

LESSON PLAN TEMPLATE

Lesson Title	Cellular Powerhouses: Unpacking Photosynthesis and Cellular 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:

- Using information from secondary sources identify the different parts of the cell where photosynthesis and respiration occur.

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

	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 chloroplast as the specific organelle where photosynthesis occurs. - Describe the internal parts of the chloroplast (thylakoid, stroma, grana) using secondary sources and diagrams.	- Identify the mitochondrion as the specific organelle where cellular respiration occurs. - Distinguish the structural parts of the mitochondrion (cristae, matrix, inner/outer membranes) using models or illustrations.	- Compare and contrast the locations and basic processes of photosynthesis and respiration. - Create a visual flow chart showing the relationship between chloroplasts and mitochondria using information from various secondary sources.	- Synthesize information to explain the importance of chloroplasts and mitochondria in the global energy cycle. - Demonstrate understanding by identifying the organelles involved in real-life Philippine environmental scenarios.
Learner Context:	Learners show high engagement with visual aids but struggle with technical biological terminology. Most students are familiar with local flora like mango and narra trees, which can serve as a concrete starting point. A few learners have reading comprehension barriers, requiring	Learners respond well to analogies, such as comparing organelles to community roles (e.g., the barangay hall or local mills). Some students exhibit difficulty in distinguishing between 'breathing' and 'cellular respiration,' requiring explicit clarification. Strengths include collaborative	The class has a mix of visual and kinesthetic learners. While most can identify organelles individually, connecting them in a cycle is a challenge for about 30% of the class. They enjoy competitive but collaborative games and peer-teaching opportunities.	Learners are highly motivated when lessons are linked to environmental protection and local issues like climate change or local farming practices. Language barriers are minimized when students are allowed to express complex ideas using a mix of English and the local dialect during

	simplified text versions of secondary sources.	drawing and creative mapping.		discussions.
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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:	• "Spot the Green": A quick photo-walk or slide show of local Filipino plants (e.g., Pechay, Rice, San Francisco) where students identify which parts of the plant are likely making food. • Review of basic cell structure from previous grades.	• "Energy Check": Students perform a 30-second jumping jack exercise and describe how they feel (breathing, heat, energy levels) to transition into the concept of energy release.	• "Match-up Mania": A quick game where students match 'Raw Materials' and 'Products' to the correct organelle (Chloroplast vs. Mitochondrion).	• "The World Without": A brainstorming session on what would happen if all chloroplasts suddenly disappeared from the local rice fields.
Flow:	• Scaffolding : The teacher presents a magnified image of a leaf cell. • Active Retrieval: Students brainstorm what plants	• Scaffolding : Comparison of a battery or a local power plant (like the Bangui Wind Farm) to the mitochondrion.	• Scaffolding : The teacher uses a 'Giant Cycle' floor map to show the flow of oxygen and carbon dioxide. • Information	• Active Retrieval: A quick 'Recap Quiz' using a game-based format (e.g., Quizizz or a physical 'Step Forward' game).

	need to grow based on their experiences at home or in local farms. ● Information Processing : Small groups examine printed infographics (secondary sources) about the chloroplast. ● Check for Understanding: A "Label-as-you-go" activity where students identify parts of the chloroplast on a large board diagram. ● Social Learning: Pairs discuss why the chloroplast is often compared to a 'kitchen'.	● Active Retrieval: Quick recap of the chloroplast from the previous session to contrast 'food making' vs 'food breaking.' ● Information Processing : Analysis of secondary source articles detailing the 'Powerhouse of the Cell.' ● Social Learning: Groups create a 3D-style drawing of a mitochondrion using recycled materials or colored chalk. ● Check for Understanding: 'True or False' flashcard drill focusing on the location of respiration.	Processing : Jigsaw Reading: Different groups read different secondary sources (one on photosynthesis, one on respiration) then teach each other. ● Social Learning: Groups construct a 'Relationship Poster' showing how the product of one organelle becomes the reactant for the other. ● Check for Understanding: 'Think-Pair-Share' on the question: 'Can plants survive without mitochondria?'	● Information Processing : Analyzing a case study on 'Urban Gardening in the Philippines' and identifying the cellular processes at play. ● Social Learning: Small groups design a 'Call to Action' poster for environmental conservation, highlighting the 'invisible' work of cells. ● Check for Understanding: Students present their posters, explaining the cellular science behind their message.
Learning Resources:	● Printed diagrams of Chloroplast structure. ● Projector and Slide Presentation	● Mitochondrion structural models or detailed posters. ● Video clip on cellular	● Manila paper and markers. ● Secondary source readings (encyclopedia)	● Case study handouts on local environmental issues. ● Art materials for poster

	- Science Textbooks (Grade 8). - Local plant samples.	respiration basics. Whiteboard and colored markers.	as, curated websites, or textbooks). Graphic organizer templates (Venn Diagram).	making. Laptop/Projector for the final summary.
Opportunities for integration:	Integration with TLE (Agriculture) : Understanding how plant health depends on these cellular structures for crop yield.	Integration with Physical Education: Explaining why we breathe faster during exercise at a cellular level.	Integration with Araling Panlipunan: Discussing the balance of nature and how the destruction of forests (local watersheds) affects this cellular cycle.	- Integration with Arts: Creative poster design and visual communication of scientific concepts. - Integration with ESP: Values of stewardship and caring for the environment
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:	- A short 'Identify and Describe' worksheet where students match the chloroplast parts to their specific locations within the cell. - Observation of group discussions	Exit Ticket: 'Where am I?' Students must write the name of the organelle and the specific part where energy is released based on a description provided by the teacher.	- Completion of a Comparison Table (Organelle, Location, Process, Main Goal). - Peer-evaluation of the 'Relationship Posters' using a simple rubric.	Final Summative Quiz: Multiple choice and short answer questions focusing on identifying locations and processes from secondary source

	during the diagram labeling.			descriptions. ● Rubric-based assessment of the 'Call to Action' posters.
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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:	● For students who finish early: Research why some leaves are not green (e.g., Mayana) and if they still have chloroplasts. ● For students needing support: Provide a 'color-coded' map of the chloroplast.	● Home Task: Interview a family member who works in a physically demanding job (e.g., farmer, construction worker) and explain to them how their mitochondria are helping them work.	● Reflective Journal: 'The Cycle of Life in my Barangay' – writing a short paragraph on how humans and plants in their own community support each other's cellular needs.	● Community Action: Students are encouraged to plant at least one seedling at home and explain the science of its growth to their parents.
Reflections:	● Did the use of local plant examples help bridge the gap between abstract organelles and reality? ● Which specific parts of the chloroplast were most difficult for the learners to visualize?	● How effective was the physical exercise activity in grounding the concept of respiration? ● Are students still confusing the mitochondria with the chloroplast?	● Did the Jigsaw method effectively engage the students who usually struggle with reading? ● Is the conceptual link between the two organelles clear to the majority?	● How well did the students connect cellular biology to large-scale environmental issues? ● Were the assessments varied enough to capture the learning of all students regardless of their initial

				proficiency?
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