What is Symbiosis?
Episode 1: Symbiotic Superpowers
Lesson 1 of 4
Grade: 7

Benchmarks:
Big Idea: The Practice of Science
Big Idea: Interdependence

Purpose: In this lesson, the students will understand the concept of symbiosis, identify different examples of symbiosis, realize that symbiosis is all around us including inside of us, and recognize how scientists work together towards a shared goal.

Background:
Dr. Alex Wilson of the University of Miami is an evolutionary biologist whose research centers on symbiotic relationships. In this short, animated film, she introduces the concept of symbiosis to the viewers. This is the first of four films created with funding from the National Science Foundation, SYMBIOSIS – Episode 1: Symbiotic Super Powers from Day’s Edge Productions on Vimeo. This lesson, which includes a pre-test, slide presentation, and activity was developed to support the learning concepts provided by Dr. Wilson’s films.

Materials:
1. Pre-test (can be copied as a class set, per student, or pre-test can be projected on a board)
2. PowerPoint Symbiosis - Episode 1
4. Activity Sheet, Introduction to Extraterrestrial Symbiosis (class set)
5. Activity Sheet, Extraterrestrial Symbiosis Table
6. One poster board or drawing paper per group
7. Markers, crayons, pencils.

Procedures:

<table>
<thead>
<tr>
<th>Before Activity</th>
<th>What the teacher will do:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Pre-test</td>
</tr>
<tr>
<td></td>
<td>The teacher will administer the pre-test to the students.</td>
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<tr>
<td></td>
<td>2. Engage and Explore</td>
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<td></td>
<td>The teacher will present the first animated film to the class.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>During Activity</th>
<th>What the teacher will do:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Explain</td>
</tr>
</tbody>
</table>
a. Using the accompanying PowerPoint presentation (SYMBIOSIS - Episode 1), activate students’ prior knowledge and ensure they will understand the first video, SYMBIOSIS – Episode 1: Symbiotic Super Powers.

**Directions**

1. After viewing the video in its entirety, it is advisable to show the video a second time. The teacher could stop the video at different intervals to probe and ensure student understanding.

2. **Application and assessment of concepts learned**: The video is followed by the collaborative project titled, “Extraterrestrial Symbiosis.” Refer to Activity Sheets: Introduction to Extraterrestrial Symbiosis (class set) and Extraterrestrial Symbiosis Table

   a. In groups, students will use their imaginations and create two species in a symbiotic relationship on an alien planet.

   b. After discussing their ideas and drawing the two organisms, each group will complete the table provided and present their final product to their classmates.

**Extraterrestrial Symbiosis**

In the video you just viewed, SYMBIOSIS – Episode 1: Symbiotic Super Powers, Dr. Wilson stated that scientists seldom work alone, they collaborate with other scientists. Today, you will be working with your fellow astrobiologists. An astrobiologist is a scientist who studies life on other planets or moons. You and your team have been sent to a faraway Class M planet, a planet which can support life as we know it. The planet is an Earth-like planet with very similar ecosystems to our own.
**Your mission:** You will describe the eco-system you encounter, it can be a marine, forest, desert or a tropical ecosystem. Your goal is to identify, describe, and draw the organisms involved in a symbiotic (mutualistic) relationship on this new planet. Remember, in this case, symbiosis is referring to mutualism, a partnership whereby both organisms benefit. You must return to Earth with a drawing of your organisms and a completed table describing what you have learned. Your group must present your findings to the rest of the scientific community (your classmates).

Discussion points for your research:

1. What kind of organisms did you identify? Remember, you can imagine animals, plants, fungi, and even one-celled organisms like bacteria.
2. How will these organisms help each other survive? They can provide each other with shelter, food, protection from predators, etc. It’s your choice!

As a group, complete the data table provided by your teacher. Please refer to the rubric your teacher will give you to help you be successful. Good luck!!

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**Extraterrestrial Helping Extraterrestrials!!**

<table>
<thead>
<tr>
<th>Organism 1</th>
<th>Description of Habitat of both Organisms</th>
<th>Description of Organism (Animal? Plant? Fungi? Bacteria?)</th>
<th>Role of Organism in Habitat (producer, consumer, decomposer)</th>
</tr>
</thead>
</table>
Student Objectives:
- The student will be able to identify and describe a symbiotic relationship, including the benefit to each organism in the relationship.
- The student will be able to produce clear and coherent writing about an imaginary symbiotic relationship.
- The development, organization, and style will be appropriate to task, purpose, and audience.

Rubric

<table>
<thead>
<tr>
<th>Table</th>
<th>The table clearly describes the habitat, the 2 organisms, the roles/benefits to the 2 organisms and how they depend on each other.</th>
<th>The table describes the habitat, the 2 organisms, the roles/benefits to the 2 organisms but is missing some details.</th>
<th>The table does not clearly describe the habitat, the 2 organisms, the roles/benefits to the 2 organisms.</th>
<th>The table is incomplete, with major details missing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points</td>
<td>50</td>
<td>40</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>Presentation</td>
<td>The presentation clearly explains what the habitat, the 2 organisms, the roles/benefits to the 2 organisms and how they depend on each other.</td>
<td>The presentation clearly explains what the habitat, the 2 organisms, the roles/benefits to the 2 organisms but is missing some details.</td>
<td>The presentation does not clearly explain what the habitat, the 2 organisms, the roles/benefits to the 2 organisms.</td>
<td>The presentation was incomplete, with major misconceptions.</td>
</tr>
<tr>
<td>Points</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>5</td>
</tr>
</tbody>
</table>
### Teacher

<table>
<thead>
<tr>
<th>Drawing Points</th>
<th>The drawing is neat, colored, and includes caption.descriptions.</th>
<th>The drawing is neat but is missing descriptions/captions.</th>
<th>The drawing is complete but includes no descriptions.</th>
<th>The drawing is messy and not complete. It includes no descriptions.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Participation Points</td>
<td>The student listened respectfully to the other presentations. The student can communicate the objectives clearly. They asked interesting questions about the other presentations.</td>
<td>The student listened respectfully to the other presentations. The student participated but the questions or comments may not have been particularly insightful.</td>
<td>The student listened respectfully to the other presentations. However, the student did not participate in the class discussion.</td>
<td>The student did not participate in the class discussion. The student interrupted other presentations.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Total Points</td>
<td></td>
<td></td>
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</tbody>
</table>
Extension Activities- Video 1

- Design a crossword puzzle with an answer key using all of the vocabulary words from video 1.
- Create a virtual poster using prezi.com showing the different types of symbiosis that can be found in an ecosystem.
- Make a picture dictionary using all of the vocabulary words from Video 1.
- Write a skit about what life would be like without symbiosis around us. At the end, write a conclusion about why symbiosis is important to everyday life. Use all of the vocabulary words in the skit.
- Write and direct a “one-act play” showing symbiosis. The play needs to include 3 characters and last a minimum of 90 seconds.
- Create a cooperative game that helps students learn and understand symbiosis. Use all of the words from Video 1. Your game must include board, pieces and instructions.
- Create a song using all of your vocabulary words with their definitions from Video 1. Please include the music to which the song was written as well as the lyrics.
- Create a photo essay of one example of symbiosis. Describe how symbiosis works using your vocabulary words from Video 1.
- Write a letter to a magazine editor explaining how symbiosis works. Explain to the editor why it is important to conserve nature. What could happen if one of the species in the symbiotic relationship disappears from an ecosystem.
- Create a picture book about symbiosis for a group of 1st graders.
- Create a diorama for symbiosis.
- Create a poster that promotes mutualism, with an explanation of mutualism, its benefits, and real-life examples.
- Create a jeopardy game based on symbiosis. There should be 5 categories across and 5 clues for each category. Include clues and answers for each category on a separate sheet of paper.
Episode 1 SYMBIOSIS- Episode 1 Symbiotic Superpowers
Pre-test

1. What is symbiosis?
2. What is mutualism?
3. Can you think of an example of symbiosis?
4. Why is symbiosis important?
5. Symbiosis is:
   a. Rare in nature
   b. Everywhere
Episode 1 SYMBIOSIS- Episode 1 Symbiotic Superpowers
Pre-Test Answer Key

1. What is symbiosis?
   Symbiosis is a relationship between two different species.

2. What is mutualism?
   A symbiosis that benefits both organisms.

3. Can you think of an example of symbiosis?
   Answers may vary

4. Why is symbiosis important?
   Answers may vary. Symbiosis gives both species an advantage for survival and reproduction.

5. Symbiosis is:
   c. Rare in nature
   d. Everywhere