



Elaborate: BFFs or Frenemies? The World of Symbiosis

INSTRUCTOR:

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Objective:

Students will explore different types of symbiotic relationships by analyzing an exemplar case study and then creating their own dystopian symbiosis case study.

Background:

*In nature, organisms interact in many ways. Some relationships help both organisms, while others only benefit one side. Scientists call these interactions **symbiosis**. Symbiosis comes in different forms:*

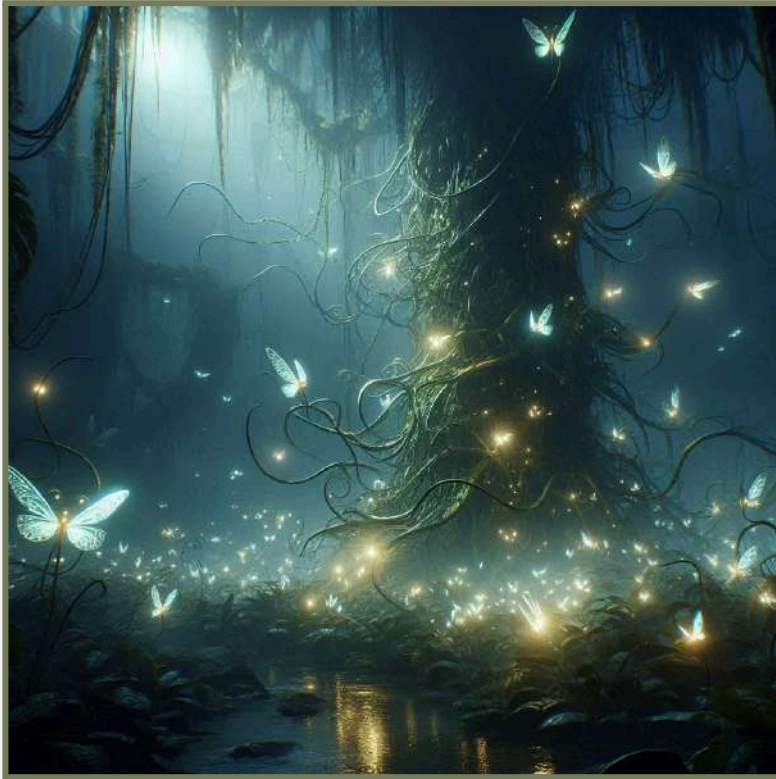


- **Mutualism** – Both organisms benefit. (Example: Bees get nectar from flowers while helping flowers pollinate.)
- **Commensalism** – One organism benefits, and the other is neither helped nor harmed. (Example: Barnacles attach to a whale to move through the ocean, but the whale is unaffected.)
- **Parasitism** – One organism benefits while the other is harmed. (Example: A tick drinks a dog's blood, harming the dog.)

In this activity, you will first read an example case study and analyze the relationship between two fictional species. Then, you will create your own dystopian case study using similar elements.

Example Case Study: The Shadow Vine and the Glimmer Moth

*In the mist-covered marshlands of Neo-Terra, an eerie glow pulses through the tangled undergrowth. The **Shadow Vine**, a sprawling, luminescent plant, weaves its way up towering swamp trees, its tendrils shimmering with a soft, ghostly light. As night falls, the light intensifies, sending an irresistible call to the fragile **Glimmer Moth**, a delicate creature with wings like stained glass, reflecting the vine's glow in dazzling patterns. The moths, drawn to the vine's hypnotic luminescence, land gently on its*



twisting vines, unaware of the vital role they play in the plant's survival.

As the moths flutter from vine to vine, their fuzzy legs collect thousands of microscopic spores clinging to their bodies like invisible dust. With each departure, they unknowingly scatter these spores across the swamp, allowing the Shadow Vine to take root in distant locations. In return, the Glimmer Moths sip nectar from the vine's rare, glowing flowers— a sweet, energy-rich sustenance that fuels their nocturnal flights. Without this nectar, the moths would weaken, unable to complete their delicate mating dance beneath the twin moons of Neo-Terra. Without the moths,

the Shadow Vine's spores would remain trapped, unable to spread beyond the confines of its original roots.

But balance in this symbiotic dance is fragile. As human explorers encroach upon the swamp, artificial lights from their settlements disrupt the vine's glowing signals. The Glimmer Moths, confused and disoriented, begin flocking toward the artificial lights instead, abandoning their vital role in spreading the vine's spores. Slowly, the Shadow Vine's presence dwindles, and with it, the glowing nectar the moths so desperately need. If this delicate partnership collapses, both species face a grim fate—one starved of sustenance, the other trapped in its dwindling domain.

Highlight key information from the case study to answer the following questions:

- **What type of symbiotic relationship is this?**
- **How does each organism benefit?**
- **What might happen if one of these organisms disappeared?**

Your Turn: Create Your Own Symbiosis Case Study!

1. **Setting:** Where does this relationship take place? (Planet, biome, dystopian future, deep sea, etc.)
 2. **Organism 1:** What is the first species? Describe its physical traits and behaviors.
 3. **Organism 2:** What is the second species? How does it interact with the first?
 4. **Symbiosis Type:** Is the relationship mutualism, commensalism, or parasitism?
 5. **Conflict/Challenge:** What might threaten this relationship? (Climate change, human interference, disease, etc.)
 6. **Outcome:** How does the relationship impact the ecosystem?
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Sentence Frames to Guide Your Writing:

- "The [Organism 1] depends on [Organism 2] for _____."
- "This relationship is an example of [mutualism/commensalism/parasitism] because _____."
- "If [Organism 2] were to disappear, [Organism 1] would _____."
- "A major threat to this relationship is _____ because _____."

Brainstorming**Drawing**

Name: _____

Date: _____

Your Symbiotic Relationship Story

Reflection Questions:

- 1. What was the most difficult part of creating your case study? Why?**

Name: _____

Date: _____

2. How does symbiosis impact the balance of an ecosystem?



3. If you could change your relationship type, how would it affect your organisms?



4. What real-world examples of symbiosis are similar to your fictional case study?



Teacher Instructions: BFF's or Frenemies

Engagement Strategies:

- Begin with a quick class discussion: "What are some real-world examples of symbiosis?"
- Show engaging visuals or videos of unique symbiotic relationships in nature.
- Act out simple examples of symbiosis with students as organisms.

Guiding Questions:

- **"Why do some species develop these types of relationships?"**
- **"How might the environment influence the type of symbiosis an organism engages in?"**
- **"What could happen if one part of a symbiotic relationship is removed?"**

Lesson Plan (60 Minutes):

1. **Warm-up (10 min):** Think-pair-share on symbiotic relationships.
2. **Direct Instruction (15 min):** Explain symbiosis types and review example case study.
3. **Guided Practice (10 min):** Highlight key details in the case study and answer provided questions.
4. **Independent/Group Work (15 min):** Students create their own dystopian case study.
5. **Presentation & Discussion (10 min):** Students share and critique case studies.

Differentiation Strategies:

- Provide structured sentence frames for students needing additional support.
- Offer visual diagrams for ELL students.
- Allow students to work in pairs for collaborative learning.
- Encourage advanced students to explore additional layers of their ecosystem interactions.