ECOLOGY

This lesson is a part of the Ecology unit, which explains what ecologists study and how it applies to coral reefs. Below is a summary of what is included in the entire unit.

UNIT CONTENTS

A. Background Information
   - Ecology
   - Biological Hierarchy of Life
   - Ecological Levels of Organization

B. Lessons

   Watch it! What is Ecology?
   - A worksheet to accompany the What is Ecology? video

   Factors of the Reef
   - A lesson to differentiate between inference and observation

   Backyard Ecosystem
   - An activity to perform a biological survey of an outdoor area

   Read It! Lionfish: Scourge of the Caribbean
   - A worksheet to accompany the Lionfish: Scourge of the Caribbean field blog

STANDARDS

- **CCSS**: RST.9-10.1, 3, 4, 5, 7, 8, 10; RST.11-12.1, 3, 4, 10; SL.9-10.1, 2, 3, 4, 6; SL.11-12.1, 2, 3, 4, 6; HSN.Q.A.1; HSS.IC.A.1
- **NGSS**: HS-LS1-2, HS-LS2-6
- **OLP**: 1.B, 5.B.1, 5.B.5

ONLINE CONTENTS

- Ecology Quiz
- What Is Ecology? Video
  Ecology explores living things, plus the way they interact with one another, and their physical surroundings. A coral reef is a very special type of home, it provides nourishment and shelter to an amazing range of living creatures. They interact with non-living things like rocks and sand, ocean currents, temperature, and much more. A vast web of living and non-living things makes up the ecology of coral reefs.
**ADDITIONAL BACKGROUND INFORMATION:**

Do you know the difference between observation and inference?

Let’s say that one day you’re taking a walk along the beach. You look towards the sky to the west and you notice that some very dark clouds are forming, the wind suddenly picks up, and thunder starts to boom. What are your observations? What inferences can you make using this information?

**Observation** is a fact that is learned through the senses. There are five senses: sight, hearing, touch, taste, smell. When walking on the beach you felt and could probably hear that the wind had picked up. You were able to hear the thunder and see dark clouds. These are all observations.

**Inference** is based on observations and past experiences. While walking on the beach, you probably inferred that there is a storm on the way. You knew this based on your observations and past experiences of being in a storm.

What is the difference between an abiotic factor and a biotic factor?

Remember that abiotic means without life, so it is the non-living components of an ecosystem, like rocks, temperature, or the sun.

Biotic means living. Most scientists agree that all living organisms
- are made up of at least one cell,
- reproduce,
- have DNA to pass on to the next generation,
- and use energy to perform life functions and maintain their internal environments.

There are other characteristics, like movement, that indicate that an organism is living, but not all organisms have them. Other examples of these characteristics are:
- response to a stimulus,
- complexity,
- and growth/development.

**INSTRUCTIONS:**
1. Write the definitions for abiotic, biotic, inference, and observation in the space provided below.
2. In Table 1, write down the picture number that you were assigned by your teacher.
3. Observe the picture. Record all of your observations in Table 1. You should have at least 8 observations per picture.
4. Choose three factors from your observations. Make an inference about whether it is biotic or abiotic. Record this in the right-hand column of Table 1. Be sure to include an explanation for why you said this, based on your observations. (NOTE: You should describe at least one abiotic factor per picture.)
5. Repeat steps 2-4 with other reef pictures that are assigned by your teacher.
6. Present the information about one of the pictures to the class.
7. Answer the questions below.
INSTRUCTIONS: Fill out the table.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abiotic</td>
<td></td>
</tr>
<tr>
<td>Biotic</td>
<td></td>
</tr>
<tr>
<td>Inference</td>
<td></td>
</tr>
<tr>
<td>Observation</td>
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</tr>
</tbody>
</table>

**TABLE 1:**

<table>
<thead>
<tr>
<th>Photo #</th>
<th>Observations</th>
<th>Inferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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<tr>
<td>Photo #</td>
<td>Observations</td>
<td>Inferences</td>
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</tbody>
</table>
INSTRUCTIONS:

1. Did inferences change the way that you classified the factors? Explain your answer and provide an example.

2. Did you classify any of the factors incorrectly? Why did this happen?

3. Write a paragraph explaining three interactions among these factors. Use both observations and inferences to help you with your writing. Your interactions should include:
   • how two biotic factors affect each other
   • how two abiotic factors affect each other
   • how an abiotic factor affects one of the biotic factors
PHOTO 5

PHOTO 6