

Understorey Instructions and Answers for Teachers

- Venue: World of Plants (Understorey)
- Estimated duration to complete all questions: 1 hour

Level / Subject:

- Lower Secondary (Science, Express & Normal Academic): Interactions within Ecosystem

Learning Objectives:

- Describe the adaptive traits of plants living in the understorey
- Identify examples of decomposers and explain their roles



ACTIVITY 1: LIVING IN THE SHADE (30 mins)

Proceed to the Understorey (World of Plants) that contains plants that are naturally found in this particular layer of a tropical rainforest. The understorey, together with the forest floor are areas under the dense canopy of larger trees in the rainforest. There are usually few plants living in the understorey and even fewer found on the forest floor.

(a) What do you think are the problems faced by plants living in the understorey?

Answers:

Lack of sunlight, competition with other plants for nutrients and water, presence of predators

(b) The plants found in this layer are often "shade-tolerant" and popular as house plants. They have certain characteristics that help them adapt to the layer they are found in so that they may survive better. Find out more about the following plants and describe their adaptive traits in the table provided.

(Hint: Look for the panels at the Understorey and read about the adaptations of these plants)

Answers:

Problem	Plant	Adaptive Traits
Lack of sunlight	Peacock Fern (<i>Selaginella uncinata</i>)	Consists of blue iridescence on their leaves that is more effective in capturing red light that is filtered through the canopy.
Competition for nutrients	Leaf-litter Plant (<i>Agrostistachys borneensis</i>)	Collects leaf litter falling from other taller trees. When the leaves decompose, they serve as a source of nutrients for the plant.
Predators from the forest floor	Swiss Cheese Plant (<i>Monstera adansonii</i>)	Leaves display natural holes to make them look like they have already been attacked by predators. Insects will hence avoid laying eggs on this plant to protect their young from these "predators".

ACTIVITY 2: RECYCLING NUTRIENTS (15 mins)

(a) There are many fungi such as mushrooms found on the forest floor. Do you think mushrooms are plants? Explain your answer and describe how they obtain energy in that particular layer of the tropical rainforest.

Answer: A mushroom is not a plant as it does not produce energy from sunlight through photosynthesis. Fallen leaves, branches and dead plants and animals are found on the forest floor. Mushrooms grow on these dead plants and animals, and get their energy by breaking down tissue to release nutrients that are then absorbed with their feeding threads / hyphae.

(b) Enter the "mushroom" hut and observe the underside of its roof. Identify and list the organisms featured there.

Answer: The organisms featured are ants, termites, cockroaches, millipedes, beetles, snails, earthworms and flatworms.

(c) Together with fungi, the organisms identified in (b) exist in large concentrations on the forest floor and play an important role as decomposers in a food web. Explain how nutrients are recycled within the environment by the organisms identified in (b).

Answers: The organisms break down the dead plant or animal tissue by chewing, and shredding them into smaller pieces for consumption. The nutrients stored in the tissue

are taken in by the decomposers while any remaining in the soil are absorbed by other living plants through their roots. The nutrients are hence recycled as these decomposers and plants in turn become food for other animals in the food web.

GROUP ACTIVITY: LIVING IN THE UNDERSTOREY (15 mins)

In your groups, explore the Understorey and pick two labelled plants that interest you. Sketch or take photographs of the plants and their plant parts. Design a pocket guide / powerpoint presentation / online blog to teach visitors about the plants living in the understorey. Conduct further research on the plants online / at the library and use the following table to help you plan your work.

Answer:

	Plant 1	Plant 2
Scientific Name		
Common Name		
Family		
Origin		
Short write-up on its adaptations or other interesting facts (e.g. colour and shape of leaves / flowers / fruits, pollination / dispersal method, uses of plant, etc.)		

Suggestion to Teacher:

You may complete this question as a post-visit activity. Set aside some time for the students to research the plants, present their work and critique each other's work.

Note to Teacher:

For more on Interactions within Ecosystem, check out these Secondary School programmes:

- Exploratory Journey of the World of Plants
- Life in the Pond
- Protecting our Green Gems
- A Breath of Fresh Air
- It's Complicated