

JOURNEY TO THE STARS

ACTIVITIES for Grades 3-5

amnh.org/stars

BEFORE YOUR VISIT

Online Video: *Journey to the Stars* Trailer and Prelude amnh.org/stars

To prepare for your Museum visit, watch the trailer and the prelude with your students.

Class Discussion: Sun's Energy & Food Chains

Review with students the Sun and its role in the food web (e.g. producers, consumers, decomposers). Ask:

- What kinds of energy does the Sun provide for Earth?
Answers may include: The Sun provides heat and light. Plants capture this energy through the process of photosynthesis, create sugars and starches, and store them for later use.
- Where do a plant, a grasshopper, a chicken, and a human get their food?
Answers may include: Plants take sunlight and turn it into food. Grasshoppers feed on plants. Chickens eat grasshoppers. Humans eat chickens, and perhaps grasshoppers.
- What is the relationship between the various parts of the food chain? Or: In a food chain, what is the relationship between a plant, a grasshopper, a chicken, and a human?
Answers may include: Plants are producers because of their ability to photosynthesize. Grasshoppers, humans, and chickens cannot photosynthesize—they are consumers. Consumers eat producers or other consumers.
- How is the Sun a part of the food chain?
Answers may include: Most living organisms need the Sun's energy for fuel. Some obtain this by either capturing energy from the Sun directly. Others feed on other living organisms that have stored up energy from the Sun. This is how the Sun's energy is transferred through the food chain. Thus, grasshoppers must eat plants to obtain energy from the Sun captured by the plant, chickens eat the grasshoppers that ate the plant, and humans feed on the chicken that ate the grasshopper that ate the plant to obtain energy from the Sun.

Hands-on Activity: Web of Life Game

amnh.org/ology/features/stufftodo_bio/weboflife.php

Download and print instructions. Students can play this game to explore how all members of an ecosystem depend on each other to survive.

DURING YOUR VISIT

Journey to the Stars Planetarium Space Show (30 minutes)

Before the show, prompt students to think about these questions:

- How is the Sun important?
- What kinds of energy does the Sun provide for Earth?

Cullman Hall of the Universe: Explore an Ecosphere (20-30 minutes)

On the lower level, find the giant glass ball. It is a totally enclosed, self-sustained ecosystem called an "ecosphere." Help students observe the things that are living and non-living, and then list them on their worksheets. (Tip: You may wish to have students use magnifying glasses.) Tell students that there are bacteria inside of the glass ball and that they're microscopic. They are not visible without the aid of a microscope. Ask: What role do the bacteria play in the ecosphere?
Answers may include: These bacteria are decomposers. They break down waste material produced by the shrimp and recycle it back into the system.

Elementary Science Core Curriculum

Major Understandings

Living Environment 6.2b

- The Sun's energy is transferred on Earth from plants to animals through the food chain.

NOTE: Distribute copies of the **Student Worksheet** before coming to the Museum.

TIP: Please plan to arrive at the 1st floor space show boarding area 15 minutes before the show starts.



ACTIVITIES for Grades 3-5 (Continued)

BACK IN THE CLASSROOM

Online Activity: The Circle of Food Chain and Decomposition

amnh.org/nationalcenter/youngnaturalistawards/2000/hallie.html

Have students further explore food chains by reading *The Circle of Food Chain and Decomposition*. This article shows how a 7th-grader established an economical way of gardening at her new house. Ask students to identify the method presented in this article and record the different members of the food chain that enrich the soil for a successful garden. *Answers may include: The economical method of gardening is composting. Members of the food chain include dead and decaying plant matter, saprophytes, fungus, bacteria, earthworms, centipedes, roly-polys, and pillbugs.*

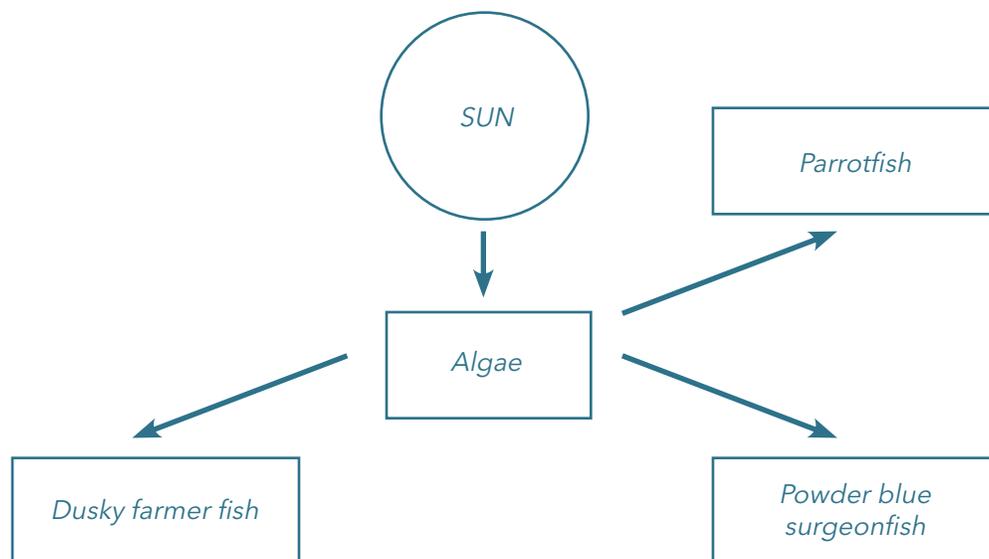
Online Activity: Diagram of a Food Web

amnh.org/exhibitions/permanent/ocean/02_ecosystems/02a3_community.php

Have students explore the coral reef ecosystem on the Milstein Hall of Ocean Life website. Ask them to identify members of the food chain for this ecosystem and create a food web diagram. As an extension, have students build dioramas of this marine ecosystem. For ideas on building dioramas, visit: amnh.org/ology/features/stufftodo_marine/coral_main.php

Sample food diagram:

Algae capture energy from the Sun through the process of photosynthesis and create food for later use. Parrotfish, dusky farmer fish, and the powder blue surgeonfish feed on algae to obtain energy from the Sun.



STUDENT WORKSHEET for Grades 3-5

Explore an Ecosphere

This giant glass ball is known as an "ecosphere." No one ever needs to feed the living things inside. What this ecosystem does need to maintain a healthy balance is sunlight. Did you notice that the ball spins slowly? It spins so that all parts of the ecosystem are exposed to sunlight.

Observe what's inside and select three things to investigate. They can be living or non-living.

NAME:	NAME:	NAME:
Draw it:	Draw it:	Draw it:
Describe how it is connected to its food web. For example, what organisms might it eat or be eaten by? Where might it get its food? How does it contribute to this ecosystem?		
Write it:	Write it:	Write it:

What role does the Sun play in this ecosystem? _____

STUDENT WORKSHEET for Grades 3-5

ANSWER KEY

Explore an Ecosphere

This giant glass ball is known as an "ecosphere." No one ever needs to feed the living things inside. What this ecosystem does need to maintain a healthy balance is sunlight. Did you notice that the ball spins slowly? It spins so that all parts of the ecosystem are exposed to sunlight.

Observe what's inside and select three things to investigate. They can be living or non-living.

NAME:	NAME:	NAME:
Draw it:	Draw it:	Draw it:
<i>Possible student selections include the shrimp, algae, rock, and bacteria (microscopic).</i>		
Describe how it is connected to its food web. For example, what organisms might it eat or be eaten by? Where might it get its food? How does it contribute to this ecosystem?		
Write it:	Write it:	Write it:
<p><i>Answers may include: All the elements found in the ecosphere are important to its function. Life functions inside just as it does on the Earth. The shrimp, algae, and the bacteria have key roles that directly affect each other and their roles in the ecosphere. The shrimp breathe out carbon dioxide (CO₂) an element essential for the algae, which use it together with light to produce oxygen. Algae produce oxygen only when light is available, during the day. No oxygen is made in the dark (or at night). Shrimp and bacteria need oxygen to breathe. When it is dark, they consume the oxygen available while none is being made. This is why there are not too many living things inside of the ecosphere; there would not be enough oxygen at night to keep them alive.</i></p> <p><i>The shrimp eat the algae, bacteria, and even their own shed exoskeleton. The shrimp eats not all bacteria, some find great hiding places in the rocks, gravel, and plant life in the ecosphere. These bacteria break down waste materials and recycle them back into the ecosystem.</i></p>		

What role does the Sun play in this ecosystem?

Answers may include: The Sun is the starting point for the food chain. The light energy that it provides is captured by the algae and used along with carbon dioxide to provide food and oxygen for the shrimp. The shrimp, which cannot create their own food, get their energy from the Sun by eating the algae. The waste that the shrimp produce is broken down by the bacteria and recycled back into the ecosystem.