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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Science

Quarter 2
Lesson
3

Lesson Exemplar for Science 4
Quarter 2: Lesson 3 (Week 3)
S.Y. 2024-2025

Development Team

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SiMERR National Research Centre

SCIENCE (BIOLOGY) / QUARTER 2 / GRADE 4

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	Learners learned that animals and plants have systems that function to keep them alive.
B. Performance Standards	By the end of the Quarter, learners identify that plants and animals have systems whose function is to keep them alive.
C. Learning Competencies and Objectives	***The learners observe the root and shoot system in plants and describe why they are important.*** **1.** *Observe and identify the root system of a plant.* **2.** *Observe and identify the shoot system of a plant.* **3.** *Describe the functions of the root system.* **4.** *Explain the functions of the shoot system.* **5.** *Discuss the importance of root and shoot systems in plant growth.* **6.** *Compare and contrast the roles of root and shoot systems in plants.*
D. Content	**Plant Systems** - Root system - Shoot system - Importance and Roles of Root and Shoot systems
E. Integration	Home Economics and Livelihood Education Food Security Vegetable and Fruit Production Biological Diversity

II. LEARNING RESOURCES

- Shelden, M. C., & Munns, R. (2023). Crop root system plasticity for improved yields in saline soils. *Frontiers in Plant Science*, *14*, 1120583.
- Sanders, P. L., & Markhart, A. H. (2023). Root system functions during chilling temperatures: injury and acclimation. In *Crop responses and adaptations to temperature stress* (pp. 77-108). CRC Press.
- Shen, G. (2020). Campbell biology (edited by Lisa Urry, Michael Cain, Steven Wasserman, Peter Minorsky and Jane Reece).

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**Day 1** **Short Review** **A. Plant Parts and Functions:** Students will learn about the different parts of plants and their functions. **Instructions**: Have students draw or label diagrams of plants, including roots, stems, leaves, and flowers. Discuss the functions of each part and how they contribute to the plant's survival and growth. **B. Interactive Plant Needs Game**: Students will engage in a fun, interactive game to learn about plant needs. **Instructions**: Create a card game with pictures of various animals on one set of cards and characteristics on another set. Students have to match the animal with its unique characteristics, such as "webbed feet for swimming" or "fur for warmth."	
B. Establishing Lesson Purpose	**1. Lesson Purpose** **Root system (Day 1 and 2)** Part A ● Start with a "Root Dig" where students can plant a small seedling or take a closer look at a potted plant's roots. ● Encourage students to carefully examine the roots and discuss their observations. ● Establish the reason for learning by explaining that understanding roots can help them take better care of plants, gardens, and even appreciate the beauty of plant life.	In each engagement activity, connect the learning objectives to real-life applications and show students how this knowledge is relevant to gardening, agriculture, environmental conservation, and their appreciation of the natural world.

	Part B ● Show students a plant with its roots exposed, and guide them to see how roots anchor the plant and absorb water and nutrients. ● Conduct a simple experiment where students observe how roots absorb water from a container, by performing Activity No. 2 titled “Uncovering the Secrets of Plant Roots” ● Establish the reason for learning by explaining that understanding root functions is essential for gardening, agriculture, and ecosystem health. **Shoot system (Day 3)** Part A ● Bring in a variety of potted plants with different types of shoot systems, such as flowers, trees, and vines. ● Ask students to identify the different shoot systems and discuss their observations. ● Establish the reason for learning by emphasizing that recognizing shoot systems helps them appreciate the diversity and importance of plants in our world. Part B ● Present students with various plant samples and ask them to identify and discuss the different parts of the shoot system, such as stems, leaves, flowers, and fruits. ● Discuss the primary functions of these shoot system components, like photosynthesis and reproduction. ● Establish the reason for learning by highlighting how understanding the shoot system is crucial for agriculture, horticulture, and environmental awareness.	

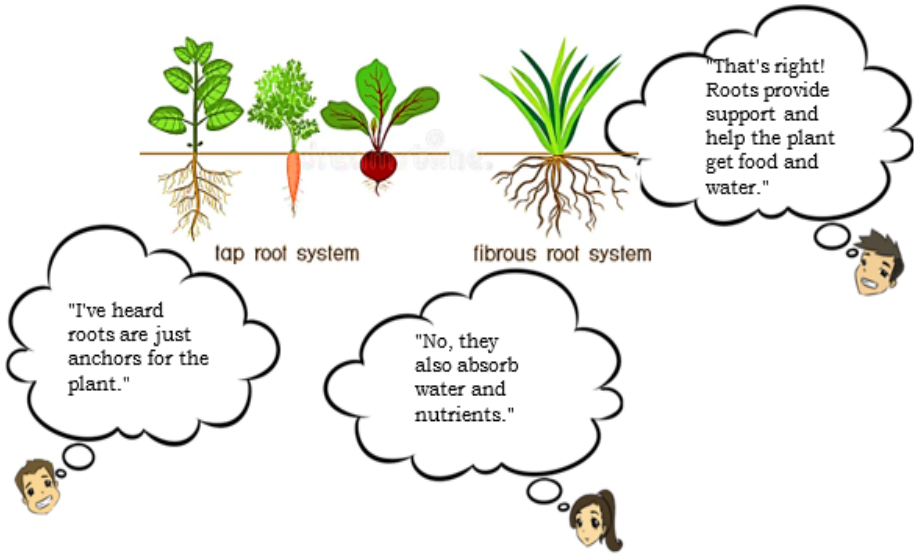
	Importance and Roles of Root and Shoot systems (Day 4) Part A ● Show students a series of pictures or diagrams illustrating plants with healthy root and shoot systems and plants with damaged systems. ● Discuss how each system contributes to plant growth and overall health. ● Establish the reason for learning by emphasizing that healthy root and shoot systems are essential for food production, oxygen generation, and maintaining the environment. Part B ● Provide students with a Venn diagram or a T-chart to compare and contrast the functions of the root and shoot systems. ● Discuss real-world scenarios like drought or soil erosion and how the root and shoot systems are affected. ● Establish the reason for learning by emphasizing that understanding these systems helps us make informed decisions about planting, landscaping, and conservation efforts. **2. Unlocking Content Area Vocabulary** **Root system (Day 1 and 2)** Part A ● Provide students with a variety of potted plants or plant specimens. ● Encourage them to carefully observe the plants and draw or label the root systems they see. ● Have a discussion where students describe what they observed and use basic terms like "roots," "underground," and "anchoring." Part B ● Provide students with a list of words related to the root system, such as "absorption," "anchoring," "support," and "storage." ● Ask students to find simple explanations or synonyms for these words.	These activities aim to help students understand complex concepts related to plant systems while breaking down difficult words and terminology into simpler language and visuals.

	• Have them create a poster or diagram that illustrates the functions of the root system using straightforward language. **Shoot system (Day 3)** Part A • Provide students with different plants, highlighting the parts above the soil. • Ask students to observe and sketch the visible parts of the plants, such as stems, leaves, and any flowers or fruits. • During a group discussion, use simple language to describe the visible plant parts and their functions, like "above-ground," "leaves," and "photosynthesis." Part B • Provide students with a list of words related to the shoot system, such as "photosynthesis," "support," "transport," and "reproduction." • Encourage students to find simplified explanations or synonyms for these words. • Have students create a visual representation, such as a flowchart, that explains the functions of the shoot system using straightforward language. **Importance and Roles of Root and Shoot systems (Day 4)** Part A • Begin with a discussion about the importance of the root and shoot systems and simplify these concepts to "anchors and food makers." • Provide students with pictures or diagrams of plants and ask them to label the root and shoot systems. • Have a class discussion about how the root and shoot systems work together to help plants grow, using basic terms like "food," "water," "anchoring," and "support." Part B • Provide students with a Venn diagram with two overlapping circles, one for the root system and one for the shoot system.	

	• Ask students to list the functions of each system in their respective circles and identify common functions in the overlapping area. • Facilitate a discussion where students compare and contrast the roles of these systems in plants, using simplified terms like "below-ground" and "above-ground."	
C. Developing and Deepening Understanding	**SUB-TOPIC 1: ROOT SYSTEM (Day 1 and 2)** **1. Explicitation** • Take students to a garden or provide potted plants in the classroom. Have them carefully dig out a plant, wash away the soil, and examine the root system. Provide magnifying glasses and labels for different root structures (e.g., taproot, fibrous roots) to help them identify and label the roots. • Divide the class into groups, and assign each group a specific function of the root system (e.g., anchoring, water absorption, nutrient uptake). Have them create short skit or presentations that demonstrate these functions and their importance to the plant. **2. Worked Example** • Visit a local garden or farm and choose a commonly grown plant like a rice plant (palay). Gently dig around the base of the plant to uncover its roots. Observe the different types of roots (fibrous and taproots) and their functions in anchoring the plant and absorbing water and nutrients. • Choose a native tree like the Narra or Sampaloc. Describe how the root system helps the tree absorb water and nutrients from the soil, provides stability during strong winds and typhoons, and stores energy in the form of starch. **3. Lesson Activity** • **Root System Dissection**: Provide students with a variety of plants (e.g., bean plants, radishes, or small trees). In this activity, students will carefully dissect the roots of these plants and observe their structure. They can draw and label the different parts of the root system. This	The explicitation activities should provide students with a hands-on and interactive learning experience to meet the learning objectives effectively. It is highly encouraged to provide an integration of concepts of any of the themes identified in the preliminary pages. The worked examples provide a localized and practical approach to understanding the root and shoot systems of plants and their importance in the Philippines. Lesson activities are designed to engage students and reinforce their understanding of the root and shoot systems in plants while addressing each of the specified learning objectives.

hands-on experience will help them identify and understand the root system.

- Ask the students to perform Activity No. 1 in the Student Work Sheet with the title “Exploring Plant Roots: Below the Surface”
- **Root System Role Play**: Organize a role-playing activity where students take on the roles of different parts of a plant. Some students can be "roots," and others can be "leaves" or "stems." The "roots" can act out their functions by absorbing water and nutrients from the soil, while the "leaves" and "stems" can demonstrate how they rely on the "roots" for support and nourishment. This interactive exercise will help students understand the functions of the root system.
- Use the concept cartoon below to generate classroom discussions where students can discuss and apply their understanding of the plant root system in a simple and engaging way. Students need to select one statement from the scenario and then let them explain why they chose the said statement.

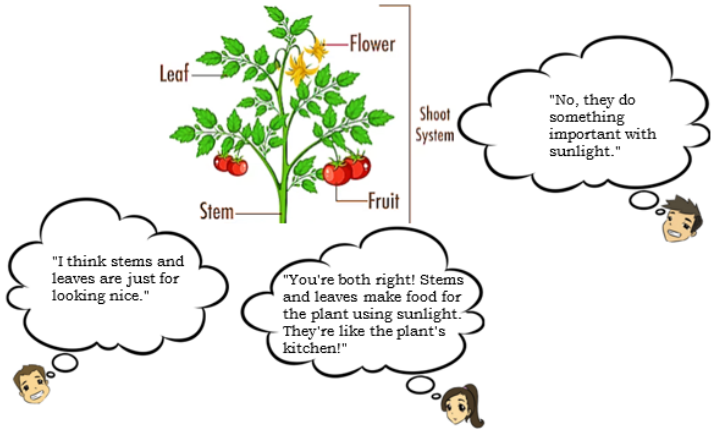


The photo at the center is obtained from
https://www.dreamstime.com/illustration/tap-root.html

	SUB-TOPIC 2: SHOOT SYSTEM (Day 3) **1. Explicitation** ● Provide different types of plants with various shoot systems (e.g., trees, herbs, shrubs). And then, ask students to closely examine and identify different parts of the shoot system, such as stems, leaves, and flowers. Encourage them to make sketches and label the parts. ● Perform Activity No. 3 found in the Student Worksheet with the title "Exploring Plant Shoots: Above the Surface" ● Provide students with a template of a plant and ask them to draw and label the different parts of the shoot system. Then, have them write explanations next to each labeled part, describing its function in the plant's life. **2. Worked Example** ● Find a variety of plants like tomato, eggplant, or okra in a garden. Observe the above-ground parts, including stems, leaves, flowers, and fruits. Identify the various components of the shoot system and understand their roles in photosynthesis, reproduction, and support. ● Ask the students to perform Activity No. 3 found in the Student Worksheet with a title "Exploring Plant Shoots: Above the Surface" ● Examine a common vegetable like Kangkong (water spinach). Explain how the shoot system, including stems and leaves, is responsible for photosynthesis, transpiration, and support for flowers and fruits. Emphasize its role in providing food for people. **3. Lesson Activity** ● **Shoot System Scavenger Hunt**: Take the students on a nature walk around the school grounds or a nearby park. Provide them with a checklist of various types of plants (e.g., trees, shrubs, flowers) and have them identify and sketch the shoot system of these plants. This activity encourages students to observe and identify different shoot systems in their natural environment. ● **Shoot System Presentation**: Assign each student or group of students a specific plant (e.g., a tree, a flowering plant, or a vegetable plant). They should create a presentation or poster that explains the functions of the	

shoot system for their assigned plant. This activity allows students to research and present their findings to the class.

- Use the concept cartoon below to generate classroom discussions where students can discuss and apply their understanding of the plant shoot system in a simple and engaging way. Students need to select one statement from the scenario and then let them explain why they chose the said statement.



The photo at the center is obtained from:
https://www.freepik.com/premium-vector/diagram-showing-parts-plant_36929481.html

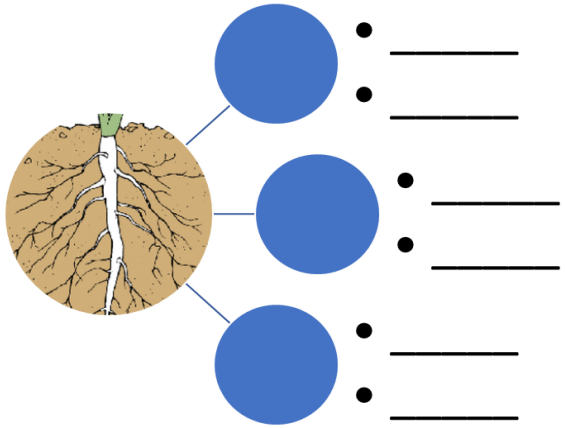
Day 4

SUB-TOPIC 3: IMPORTANCE AND ROLES OF ROOT AND SHOOT SYSTEMS

1. Explicitation

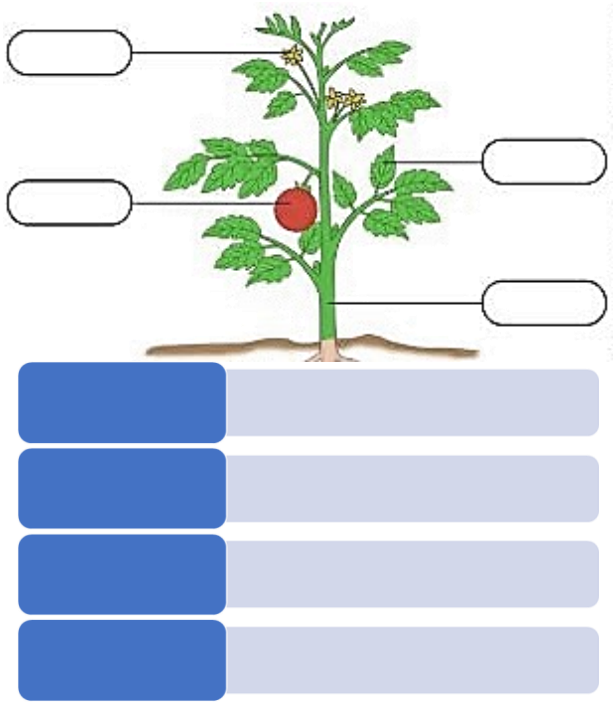
- Have a class discussion about the importance of root and shoot systems in plant growth. Then, divide students into groups and ask each group to create a mind map or concept map illustrating the key points discussed during the conversation.
- Provide students with a Venn diagram or a T-chart. Ask them to list the functions and roles of root systems on one side and shoot systems on the

	other. In the overlapping section, students should identify any shared functions between the two systems. **2. Worked Example** ● Discuss the significance of root and shoot systems in crops like rice, which is a staple food in the Philippines. Emphasize how the roots enable efficient nutrient uptake for healthy growth and how the shoot system produces grains for consumption, highlighting the importance of both systems in ensuring food security. ● Compare the root and shoot systems of a fruit tree (e.g., mango) with a root crop like cassava. Highlight the differences in structure and functions - the tree's shoot system produces fruits for consumption, while cassava's starchy roots are the edible part. Discuss how these differences meet the unique needs of each plant and its uses in Filipino cuisine. **3. Lesson Activity** ● **Debate on Plant Growth**: Divide the class into two groups, one advocating for the importance of the root system and the other for the shoot system in plant growth. Encourage them to research and prepare arguments for their respective systems. Then, have a structured debate where students present their arguments and counterarguments, leading to a class discussion on the interdependence of both systems. ● **Venn Diagram Comparison**: Provide students with Venn diagrams or T-charts, and ask them to compare and contrast the roles of the root and shoot systems. They can list the unique functions of each system in their own section and identify overlapping functions in the center. This visual representation will help students see the relationships between the two systems. ● Perform Activity No. 4: Root and Shoot: Partners in Plant Growth ● Use the concept cartoon below to generate classroom discussions where students can discuss and apply their understanding of the importance and roles of root and shoot systems in a simple and engaging way. Students need to select one statement from the scenario and then let them explain why they chose the said statement.	

	 The photo at the center is obtained from: https://www.shutterstock.com/image-vector/cute-cartoon-rainy-season-clipart-page2343242599?utm_campaign=image&utm_medium=googleimages&utm_source=schema	
D. Making Generalizations	**1. Learners' Takeaways** ***Functions of the Root System Mind Map*** ***(Day 1 and 2)*** **Direction**: Using the mind map below, list various functions of plant root system and give short explanations. 	This reflection activity not only reinforces the students' understanding but also encourages peer learning and reflection. It allows students to assess their knowledge and identify areas where they may need more clarification.

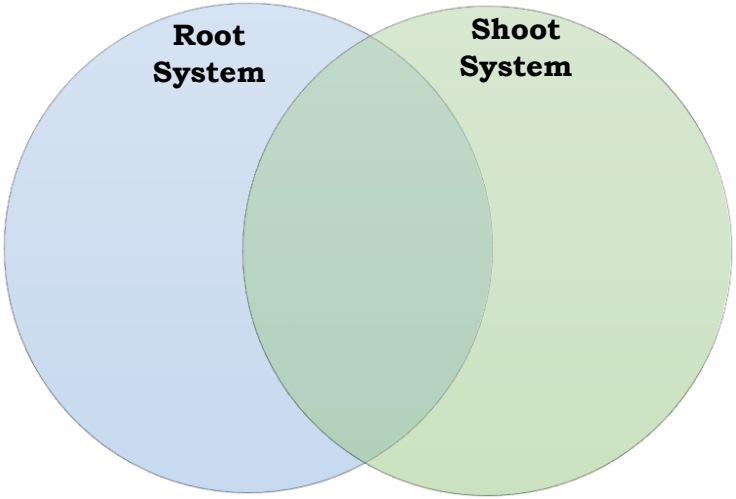
Shoot System Observation Diagram ***(Day 3)***

Direction: Labeled the diagram of a plant with arrows pointing to various parts of the shoot system. And using the graphic organizer, write the parts and your observations about each part's characteristics.



Importance of Root and Shoot Systems (Day 4- Week 3)

Direction: Complete the Venn Diagram. List shared functions of root and shoot systems. In the separate sections, list unique functions or importance for each system.



2. Reflection on Learning

Direction: Complete the table below by answering the given questions.

Topic	Guide Questions	Answers
Root System (Day 1 and 2)	Reflect on the roots you observed. What do you remember about their appearance and structure?	
	How do the roots help the plant stay anchored in the soil?	
	Can you draw or describe the root system you observed in detail?	
	List some of the functions of a plant's root system that you learned about.	
	Why is it important for a plant to have roots? How do these functions help the plant survive and grow?	

	Can you think of a real-life situation where a plant's root system plays a critical role?	

Topic	Guide Questions	Answers
Shoot System (Day 3)	Think about the different parts of the plant you observed (leaves, stems, flowers). What did you notice about each of them?	
	How does the shoot system help the plant capture sunlight for photosynthesis?	
	Describe the shoot system of a specific plant you observed. What was unique about it?	
	Explain the role of leaves, stems, and flowers in the shoot system. How do they contribute to the plant's survival?	
	Imagine a plant without a shoot system. What would happen to it?	
	Describe the function of leaves in more detail. How are they are considered as the "food factories" of the plant?	

Topic	Guide Questions	Answers
Importance and Roles of Root and	Reflect on the discussions and activities about root and shoot systems. Why are these systems crucial for a plant's growth?	

	Shoot Systems (Day 4)	How do root and shoot systems work together to help a plant thrive?		
		Can you connect the importance of these systems to our own lives? Are there any similarities or lessons we can learn from plants?		
		Think about the Venn diagram or chart you created to compare root and shoot systems. What were the key similarities and differences you discovered?		
		Which system do you think is more important for plant survival, and why?		
		Can you come up with an analogy or metaphor to explain the relationship between root and shoot systems in a plant?		

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		**NOTES TO TEACHERS**
A. Evaluating Learning	**Summative Assessment - Day 4** **Multiple-Choice Questions** **Direction**: Encircle the letter of the best answer. 1. What do you think is the primary reason why plants along the roadside may struggle to grow healthy? a. Lack of sunlight b. Excessive watering c. Pollution from passing vehicles d. Too much fertilizer	**Answer Key:** 1. c. Pollution from passing vehicles 2. b. Insect infestation 3. b. Strong winds 4. b. Anchoring the plant in the soil 5. b. They require less maintenance 6. c. By capturing sunlight for photosynthesis 7. c. Seasonal adaptation

	2. In a garden, you notice a plant's leaves with a hole and brown spots. What is the most likely cause of this issue? a. Overwatering b. Insect infestation c. Lack of nutrients d. Proper care 3. A tree growing alongside a busy road has developed a bent and curved trunk. What is the most likely reason for this? a. Pollution b. Strong winds c. Soil erosion d. Inadequate watering 4. What is one of the primary functions of a plant's root system? a. Photosynthesis b. Anchoring in the soil c. Capturing sunlight d. Producing flowers 5. Why do national parks and roadside landscapes encourage planting more native plant species? a. They are more colorful. b. They could adapt easily and require less maintenance. c. They deter wildlife. d. They grow faster. 6. How do leaves contribute to the shoot system's functions? a. By anchoring the plant in the soil b. By absorbing water and nutrients c. By capturing sunlight for photosynthesis d. By producing flowers and seeds	8. c. Transporting water and nutrients 9. c. Root systems absorb water and nutrients, while shoot systems capture sunlight and perform photosynthesis. 10. c. The plant is likely thriving and has adapted to its environment

	7. In some countries like Japan or Australia, some trees along a roadside have bright red or orange leaves during the fall. What is the likely reason for this change in color? a. Disease b. Lack of nutrients c. Adaptation d. Insect infestation 8. What is the main function of stems in the shoot system of a plant? a. Absorbing water and nutrients b. Anchoring the plant in the soil c. Transporting water and nutrients d. Capturing sunlight for photosynthesis 9. Why is it important for a plant to have both root and shoot systems? a. Root systems produce oxygen, and shoot systems produce carbon dioxide. b. Root systems store excess water, and shoot systems release excess water. c. Root systems absorb water and nutrients, while shoot systems capture sunlight and perform photosynthesis. d. Root systems anchor the plant in the soil, and shoot systems produce carbon dioxide. 10. When you observe a plant with well-developed root and shoot systems, you can conclude that: a. The plant is unhealthy and needs more care. b. The plant is undergoing a growth spurt. c. The plant is likely thriving and has adapted to its environment. d. The plant will produce fewer flowers and fruits. **1. Fill-in-the-Blank Questions** **Direction**: Write the correct word on the space provided. Choose the words from the box. Words can be repeated as answer. 1. To learn about plant root systems, you should _____ and _____ the roots of a plant.	**Answer Key:** 1. observe, identify

	2. The part of a plant responsible for absorbing water and nutrients from the soil is the _____ system. 3. The shoot system of a plant includes the _____, _____, and _____. 4. The main function of the root system is to _____ water and nutrients from the soil. 5. When explaining the functions of the shoot system, be sure to include its role in _____, _____, and _____. 6. The shoot system supports important plant functions such as _____ and _____. 7. In plant growth, the root system plays a crucial role in _____ water and nutrients, while the shoot system is responsible for _____ and _____. 8. When discussing the importance of the root system, consider its contribution to _____ and _____ stability. 9. The shoot system's functions, including _____ and _____, are vital for a plant's overall health. 10. When you compare and contrast the roles of root and shoot systems in plants, focus on their _____ functions and their _____ to plant survival.			2. root 3. stems, leaves, flowers 4. absorb 5. photosynthesis, transport, support 6. photosynthesis, reproduction 7. absorbing, photosynthesis, transport 8. anchorage, water 9. photosynthesis, reproduction 10. distinct, contributions
B. Teacher's Remarks	*Note observations on any of the following areas:*	**Effective Practices**	**Problems Encountered**	
	strategies explored			
	materials used			

	learner engagement/ interaction			
	Others			
C. Teacher's Reflection	**Direction:** *Answer briefly the following questions.* 1. *What principles and beliefs informed my lesson?* 2. *Why did I teach the lesson the way I did?* 3. *What roles did my students play in my lesson?* 4. *What did my students learn? How did they learn?* 5. *What could I have done differently?* 6. *What can I explore in the next lesson?*			