



# LESSON PLAN

## SYMBIOSIS GRADES 6-8

### SUMMARY

Students will critically read scientific texts adapted for classroom use to obtain scientific information in order to describe patterns of interactions between organisms across different ecosystems.



**LS2.2.** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Science & Engineering Practices	Connections to Classroom Activity
<p><b>Obtaining, evaluating, and communicating information</b></p>	<ul style="list-style-type: none"> <li>• Small student groups are provided a food web and short reading adapted for classroom use with information about interactions within a particular ecosystem. Students record relationship interactions on an organizer to describe patterns within that ecosystem.</li> </ul>
Disciplinary Core Ideas	Connections to Classroom Activity
<p><b>LS2.A: Interdependent Relationships in Ecosystems</b></p> <p>Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared.</p>	<ul style="list-style-type: none"> <li>• Student groups share their findings about patterns of interactions in six different ecosystems and conclude that although the species varied, the same patterns of interactions can be found in each ecosystem. Students identify these interactions as predatory, mutualistic, parasitic, commensalistic, and/or competitive.</li> </ul>

## Cross Cutting Concepts

## Connections to Classroom Activity

### Patterns

- Students use patterns of interactions within ecosystems to identify the impact of cause-and-effect relationships on organisms in an ecosystem.

## DURATION

45 min.



## ENGAGE

Ask students if they think that zombies really exist on Earth. Have students watch the video "[Killer Zombie Fungus](#)," stopping at 2:40 min. Have students jot down ideas in their science notebooks about why this type of relationship occurs and if they think it is unique to tropical forest ecosystems. Tell students that we refer to interactions between different organisms in an ecosystem as symbiosis and that these interactions can be helpful (+), harmful (-), or have no effect (0). Have students use these symbols (+, -, and 0) to describe the relationship between the Cordyceps fungus (+) and ants (-). Tell students that they are going to look for patterns in different ecosystems to identify cause-and-effect relationships among organisms to help us **figure out why relationships that are harmful persist and if these relationships are found only in some ecosystems.**

## MATERIALS

- Ecosystem food webs information sheet and readings
- Symbiotic Relationships organizer
- Science notebook or paper
- Pen or pencil



## EXPLORE

Working in groups of four, give each group a reading for a different ecosystem. Tell students to use the food web diagram and the text to identify as many interactions between different organisms as they can and record them on the Symbiotic Relationships organizer.



## EXPLAIN

Have students share the patterns they found in each ecosystem. Ask students, "What seems to be true of our findings across the ecosystems examined? What can we conclude? What new questions do we have? Can someone remind us of the question we are trying to answer?" (*Why do relationships that are harmful persist in an ecosystem? Are these relationships found only in some ecosystems?*)

Tell students to do the following:

1. Note the types of symbiosis and identify them on their organizer. (Record on the line under the symbols in the first column.)
2. Jot down possible impacts on the relative number of organisms in their group's ecosystem as a result of the different interactions as they watch the Generation Genius video and Dr. Jeff shares examples.



## WATCH THE GENERATION GENIUS SYMBIOSIS VIDEO AS A GROUP

After watching the video, have students share how they named each type of relationship on their organizer. In their ecosystem small groups, each student should examine a different interaction, predict possible effects on the relative number of different organisms, and share his or her predictions with the group. Ask students, “Which of the symbiotic interactions seem the least harmful? Use an example to support your thinking. Which symbiotic interactions seem the most harmful? Use an example to support your thinking.”

Wrap up the discussion by asking, “What are some things we think we can say at this point about our lesson phenomenon, Cordyceps and ants, and why harmful relationships persist in an ecosystem? What is our evidence for these ideas (these explanations)?”

- Although the species vary, the same patterns of symbiotic relationships exist across multiple ecosystems.
- Symbiotic relationships are crucial for maintaining balance in ecosystems.



## ELABORATE

Perhaps the most hostile ecosystems on Earth are the hydrothermal vents along the mid-ocean ridges on the ocean floor. Despite the extreme temperatures and pressures, toxic minerals, and lack of sunlight, the species living there are thriving. Have students use the Woods Hole Oceanographic Institution Hydrothermal Vent Basics [interactive](#) to identify the symbiotic relationships; compare the patterns with those of the other ecosystems they explored; and construct an argument, using qualitative evidence and scientific reasoning, about whether the patterns of interactions are similar to those of other ecosystems and how they help organisms survive in such harsh environments.



## EVALUATE

There are multiple ways to assess your students' understanding of this topic. The exit ticket is an opportunity for students to use the science ideas they built in the lesson in a new context. Alternatively, you can use the Kahoot! quiz (which provides downloadable scores at the end of the game) and/or the paper quiz. All these resources are located right below the video in the assessment section.



## EXTENSION

More advanced students can create a simulation to test changes in interactions between organisms in a specific ecosystem using the [Sage Modeler](#) from Concord Consortium. Students can generate empirical data that can be used to support their answer to this lesson's question.

