3.1 What Is Ecology?

Lesson Objectives

- Describe the study of ecology.
- Explain how biotic and abiotic factors influence an ecosystem.
- Describe the methods used to study ecology.

Lesson Summary

**Studying Our Living Planet** Ecology is the scientific study of interactions among organisms and between organisms and their environment.

- Earth’s organisms live in the **biosphere**. The biosphere consists of the parts of the planet in which all life exists.
- Ecologists may study different levels of ecological organization:
  - Individual organism
  - An assemblage of individuals that belong to the same species and live in the same area is called a **population**.
  - An assemblage of different populations that live together in an area is referred to as a **community**.
  - An **ecosystem** includes all the organisms that live in a particular place, together with their physical environment.
  - A group of ecosystems that have similar climates and organisms is called a **biome**.

**Biotic and Abiotic Factors** Ecosystems include biotic and abiotic factors.

- A **biotic factor** is any living part of an environment.
- An **abiotic factor** is any nonliving part of an environment.

**Ecological Methods** Ecologists use three basic methods of research: observation, experimentation, and modeling:

- Observation often leads to questions and hypotheses.
- Experiments can be used to test hypotheses.
- Modeling helps ecologists understand complex processes.

**Studying Our Living Planet**

1. What is ecology?

2. What does the biosphere contain?
3. Label each level of organization on the diagram.

4. Explain the relationship between ecosystems and biomes.
Biotic and Abiotic Factors

5. Use the terms in the box to fill in the Venn diagram. List parts of the environment that consist of biotic factors, abiotic factors, and some components that are a mixture of both.

<table>
<thead>
<tr>
<th>Biotic Factors</th>
<th>Abiotic Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>air</td>
<td>heat</td>
</tr>
<tr>
<td>animals</td>
<td>precipitation</td>
</tr>
<tr>
<td>bacteria</td>
<td>soil</td>
</tr>
<tr>
<td>plants</td>
<td>sunlight</td>
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</tbody>
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Ecological Methods

6. Why might an ecologist set up an artificial environment in a laboratory?

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7. Why are many ecological phenomena difficult to study?

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8. Why do ecologists make models?

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Apply the Big idea

9. What makes a planet living? Explain your answer by comparing Earth with Mars.

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