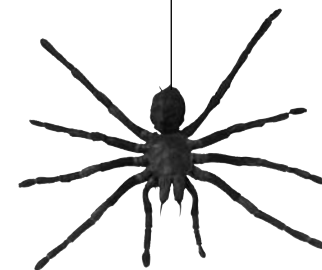


Rethinking School Lunch  
Linking Food, Culture, Health and the Environment

# food webs



Grade 6

A planning resource

# essential understandings: what students need to know

Good curriculum design begins with an analysis of what students need to know. The following references outline essential understandings about food webs, and may be used as a guide for planning instruction around that theme.

## **American Association for the Advancement of Science (*Benchmarks for Science Literacy, Grades 6-8*)**

Food provides the fuel and the building material for all organisms. Plants use the energy from light to make sugars from carbon dioxide and water. This food can be used immediately or stored for later use. Organisms that eat plants break down the plant structures to produce the materials and energy they need to survive. Then they are consumed by other organisms. Over a long time, matter is transferred from one organism to another repeatedly and between organisms and their environment. As in all material systems, the total amount of matter remains constant, even though its form and location change.

(Benchmark 5E: Flow of Matter and Energy)

All organisms, including the human species, are part of and depend on two main interconnected global food webs. One includes microscopic ocean plants, the animals that feed on

them, and finally the animals that feed on those animals. The other web includes land plants, the animals that feed on them, and finally the animals that feed on those animals. The cycles continue indefinitely because organisms decompose after death to return food material to the environment.

(Benchmark 5A: Diversity of Life)

In exploring these benchmarks, students need to gain an understanding of:

- the dependence of organisms on their environment
- classification (e.g., producer, consumer, detritivore, decomposer, etc.) as a framework for describing diversity, and for framing questions or research
- the diversity of life on the planet and the connection between this diversity and geography
- the biological meaning of “food,” compared to the everyday use of the word
- organisms as chemical systems

## **Grade 6: Food Webs**

**California's Education and the Environment Initiative (6th Grade Science Standards Alignment)**

All organisms depend on the transfer of matter [and energy] through food webs, and between organisms and the physical environment. Food chains and webs maintain the flow of matter and energy within natural systems and are among the cycles and processes required for natural systems to function. Human activities can change patterns of flow within food webs. The capacity of food webs to adjust to human alterations varies with the nature and scope of the alterations and the nature of the system. The byproducts of human activities may be introduced into food webs and may affect natural systems. (Standard 5b)



# connections to science, history-social science, and health

Food webs may be explored from the perspectives of science, history-social science, and health. The following essential questions and related California content standards are suggestions for connecting the theme of food webs to these content areas.

## Science

**Essential Questions:** What is energy? Where do living organisms get their food energy? How might we investigate the flow of energy in an ecosystem? What do we mean by energy relationships (who eats whom, what, and why)? What would life on Earth be like without decomposers, scavengers, and detritivores?

**Related California Content Standard (Science, Grade 6):** 5.

Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

- a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.

- b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.
- c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.
- d. Students know different kinds of organisms may play similar ecological roles in similar biomes.
- e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.



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## History-Social Science

**Essential Questions:** Throughout history, what effect have human activities had on natural systems? Have human activities affected energy relationships in natural systems? What is the relationship between culture and food webs (for example, in hunter-gatherer societies, or when studying the effect of irrigation or of permanent settlements)?

**Related California Content Standards (History-Social Science, Grade 6):** Following are just a few of the standards that could be addressed.

- 6.1.** Students describe what is known through archaeological studies of the early physical and cultural development of humankind from the Paleolithic era to the agricultural revolution.
1. Describe the hunter-gatherer societies, including the development of tools and the use of fire.
  3. Discuss the climatic changes and human modifications of the physical environment that gave rise to the domestication of plants and animals and new sources of clothing and shelter.
- 6.2.** Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of Mesopotamia, Egypt, and Kush.

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2. Trace the development of agricultural techniques that permitted the production of economic surplus and the emergence of cities as centers of culture and power.

## Health

**Essential Questions:** Do the choices people make about food affect natural systems, including food webs? In what ways are human health and the environment related? How do behavior patterns and food choices affect the health of the human body system and the health of the environment?

**Related California Content Standard (Health, Grades 4-6):** Unifying Idea—Acceptance of personal responsibility for lifelong health; Expectation 1—Students will demonstrate ways in which they can enhance and maintain their health and well-being.



# applications for school garden, kitchen classroom, and school lunchroom

According to the AAAS *Benchmarks for Science Literacy*, “Tracing simple food webs in varied environments can contribute to a better understanding of the dependence of organisms (including humans) on their environment.” Following are sample ways to explore the food web theme with students in contexts beyond the classroom.

## **School Garden:**

- Observe different food webs in the garden; keep records over time to investigate the effect of seasonal changes on food webs.
- Investigate the detritivores and decomposers in the garden. Describe their sources of food energy.
- Investigate the garden soil ecosystem. What food webs are present? What are the sources of food energy? What roles and functions do different organisms play?
- Does the number or diversity of organisms in the school garden fluctuate with the seasons? What abiotic factors change with the seasons? How do they change?
- Is there a correlation between the richness of plant growth in the garden and the diversity of species and size of the populations in the garden? How can we investigate this? What kinds of questions do we need to ask? What is our hypothesis?
- What do plants need to support vigorous growth? Where do plants get these resources?

- Study garden food webs to observe first-hand how a food web is a network of many species with the ability to eat a number of different kinds of food. Include producers, consumers, detritivores, decomposers, and ways they affect each other.
- If a new species of plant is introduced into the school garden, does this have an impact on the food webs already present? How can we tell?

## **Kitchen Classroom and School Lunchroom:**

- Describe a food web of which you are part, using food from the day’s lunch as a beginning point.
- Observe, record, graph, and display data related to the amount of waste that you generate in the kitchen classroom or the school lunchroom. What happens to this waste? Does any organism use it as a food source? In nature, what happens to food waste? Is there a difference between the conditions in a compost pile and the food waste in a natural system, like a forest?
- Think about one food item that you ate for lunch. Where did it come from? How did it get to your school? What activities were involved in bringing the food from the field (or other source) to your plate? Did any of these activities have an impact on any food webs? In what ways might the food choices you make each day affect food webs?
- What is the meaning of “food” in the kitchen or the school lunchroom?

## **Grade 6: Food Webs**