aids and collaborative tasks, though a few exhibit hesitancy	Learners have begun to grasp the input stage but show confusion when discussing internal chemical transformations. They are particularly motivated by kinesthetic activities. A few learners with ADHD-like tendencies require frequent movement and clear, short instructions to maintain focus	Students are energetic and relate well to physical education topics. They understand that 'eating gives energy' but struggle to connect the food they eat to the microscopic process in cells. Some learners respond better to auditory explanations and rhythmic mnemonics.	Learners are now ready to synthesize the two concepts. They show a preference for creative expression through drawing and role-play. A small group of learners requires additional support in organizing their thoughts into a coherent comparison table, benefiting from pre-filled graphic organizers.

	during individual writing activities due to linguistic barriers.	during the abstract explanation of the Calvin Cycle.		
Learning Experience. A learning experience is like a thoughtfully designed journey. Each activity and interaction builds towards meaningful understanding and growth. Identify activities and interactions to help learners gain knowledge, skills, or understanding in a purposeful way.				
Pre-Lesson:	'The Green Hunt': Students observe various plants in the school garden (or photos of local plants like Malunggay) and list what they think the plants 'eat' or 'drink' to stay green.	'Mystery Box': Students feel objects inside a box (a sugar cane/glucose source and an empty bottle/symbolizing oxygen) to guess the 'output' of the factory.	'Jumping Jack Challenge': Students perform 30 seconds of jumping jacks and describe changes in their breathing and heart rate.	'The Mirror Game': In pairs, one student acts as a 'Plant' and the other as an 'Animal,' mimicking each other's 'breathing' (CO₂/O₂ exchange).
Flow:	1. Active Retrieval: Ask students how they feel after standing in the sun versus under a tree. 2. Scaffolding: Present a diagram of a leaf as a 'Food Factory.' Use local analogies like how a 'Nanay' needs ingredients to cook 'Sinigang.' 3. Social Learning: In pairs, students label the inputs (sunlight, water, carbon dioxide) on	1. Active Retrieval: Review the raw materials from Session 1 using a quick 'Pass the Ball' game. 2. Social Learning: Group 'Assembly Line' activity—Groups act as the Calvin Cycle, taking 'Carbon' (gray blocks) and 'Energy' (battery icons) to build a 'Glucose' model (a sugar cube pyramid). 3.	1. Active Retrieval: Ask 'Where did the energy for your jumping jacks come from?' 2. Scaffolding: Compare the Mitochondria to a 'Battery Charger' or a 'Local Power Plant' (like a hydroelectric dam). 3. Social Learning: 'Respiration Relay'—Groups must collect 'Glucose'	1. Active Retrieval: Use a Venn Diagram on the board; students stick labels of materials under 'Photosynthesis,' 'Respiration,' or 'Both.' 2. Social Learning: 'The Great Circle of Life'—Groups create a large poster showing a carabao and a mango tree, drawing arrows for the exchange of gases and

	a provided plant diagram. 4. Checks for Understanding (CFU): 'Ingredient Check'—Students raise green cards for raw materials and red cards for non-essential items. 5. Step-by-Step: Explain the light-dependent reaction by simulating 'energy capture' where students represent chlorophyll trapping 'sunlight' (yellow balls) to split 'water' (blue balloons).	Scaffolding: Use a simplified flowchart to bridge the light-dependent and light-independent stages. 4. CFU: 'Stop or Go'—The teacher describes a step; students shout 'Light' if it needs sun or 'Dark' if it is part of the Calvin Cycle. 5. Modeling: Writing the complete word equation on the board together: Carbon Dioxide + Water + Sunlight → Glucose + Oxygen.	(crackers) and 'Oxygen' (air) to trade for 'Energy Tokens' (ATP) at the 'Mitochondria Station.' 4. CFU: 'Breath Check'—Students blow into a straw in water (with indicator if available) to see the 'waste' (CO₂) they produce. 5. Step-by-Step: Map the flow of glucose from the stomach to the cell, then into the mitochondria.	nutrients. 3. Scaffolding: Provide a 'Comparison Matrix' with categories like 'Location,' 'Inputs,' and 'Outputs' to guide the synthesis. 4. CFU: 'Who Am I?'—Teacher gives a description (e.g., 'I produce Glucose'), and students shout the process. 5. Synthesis: Explain that the 'waste' of one is the 'food' of the other.
Learning Resources:	• Diagram of a Leaf Cross-section • Local Potted Plant • Colored Paper/Flash cards • Projector/Slide Presentation	• Sugar Cubes/Blocks • Flowchart Posters • Whiteboard/Chalkboard • Flashcards	• Stopwatch • Crackers/Small Snacks • Straws and Cups • Mitochondria Model/Diagram	• Large Manila Paper • Crayons/Markers • Venn Diagram Templates • Adhesive Labels
Opportunities for integration:	Social Studies (Araling Panlipunan): Discussing the role of agriculture and local crops in the Philippine economy.	Mathematics: Balancing simple numbers in the word equation to introduce the concept of ratios.	Health/PE: Discussing the importance of proper nutrition and oxygen intake during sports and physical exercise.	Art: Developing visual literacy through poster making and diagramming. Environmental Science: Discussing the impact of deforestation on the oxygen-carbon dioxide cycle.
Assessment.				

Assessments reveal what learners have gained and what they still need help with. These are helpful in providing you with information to guide your future instruction throughout the entire session.

Formative Assessment:	'Label the Factory': A worksheet where students must correctly place the raw materials (CO₂, H₂O, Sunlight) entering the leaf.	'The Plant's Receipt': Students write a short 'receipt' of what the plant produced after a day of work.	'Energy Map': A drawing showing food entering the body and ATP coming out of the cell.	'The Cycle Masterpiece': A rubric-based assessment of the group poster showing the interconnect edness of the two processes.
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Ways Forward.

Meaningful learning can also happen beyond the classroom – for both the learners and the teacher. Pause and reflect on what happened today.

Extended learning opportunities:	Students will find a leaf at home and draw a 'comic strip' of a water molecule entering the plant.	Interview a local farmer or gardener about how they ensure their plants get enough 'raw materials' (water/sun).	Observe a family member doing a chore and identify where they are getting their 'respiration' materials and what 'waste' they are producing.	Write a 'Thank You' letter from a human to a plant, or vice-versa, explaining why they need each other to survive.
Reflections:	Reflect on whether students can differentiate between the 'ingredients' and the 'output' based on the cooking analogy.	Assess if the 'Assembly Line' simulation successfully cleared the confusion regarding the chemical change	Evaluate if the 'Jumping Jack' activity helped bridge the gap between physical breathing and cellular energy production.	Reflect on whether the concept of 'Interdependence' was clearly understood through the visual posters.

		from CO ₂ to Glucose.		
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