

Science Short Answer Scoring Guide

Question Overview: In this SA question, test-takers are required to give an explanation *about the effects of deforestation on the particular species of ant described in the textual stimulus.*

Then, they must cite specific evidence from that text that supports their explanation. Their general understanding of ecosystems and life cycles may help them provide a more precise explanation of how deforestation can be disruptive. This question tests learners' skill at the complex task of using, producing, and justifying a text-based line of reasoning by incorporating elements from the text into the presentation of their own ideas.

Scoring Guide: Each response is scored on the basis of two key elements. Each bullet below describes the quality of these elements typical of each score point.

3-Point Response

Response contains

- a clear and well-developed explanation of how deforestation could disrupt the life cycle of *Ophiocordyceps unilateralis* In tropical rain forests
- complete support from the passage

2-Point Response

Response contains

- an adequate or partially articulated explanation of how deforestation could disrupt the life cycle of *Ophiocordyceps unilateralis* in tropical rain forests
- partial support from the passage

1-Point Response

Response contains

- a minimal or implied explanation of how deforestation could disrupt the life cycle of *Ophiocordyceps unilateralis* In tropical rain forests
- minimal or implied support from the passage

0-Point Response

Response Includes

Science Excerpt, Prompt, and Scoring Guide

Tropical rain forests contain diverse communities of organisms with many interesting relationships. One such relationship connects parasitic fungi and their insect hosts. A type of parasitic fungus, called *Ophiocordyceps unilateralis*, disperses spores onto the forest floor, but cannot successfully grow on the ground. The fungus requires specific conditions and must grow inside of a specific ant species, called the host, to reproduce. The ants, various species of carpenter ant, make nests in the trees.

O. unilateralis feeds on and grows inside the insect host, and within a few days the fungus affects the insect's brain. The insect exhibits unusual behaviors such as wandering away from the colony to where light and humidity favor fungal growth. Just before dying, the insect bites into and firmly attaches itself to a plant. Then, the fungus slowly grows outward from the dead insect's head, producing a pod of spores that eventually bursts open. The spores fall to the ground, restarting the life cycle of the fungus.

Though this relationship may sound gruesome, researchers note that these parasitic fungi may help maintain biodiversity in the tropical rain forest. Some parasitic fungi may be host-specific, meaning that a fungus species only infects a particular type of insect. Scientists have observed that if an insect population begins to grow, more fungal infections occur, and then the insect population levels off again. This relationship may prevent overpopulation of the habitat by any one insect species.

Prompt

Deforestation, or clearing away trees, is occurring in tropical rain forests.

Explain how deforestation could disrupt the life cycle of *Ophiocordyceps unilateralis* in tropical rain forests. Include multiple pieces of evidence from the text to support your answer.

Type your response in the box. This task may require approximately 10 minutes to complete.

Scoring Guide

3-Point Response

Response contains

- A clear and well-developed explanation of how deforestation could disrupt the life cycle of *Ophiocordyceps unilateralis* in tropical rain forests
- Complete support from the passage

2-Point Response

Response contains

- An adequate or partially articulated explanation of how deforestation could disrupt the life cycle of *Ophiocordyceps unilateralis* in tropical rain forests
- Partial support from the passage

1-Point Response

Response contains

- A minimal or implied explanation of how deforestation could disrupt the life cycle of *Ophiocordyceps unilateralis* in tropical rain forests
- Minimal or implied support from the passage

0-Point Response

Response includes

- No explanation of how deforestation could disrupt the life cycle of *Ophiocordyceps unilateralis* in tropical rain forests
- No support from the passage

Scoring the Science Short Answer

Student Science 1 **Score** _____

Ophiocordyceps unilateralis feed of the carpenter ant, which nests In the trees. Deforestation will cause many carpenter ant to die because of the lack of homes. As a result O. unilateralis lose many hosts to feed off of, and In turn reproduction Is disrupted.

Student Science 2 **Score** _____

Deforestation destroys the environment where thousands of species of animals flourish Including Ophiocordyceps. Ophiocordyceps rely heavily on the environment to survive for two major reasons. First of all, Ophiocordyceps often find hosts in Carpenter Ants which build their nests high up in the trees of rainforests. When deforestation occurs, Carpenter Ants lose their nests and homes which would likely result in the diminishment of their species. This would disrupt the Ophiocordyceps species significantly as Ophiocordyceps can't survive without a host - without the Carpenter Ants, there would be no Ophiocordyceps. The other reason that Ophiocordyceps would suffer is because without the trees, there would be nothing for them to climb to reach greater amounts of light and less humidity. While lack of trees would lead to more light reaching the ground, the Issue of humidity affecting the Ophiocordyceps would still exist. With tall trees, the Ophiocordyceps are able to reach heights with less humidity hut deforestation would leave the Ophiocordyceps without a way to escape the humidity ultimately slowing the growth of the fungus. In conclusion, deforestation Would have a very significant Impact on the life cycle of the Ophiocordyceps for without trees there would be no hosts for the Ophiocordyceps to grow and without a way to escape humidity there would be a slowing of growth.

Student Science 3 **Score** _____

WITHOUT THE TREES OPHIOCORDYCEPS UNILATERALIS CANNOT GROW BECAUSE THEY NEED THE TREES TO DISPERSE SPORES ONTO THE FOREST FLOOR IN ORDER TO GROW AND REPRODUCE