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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Science

Quarter 2
Lesson
2

Lesson Exemplar for Science Grade 7
Quarter 2: Lesson 2 (Week 2)
S.Y. 2024-2025

Development Team

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SCIENCE (BIOLOGY) / QUARTER 2 / GRADE 7

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
1. Content Standards	1. Familiarity and proper use of a compound microscope are essential to observe cells. 2. The organelles of plant and animal cells can be identified using a compound microscope. 3. Cells are the basic unit of life and mitosis, and meiosis are the basic forms of cell division.
2. Performance Standards	*By the end of the Quarter*, learners will be able to create a visual representation, such as poster, model, or e-poster, explaining the trophic level in a chosen ecosystem.
3. Learning Competencies and Objectives	**1. Identify the parts and functions, and demonstrate proper handling and storing of a compound microscope** *Lesson Objective 1: Identify the parts of a compound microscope and the function of each part.* *Lesson Objective 2: Demonstrate the proper handling and storing of a compound microscope* **2. Use proper techniques in observing and identifying the parts of a cell with a microscope such as the cell membrane, nucleus, cytoplasm, mitochondria, chloroplasts, and ribosomes** *Lesson Objective 1: Use proper techniques when observing the parts of a cell under a microscope.* *Lesson Objective 2: Identify the parts of a cell, such as the cell membrane, nucleus, and cytoplasm, with a microscope* **3. Differentiate plant and animal cells based on their organelles** *Lesson Objective 1: Identify the parts of a plant cell and the function of each.* *Lesson Objective 2: Identify the parts of an animal cell and the function of each.* *Lesson Objective 3: Compare and contrast plant and animal cells based on their organelles.* ***4. Recognize that some organisms consist of a single cell (unicellular) like in bacteria and some consist of many cells (multicellular) like in a human*** *Lesson Objective 1: Describe unicellular and multicellular organisms* *Lesson Objective 2: Identify examples of unicellular and multicellular organisms*
4. Content	1. Science equipment: The Compound Microscope ● Parts and Functions ● Using of Microscope

	2. Plant and animal cells ● Parts and Functions ● Similarities and Differences
5. Integration	• Utilization of a microscope in investigating microorganism and their roles in the ecosystem • Distribution of plant and animal cells relating to global diversity patterns • The intricate pattern of plant and animal cells for inspiration for artistic pieces

II. LEARNING RESOURCES

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- https://askabiologist.asu.edu/cell-viewer-game/
- Batul, A. (2013, January 17). Rhizopus bread mold under microscope. World under Microscope.
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- Compare a plant cell to an animal cell using a venn diagram. (n.d.). Toppr Ask. https://www.toppr.com/ask/en-ae/question/compare-a-plant-cell-to-an-animal-cell-using-a-venn-diagram/
- Lab on Eukaryotes: Plants & Animals. (n.d.-b). https://www.bu.edu/gk12/christina/cells_lab.pdf
- Lumen Learning. (2019). Prokaryotes and Eukaryotes | Biology for Majors I. Lumenlearning.com. https://courses.lumenlearning.com/suny-wmopen-biology1/chapter/prokaryotes-and-eukaryotes/
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- Mokobi, F. (2020, February 22). 25 differences between plant cell and animal cell (plant cell vs animal cell). Microbe Notes. https://microbenotes.com/plant-cell-vs-animal-cell/
- Molnar, C., & Gair, J. (2019). 1.1 Themes and Concepts of Biology – Concepts of Biology-1st Canadian Edition. Opentextbc.ca. https://opentextbc.ca/biology/chapter/1-1-themes-and-concepts-of-biology/
- National Geographic Society. (2022, May 20). Cell Theory | National Geographic Society. Education.nationalgeographic.org; National Geographic. https://education.nationalgeographic.org/resource/cell-theory/
- Virtual Microscope | NCBioNetwork.org. (2021, October 27). Www.ncbionetwork.org. https://www.ncbionetwork.org/educational resources/elearning/virtual-microscope
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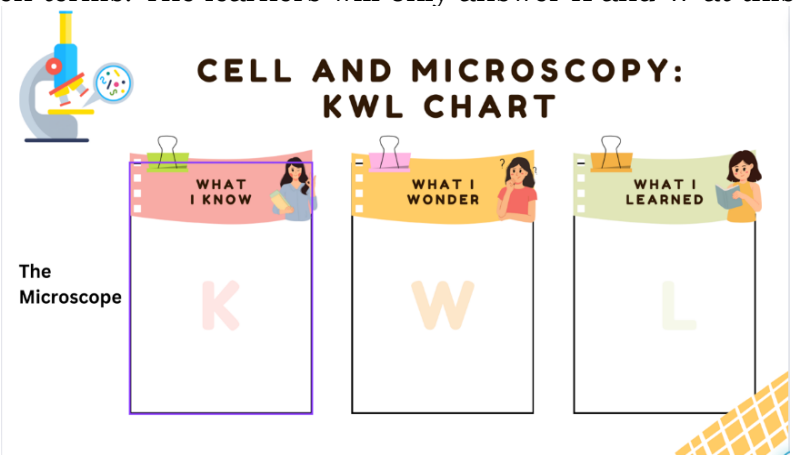
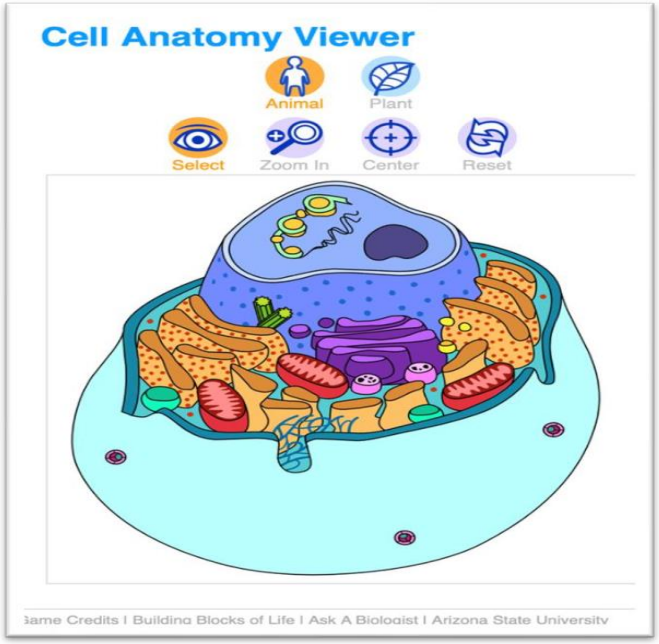
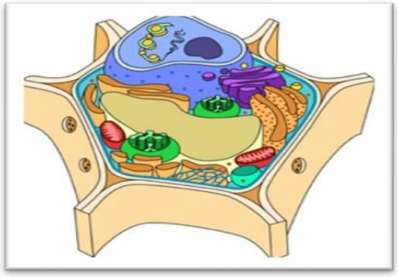
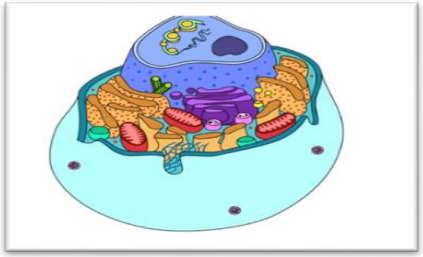
- Microscope master. (2019). Onion Cells Under the Microscope - Requirements, Preparation and Observation. MicroscopeMaster. https://www.microscopemaster.com/onion-cells-microscope.html
- Molnar, C., & Gair, J. (2019). 1.1 Themes and Concepts of Biology – Concepts of Biology-1st Canadian Edition. Opentextbc.ca. https://opentextbc.ca/biology/chapter/1-1-themes-and-concepts-of-biology/

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**Short Review** **Plant and Animal Word Search:** Using a Word Search Puzzle, the students will search for examples of living things, and will classify the examples as either plant or animal.  Plants and Animals WORD SEARCH Can you find the words hidden plants and animals in the puzzle? *Use brown to highlight the animals and green for plants.* T R O P O M A N G R O V E F G R E X O N P H E R E A S L A A S L Y A L A Y E R S E Y S Z O A A R T O S A U G U I E I V W A R T Y P I G H V N S L T E O A L N L A A C A G S P O T T E D D E E R D E L T W M W A N E H O G U O C E A E A E M O S P H E R E O M R A N O A E O N C H I V C U S U G A R C A N E H E R O R I H O Y A M E G O A E N N R E E A E W N C O L N N R U E R R M O N K E Y O E E N T N TAMARAW MONKEY SPOTTED DEER EAGLE MANGO NARRA MANGROVE FLYING LEMUR TARSIER COCONUT WARTY PIG SUGAR CANE	The lesson will start with a Word Search Puzzle that the students will answer. After searching for the term, the students will identify it as either plant or animal by highlighting the term green for plants and brown for animals. (The color may be modified based on the available materials the learners have.) This activity allows the learners to recall the classification of living organisms as plants or animals. Key: The smallest unit that constitutes plants and animals are cells. Cells are the basic unit of life in living things.

	Process Question: *What is the smallest unit that constitutes all the living things that you have identified above?* _____ _____ _____ _____ **KWL Chart:** Using the graphic organizer, the students will recall their prior knowledge about the given terms. The learners will only answer K and W at this point.  	At this point, the students already have an idea of what the lesson is all about. Using the graphic organizer, the students will write what they know, and what they wonder about: • Plant Cells • Animal Cell This KWL Chart will be revisited at the end of the lesson to answer the column on what they have learned about the different concepts.
B. Establishing Lesson Purpose	**Lesson Purpose** **Cell Theory Poster:** The students will read the text on Cell Theory. Using the material (https://education.nationalgeographic.org/resource/cell-theory/), make a poster emphasize on this part: "The classical cell theory was proposed by Theodor Schwann in 1839. There are three parts to this theory. The first part states that all organisms are made of cells. The second part states that cells are the basic units of life. These parts were based on a conclusion made by Schwann and Matthias Schleiden in 1838, after comparing their observations of plant and animal cells. The third part, which asserts that cells come from preexisting cells that have multiplied, was described by Rudolf Virchow in 1858, when he stated omnis cellula e cellula (all cells come from cells)."	The lesson proper will start with the understanding of the Cell Theory based on the material: https://education.nationalgeographic.org/resource/cell-theory/ This activity will be done collaboratively emphasizing on the 2 postulates of the Cell Theory.

	Unlocking Content Area Vocabulary **Table Completion: Complete table by providing the descriptions of the given terms.** 1. Cells 2. Prokaryotes 3. Eukaryote 4. Nucleoid 5. Nucleus 6. Organelle	
C. Developing and Deepening Understanding	**SUB-TOPIC 1:** MICROSCOPY **1. Explicitation** **Cell Anatomy:** The students will label the parts of a plant and animal cell. After identifying the structures, the function of the organelles will also be unlocked.   	The development of the topic on Cells will start with the When students already know how to manipulate, handle and properly store the microscopes, they can now use the tool to observe different parts or organelles of cells. Using the Interactive Website, Cell Anatomy Viewer at https://askabiologist.asu.edu/cell-viewer-game/play.html

1. Centriole _____
2. Cytosol/Cytoplasm _____
3. Cytoskeleton _____
4. Nuclear DNA _____
5. Golgi complex / Golgi apparatus _____
6. Lysosome _____
7. Cell membrane _____
8. Mitochondrion _____
9. Nucleolus _____
10. Nucleus _____
11. Peroxisome _____
12. Rough ER _____
13. Ribosomes _____
14. Smooth ER _____
15. Vesicle _____

Answer Key:

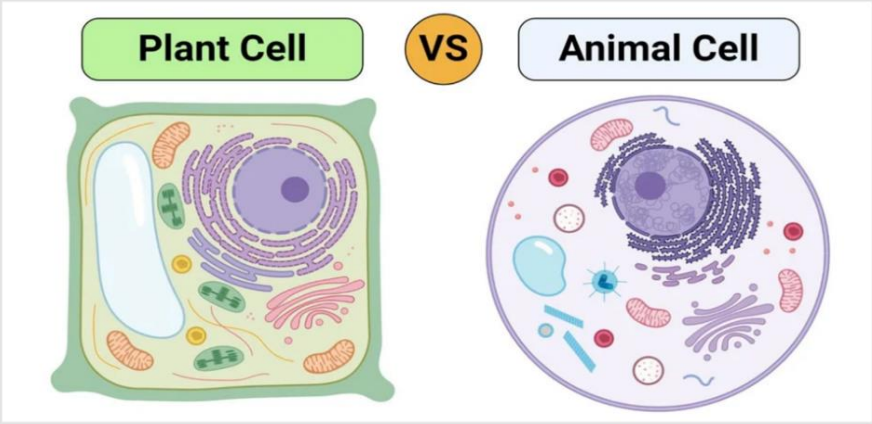
1. Centriole Involved in cell division; helps in the formation of spindle fibers that separate chromosomes during mitosis.
2. Cytosol/Cytoplasm The jelly-like fluid inside the cell that holds the organelles and is the site of many metabolic reactions.
3. Cytoskeleton A network of fibers that provides structural support for the cell, aids in cell movement, and helps transport materials within the cell.
4. Nuclear DNA Contains the genetic blueprint for the organism, encoding instructions for protein synthesis and cell function.
5. Golgi complex / Golgi apparatus Modifies, sorts, and packages proteins and lipids for storage or transport out of the cell.
6. Lysosome Contains digestive enzymes that break down waste materials, cellular debris, and foreign invaders like bacteria.
7. Cell membrane A semi-permeable membrane that surrounds the cell, providing protection and structure, and controlling the movement of substances in and out of the cell.
8. Mitochondrion Known as the powerhouse of the cell, mitochondria generate most of the cell's

supply of ATP (energy) through cellular respiration.

9. Nucleolus A structure within the nucleus responsible for producing and assembling ribosome components.
10. Nucleus Contains the cell's genetic material (DNA) and controls the cell's activities by regulating gene expression; acts as the command center of the cell.
11. Peroxisome Contains enzymes that break down fatty acids and amino acids and detoxify certain chemicals, producing hydrogen peroxide as a byproduct, which is then converted to water.
12. Rough ER Studded with ribosomes and involved in protein synthesis and processing.
13. Ribosomes Small structures that are the site of protein synthesis; they can be found floating freely in the cytoplasm or attached to the endoplasmic reticulum.
14. Smooth ER Lacks ribosomes and is involved in lipid synthesis and detoxification processes.
15. Vesicle Small membrane-bound sacs that transport and store substances within the cell and can also aid in transporting materials to and from the cell surface.

2. Worked Example

Picture Analysis: Plant and Animal Cells. The students collaboratively List down the difference between plant and animal cells.



Key Differences:

_____

_____

_____

_____

After identifying the cell parts and functions, the students will note the differences and similarities between plant and animal cells.

Key:

- Presence of the cell wall in plant cells and its absence in animal cells
- Size and shape of the cells, noting that plant cells are usually more regular in shape due to the rigid cell wall
- Presence of large central vacuoles in plant cells (if visible).

	3. Lesson Activity **Laboratory Activity on the Observing Plant and Animal Cell:** The students will perform the laboratory activity to view plant and animal cells using the microscope. **Objectives:** ● To prepare and observe slides of plant and animal cells. ● To identify the differences and similarities between plant and animal cells. ● To understand the basic cell structures. ● **Materials:** ● Microscopes ● Prepared slides of plant cells (onion epidermis) and animal cells (cheek cells) ● Glass slides ● Coverslips ● Iodine solution (for plant cells staining) ● Methylene blue solution (for animal cell staining) ● Toothpicks ● Dropper ● Tweezers ● Paper towels **Procedure:** A. Preparing Plant Cell (Onion Epidermis) 1. Peel a thin layer of epidermis from the inner side of an onion using tweezers. 2. Place the onion epidermis flat on a glass slide. 3. Add a drop of iodine solution to the onion epidermis. 4. Carefully place a coverslip over the specimen to avoid air bubbles. 5. Use a paper towel to draw the stain under the coverslip if necessary. 6. Observe the slide under the microscope, starting with the lowest magnification and moving to higher magnifications. 7. Draw the observed structures and label the cell wall, cell membrane, nucleus, and cytoplasm.	Upon identifying the difference, the students will observe plant and animal cells under a microscope. **Answer Key:** 1. a. Cell Wall is present in plant cells. b. Chloroplasts is present in plant cells. c. Vacuoles in plant cells are often large and in animal cells are usually smaller. d. Shape of plant cells is regular, box-like, while animal cells have a more irregular, rounded shape. 2. The cell wall provides structural support and protection to the plant cell. It helps maintain the cell's shape and prevents it from bursting when water enters the cell. 3. a. Iodine Solution: Used to stain plant cells, particularly starch-containing structures. It enhances the contrast, making the cell structures more visible under the microscope. b. Methylene Blue: Used to stain animal cells making the nucleus and other cell structures more

B. Preparing Animal Cell (Cheek Cells)
1. Gently scrape the inside of your cheek with a clean toothpick.
2. Smear the collected cells onto a blank microscope slide.
3. Add a drop of methylene blue solution to the cells to spread them thinly on the slide.
4. Carefully place a coverslip over the specimen.
5. Use a paper towel to draw the stain under the coverslip if necessary.
6. Observe the slide under the microscope, starting with the lowest magnification and moving to higher magnifications.
7. Draw the observed structures and label the cell membrane, nucleus, and cytoplasm.

Discussion Questions:

1. What are the main structural differences between plant and animal cells observed under the microscope?
   _____
   _____

2. Why do plant cells have a cell wall, and what is its function?
   _____
   _____

3. What is the purpose of staining the cells with iodine solution and methylene blue?
   _____
   _____

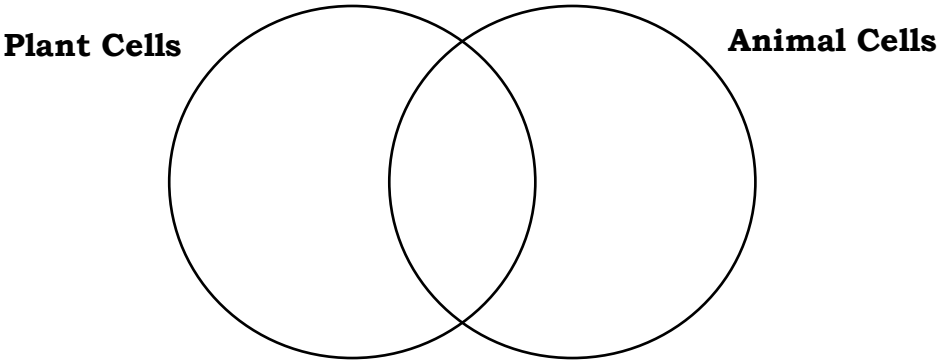
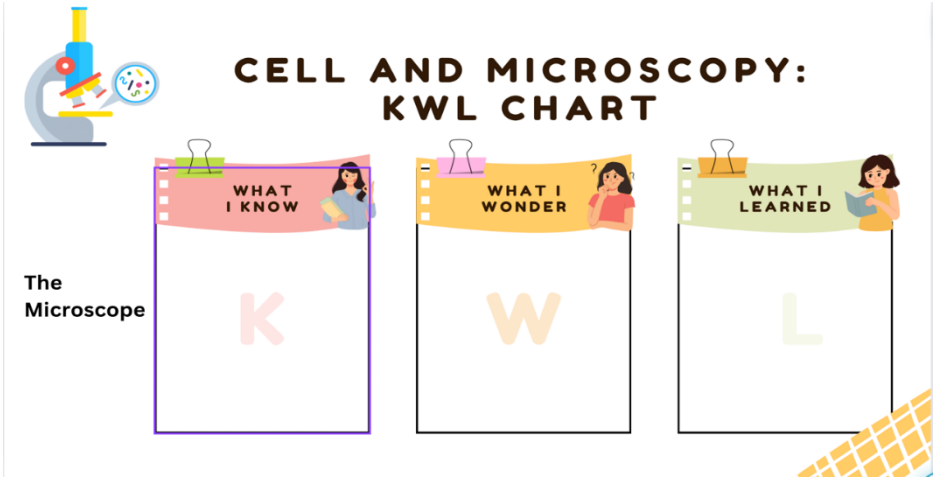
4. How does the shape of the cells differ between plant and animal cells, and why?
   _____
   _____

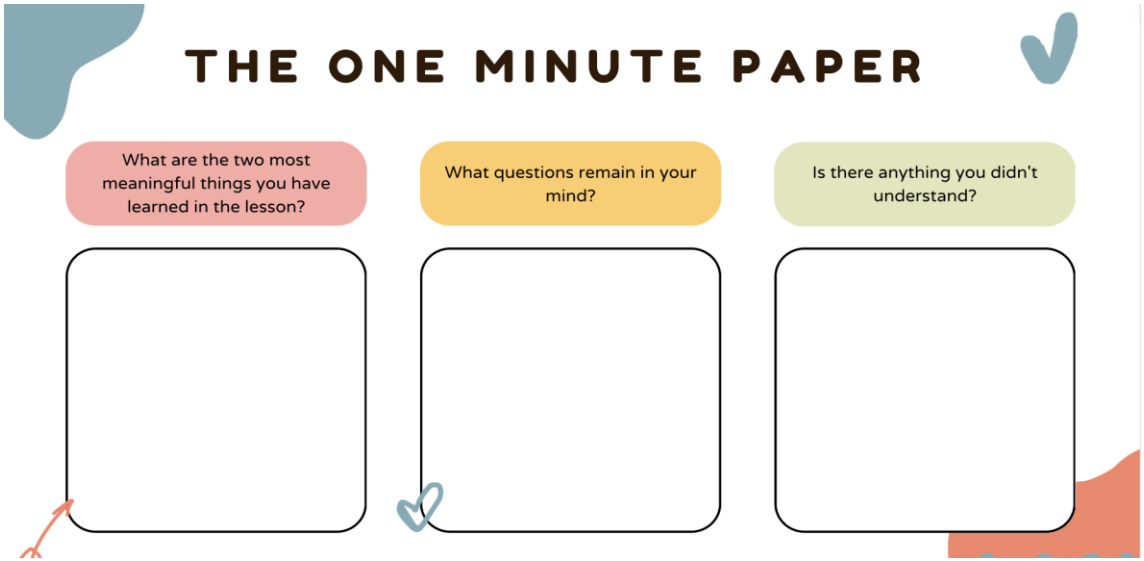
5. What similarities did you observe between plant and animal cells?
   _____
   _____

visible. This helps in clearly identifying cell components that might otherwise be difficult to see.

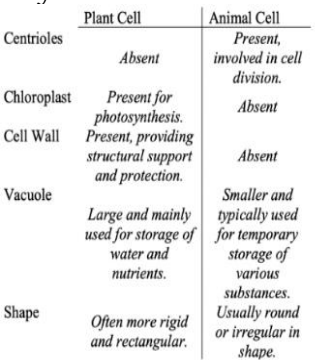
4. Plant cells generally have a more regular, box-like shape due to the presence of a rigid cell wall that provides structural support, while animal cells have a more irregular, rounded shape because they lack a cell wall and are only surrounded by a flexible cell membrane, allowing them to adopt various shapes and facilitating their movement and interaction with other cells.

5. a. Nucleus: Both plant and animal cells have a nucleus that contains their genetic material.
b. Cell Membrane: Both types of cells have a cell membrane that controls the movement of substances in and out of the cell.
c. Cytoplasm: Both cells contain cytoplasm, a jelly-like substance that holds the organelles and is the site of many metabolic reactions.
d. Organelles: Both

	Venn Diagram: Students will use a Venn Diagram to differentiate plant and animal cells.  	plant and animal cells have other common organelles, such as mitochondria, endoplasmic reticulum, Golgi apparatus, and ribosomes.
D. Making Generalizations	**Learners' Takeaways** **KWL Chart**: Using the graphic organizer, the students will answer the L column or what they have learned about the given term.  **Reflection on Learning** **One Minute Paper:** Using the graphic organizer, reflect on your learning by creating a one-minute paper by answering the questions.	Towards the end of the lesson, the students will revisit the KWL Chart to map the conceptual change. It allows the learners to identify their takeaways of the lesson.

		The students, at this point, will reflect on their learning by answering the one-minute paper. This will allow them to map what are the meaningful things they have learned, the questions they still have, and anything they did not understand.

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		**NOTES TO TEACHERS**
A. Evaluating Learning	**1. Formative Assessment** A. Multiple Choice. Write the letter that corresponds to the correct answer. _____ 1. Which of the following organelles is found in plant cells but not in animal cells? a) Nucleus b) Mitochondria c) Chloroplast d) Ribosomes _____ 2. What is the primary function of the cell wall in plant cells? a) To store genetic information b) To control movement of substances in and out of the cell c) To provide structural support and protection d) To produce energy for the cell	Teachers may encourage learners to have a quiz notebook to monitor learners' academic progress. The quiz notebook may also serve as a homework notebook. Key: 1. c) Chloroplast 2. c) To provide

	_____ 3. Which structure is responsible for protein synthesis in both plant and animal cells? a) Lysosome b) Ribosome c) Golgi apparatus d) Smooth ER _____ 4. What organelle is known as the powerhouse of the cell? a) Nucleus b) Mitochondrion c) Chloroplast d) Ribosome _____ 5. Which of the following is a function of the Golgi apparatus? a) Synthesizing proteins b) Modifying, sorting, and packaging proteins and lipids c) Breaking down cellular waste d) Producing ATP B. T-Chart. Plant and Animal Cells Plant Cell | Animal Cell Centrioles Chloroplast Cell Wall Vacuole Shape			structural support and protection 3. b) Ribosome 4. b) Mitochondrion 5. b) Modifying, sorting, and packaging proteins and lipids Key: 
B. Teacher's Remarks	*Note observations on any of the following areas:*	**Effective Practices**	**Problems Encountered**	*Teachers are encouraged to record relevant observations or any critical teaching events that influence on the attainment of the lesson objectives. Use or modify the provided template in*
	strategies explored			
	materials used			

	learner engagement/ interaction			*recording the notable instructional areas or concerns.* *In addition, notes here can also be on tasks that will be continued the next day or additional activities needed.*
	Others			
C. Teacher's Reflection	*Reflection guide or prompt can be on:* ▪ *<u>principles behind the teaching</u>* *What principles and beliefs informed my lesson?* *Why did I teach the lesson the way I did?* ▪ *<u>students</u>* *What roles did my students play in my lesson?* *What did my students learn? How did they learn?* ▪ *<u>ways forward</u>* *What could I have done differently?* *What can I explore in the next lesson?*			*Entries in this section are the teacher's reflections about the implementation of the whole lesson, which will serve as inputs for the LAC sessions. Use or modify the provided guide questions in eliciting teacher's insights.*