



Bio/Diversity Project
Food Webs and Desert Landscape Painting

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Grade Level: 3rd grade

Common Core Standard:	<p><i>Strand 4, Concept 3: Understand the relationships among various organisms and their environment.</i></p> <ul style="list-style-type: none"> • <i>PO 1. Identify the living and nonliving components of an ecosystem.</i> • <i>PO 2. Examine an ecosystem to identify microscopic and macroscopic organisms.</i> • <i>PO 3. Explain the interrelationships among plants and animals in different environments:</i> <ul style="list-style-type: none"> ○ <i>producers – plants</i> ○ <i>consumers – animals</i> ○ <i>decomposers – fungi, insects, bacteria</i>
Content Objective: Science	<ul style="list-style-type: none"> • <i>Students will be able to define the term “food web”.</i> • <i>Students will be able to explain how organisms in the same ecosystem are interconnected.</i> • <i>Students will examine the relationships between plants and animals and will design their own food webs by working in groups to paint a Sonoran Desert Landscape.</i>
Language Objective: (Optional)	N/A

Vocabulary	Materials
<ul style="list-style-type: none"> • Carnivore • Consumer • Decomposer • Ecosystem • Food Chain • Food Web • Herbivore • Interconnected • Landscape • Omnivore • Producer • Sonoran Desert 	<ul style="list-style-type: none"> • Paper or other canvas for painting (size varies depending on preference) • Paints – suggested colors: green, brown, red, blue, black, white, yellow, orange, etc. as desired • Paint brushes • Water cups • Smocks/T-shirts for students to wear over clothes • Newspaper/tarp to protect work space • “Weaving the Web” activity print outs

<p>Guiding Questions:</p> <ul style="list-style-type: none"> • What is a food chain? • What is a food web and how is it different from a food chain? • Which is a more realistic example of how ecosystems work: food chains, or food webs? • What are the effects on an ecosystem when one organism (or one piece) of a food web disappears? • What are the effects on an ecosystem when one organism in a food web becomes more numerous?

**Engagement/Introductory Activity:**

- Ask students to share what they already know about food chains and what different animals in a specific ecosystem eat – the Sonoran Desert is a great starting point for this discussion.
- Introduce the idea of a food chain and incorporate the terms producer, consumer, and decomposer – the sun is the primary source of energy for our planet, plants take in sunlight, then animals eat plants, and other animals eat those animals, etc. Discuss how sometimes food chains are more complicated than this because more than one animal may compete for a plant, or certain factors may impact the accessibility of the plants/animals.
- Discuss the similarities and differences between a food chain and a food web.
 - A food chain is a linear sequence of organisms through which nutrients and energy pass as one organism eats another. In a food chain, each organism occupies a different trophic level, defined by how many energy transfers separate it from the basic input of the chain.
 - A food web consist of many interconnected food chains and is a more realistic representation of the complex consumption relationships in ecosystems.

Exploratory Activity:

- Provide students with visual examples of food chains, and then of food webs. Discuss Sonoran Desert animals/insects that rely on specific plants to survive (e.g. monarch butterflies on milkweed) and how carnivores keep herbivore populations in check to prevent overgrazing issues (e.g. coyotes and rabbits).
- Introduce the terms herbivore, omnivore, and carnivore by using examples of each.
- As a class create a big food web using students' existing knowledge of the Sonoran Desert and what types of plants/insects/animals live there.
 - Begin with a large piece of paper that has a sun and one or two examples of plants/animals on it
 - Each student (or group of students) will be tasked with drawing a different plant, insect, or animal on their own pieces of paper
 - Students will come up one by one to the front of the class and place their organisms where they think they belong on the food web in relation to the other organisms already on it
 - Students will draw lines between the related organisms to show connections

Explain:

- Ask the students to consider what would happen if one piece of the constructed food web were to disappear. For example, if one type of plant were to stop growing due to climate change, or if one type of animal were hunted to extinction, what would be the result of the disappearance on the rest of the food web? Physically remove that piece of the food web from the class example, and erase that organism's connections to other parts of the food web so that students can see what happens and hypothesize about the ripple effect of the results.
- Ask students to think of other examples of how food webs could be disturbed either naturally or by human intervention. Have students write down why they think it is important to understand how organisms in nature are connected to each other.

Extension Activity/Questions:

Split students into smaller groups, or allow them to work individually if desired. Give each student access to the art supplies they will need and explain that they are to design and paint their own Sonoran Desert Landscape, and include a food web in their design. This can be done in a more creative fashion by having students include various parts of the food web (animals, plants, etc.) but not having them label or show the connections, or students can be asked to draw arrows between connected organisms and show connections.

Additional extension activity: Check out the “Weaving the Web” activity, where students act as participants in constructing a food web. Adapt the plants and animals in the activity to represent the ecology of the Sonoran Desert.

Evaluation Activity:

Ask each student or group to share their painted food web. Students should describe which organisms they chose to include and what connections they illustrated between organisms in the Sonoran Desert.