## Crosscutting Concepts

Role of Organisms and Flow of Energy

### Estimated Time:

7 weeks

<table>
<thead>
<tr>
<th>Anchoring Phenomenon</th>
<th>Standard</th>
<th>Instructional Segments</th>
<th>Disciplinary Core Ideas</th>
<th>Science and Engineering Practices</th>
<th>Instructional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating on the Space Station</td>
<td>S4L1a, b, c, d</td>
<td>Bake the Cake and Eat It Too.</td>
<td>From <em>A Framework for K-12 Science Education</em>: <strong>LS1.C: ORGANIZATION FOR MATTER AND ENERGY FLOW IN ORGANISMS</strong>&lt;br&gt;● Animals and plants alike generally need to take in air and water, animals must take in food, and plants need light and minerals; anaerobic life, such as bacteria in the gut, functions without air. Food provides animals with the materials they need for body repair and growth and is digested to release the energy they need to maintain body warmth and for motion. Plants acquire their material for growth chiefly from air and water and process matter they have formed to maintain their internal conditions (e.g., at night).&lt;br&gt;<strong>LS2.A: INTERDEPENDENT RELATIONSHIPS IN ECOSYSTEMS</strong>&lt;br&gt;● The food of almost any kind of animal can be traced back to plants.</td>
<td>● Developing and using models&lt;br&gt;● Constructing explanations and designing solutions&lt;br&gt;● Obtaining, evaluating, and communicating information</td>
<td>Background: By the end of this unit, students are using the following language in their speaking and writing during EXPLAIN or ELABORATE.&lt;br&gt;• Ecosystem&lt;br&gt;• Food chain&lt;br&gt;• Food web&lt;br&gt;• Producer&lt;br&gt;• Consumer&lt;br&gt;• Decomposer&lt;br&gt;• Scarce&lt;br&gt;• Extinct&lt;br&gt;• Overabundant&lt;br&gt;• Keystone species</td>
</tr>
</tbody>
</table>
Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Either way, they are “consumers.” Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil for plants to use. Organisms can survive only in environments in which their particular needs are met.

- A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

**LS2.B: CYCLES OF MATTER AND ENERGY TRANSFER IN ECOSYSTEMS**

- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die.
- Organisms obtain gases, water, and minerals from the environment and release waste matter (gas, liquid, or solid) back into the environment.

**LS2.C: ECOSYSTEM DYNAMICS, FUNCTIONING, AND RESILIENCE**
- When the environment changes in ways that affect a place’s physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.

**LS4.B: NATURAL SELECTION**
- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.

**LS4.C: ADAPTATION**
- Changes in an organism’s habitat are sometimes beneficial to it and sometimes harmful. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

**LS4.D: BIODIVERSITY AND HUMANS**
- Populations of organisms live in a variety of habitats, and change in those habitats affects the organisms living there. Humans, like all other organisms, obtain living and nonliving resources from their environments.

This instructional segment will connect to light and sound.