Food Chains and Webs

TABLE OF CONTENTS

About **Food Chains and Webs**

DeltaScienceModules, THIRD EDITION

Students explore *Food Chains and Webs* through twelve hands-on activities and the Delta Science Reader. Every bite we take connects us to a complex network known as a food web. Because most food webs begin with plants, students first explore plants as food producers. They experiment with soil and light to find the best growing conditions, and plant ryegrass in terrariums. Then they introduce crickets, earthworms, and anoles, and watch what happens. Students are soon able to classify each animal as a primary, secondary, or tertiary consumer, or decomposer, based on what it eats. For reinforcement, students role-play various predators and prey in a food chain game. By the end of the unit, students can apply their knowledge of specific plant and animal relationships to the understanding of food webs in nature.

In the Delta Science Reader *Food Chains and Webs,* students read about what an ecosystem is, how living things in an ecosystem get energy, and how ecosystems can change. Students explore the interaction of living things and discuss food chains and webs. The book also presents biographical sketches of key scientists—Charles Darwin and Rachel Carson—and describes the work of an ecologist. Students also will discover the relationship between moose and wolf populations on Isle Royale and consider the varied ecosystems on a mountain.

Overview Chart for Hands-on Activities

Hands-on Activity	Student Objectives
1 **Soil** *page 15*	• examine several soil samples and identify their components • test the samples for sand/silt/clay composition • prepare terrariums for study in later activities
2 **Plants and Soil** *page 23*	• discuss experimental design • plant seeds and measure plant growth • compare how plants grow in different soil mixtures
3 **Plants as Producers** *page 31*	• discuss the needs of plants • conduct an experiment to determine the effect of sunlight on plant growth • identify plants as producers
4 **Observing Crickets** *page 39*	• examine their crickets • identify the crickets' body parts • record observations of cricket behavior
5 **Observing Anoles** *page 47*	• observe green anole features and behaviors • make records of their observations • discuss their observations with their classmates
6 **Observing Earthworms** *page 53*	• measure the length of earthworms • draw and label the parts of an earthworm • observe earthworm features and behaviors
7 **Animal Behavior** *page 59*	• continue to observe and record the behavior of the animals in their terrariums • draw conclusions about when anoles change color • observe anoles eating crickets and discuss anoles as secondary consumers
8 **What Do Crickets Eat?** *page 67*	• observe how crickets respond to a variety of food choices • draw conclusions about the preferred food of crickets • place crickets in a food chain as primary consumers
9 **Earthworms and Decomposers** *page 73*	• locate and examine earthworm castings • infer what earthworms eat • discuss decomposition and decomposers • learn how earthworms fit into the food chain
10 **Mystery Pellets** *page 81*	• offer ideas about the contents and origin of owl pellets • dissect pellets and identify bones found within • construct food chains that include owls
11 **Food Chain Game** *page 89*	• act out feeding relationships between crickets, anoles, and owls • discuss how it feels to be the prey or the predator • compare simulated food chain relationships with real ones
12 **Web of Life** *page 97*	• create diagrams of food webs on paper • compare food chains to food webs • infer why real food webs are so complex
Assessment *page 103*	• See page 103.

Process Skills	Vocabulary	Delta Science Reader
observe, compare, classify	**decay, sand, silt, soil, terrarium**	pages 2, 3, 13
use variables; experiment; measure; collect, record, display, or interpret data; compare	**conclusion, control group, experiment, experimental group, nutrients, variable**	pages 2, 3, 6, 15
experiment; use variables; hypothesize; collect, record, display, or interpret data	**chlorophyll, producer**	pages 6–9
observe, classify, communicate	**abdomen, antennae, ecosystem, head, ovipositor, population, thorax**	pages 2, 3
observe, communicate	**American chameleon, green anole**	pages 4–6
measure, observe	**bristles, clitellum, earthworm**	pages 4–6
observe; collect, record, display, or interpret data; communicate	**camouflage, secondary consumer**	pages 4–6
observe; predict; collect, record, display, or interpret data; infer	**consumer, food chain, primary consumer**	pages 6–9
observe, infer, communicate	**casting, decompose, decomposer**	pages 6, 7
observe, predict	**dissect, pellet**	pages 6–9
make and use models, communicate, compare	**predator, prey**	pages 4, 14
make and use models, compare, infer	**food web**	pages 8–12

See the following page for the Delta Science Reader Overview Chart.

Overview Chart for Delta Science Reader
Food Chains and Webs

Selections	Vocabulary	Related Activity
Think About...		
What Is a Pond Ecosystem? *page 2*	community, ecosystem, habitat, organism, population, species	Activities 1–4
Living Things Interact *page 4*	adaptation, camouflage, host, interact, mimicry, parasite, predator, prey	Activities 5–7, 11
Energy in an Ecosystem *page 6*	carnivore, consumer, decomposer, energy pyramid, food chain, food web, herbivore, nutrients, omnivore, producer, scavenger	Activities 2, 3, 5–10, 12
How Do Ecosystems Change? *page 10*	diversity, endangered, extinct	Activity 12
People in Science		
• **Charles Darwin** *page 11*		Activity 12
• **Rachel Carson** *page 12*		
• **Ecologists** *page 13*		
Did You Know?		
• **About Wolves and Moose on Isle Royale** *page 14*		Activities 2, 11
• **About Mountain Ecosystems** *page 15*		

See pages 111–119 for teaching suggestions for the Delta Science Reader.

MATERIALS LIST

Food Chains and Webs

Quantity	Description
32	bag, plastic, reclosable, 15 cm × 15 cm
1	Bone Identification Sheet
1	chart, Colorful Anoles*
1	chart, Food Chain Game*
1	clay, powdered, 1 lb*†
8	containers, plastic, large, with lids
16	containers, plastic, small, with lids
11	cups, plastic, large
33	cups, plastic, small
40	flowerpots
1	Food Web cards
1	glue
8	gravel, 2 lb*†
1	index cards, 4 in. × 6 in., p/100
16	magnifiers
8	owl pellets*
1	plastic sheet, large
1	popcorn, 1 lb*
1	sand, 10 lb*†
1	seeds, ryegrass, 2 c
16	soil, peat humus, 1 qt*†
3	soil, potting, 4 qt*†
2	spray bottles
1	tape, masking*
8	thermometers, Celsius
1	toothpicks, p/750*
1	transparency, Cricket
1	transparency, Earthworm
16	trays, plastic
16	tweezers
1	yarn, 200 ft
1	Living Material Card Shipment includes: 100 crickets 8 anoles 30 earthworms

Quantity	Description
1	**Teacher's Guide**
8	**Delta Science Readers**

TEACHER-PROVIDED ITEMS

Quantity	Description
19	branches/twigs
3	containers, large, with lids
–	crayons, red, blue, and yellow
32	pair gloves, disposable*
11	grass plants
–	hamburger, cooked
1	hole punch
1	knife
–	leaves, dead*
–	markers
1	measuring cup
–	newspaper
1	overhead projector
16	paper, black, 12 cm × 18 cm*
–	paper, construction, 5 cm × 5 cm*
–	paper, scrap
–	paper towels
32	paper, white, 11 in. × 17 in.*
1	pitcher
–	potatoes
16	rulers, metric
–	sand (optional)
16	scissors
–	soil, local*
1	spoon
1	tablespoon
1	terrarium
–	water, spring*
–	water, tap*

* = consumable item

† = in separate box

To order consumable items or refill kits, please call 1-800-442-5444.

Activity Summary

This Delta Science Module introduces students to the concepts of food chains and food webs through the study of specific plant and animal relationships.

ACTIVITY 1 Students take a close look at soil. They learn that soil is composed of both grains of rock and bits of decaying organic matter. They also set up terrariums to be used throughout most of the activities.

ACTIVITY 2 Students set up an experiment to test the effect of growing plants in soil versus sand. They plant three pots with ryegrass seeds—one in soil, one in sand, and one in a mixture of the two. They care for, observe, and measure the growth of these plants, and discover firsthand that plants grow better in soil.

ACTIVITY 3 Students set up an experiment to determine the effect of depriving green plants of sunlight. One set of plants is grown in sunlight, while another set is grown in darkness. After a week, students compare their growth and condition and conclude that green plants need sunlight to be healthy. They also learn that green plants are producers—the source of all food energy on Earth.

ACTIVITIES 4, 5, and 6 Students are introduced to the live animals studied in this module: crickets, anoles, and earthworms. They observe the animals, draw them, and make initial notes on their behavior.

ACTIVITY 7 Students begin a series of terrarium observations to learn more about the behavior of their animals. They keep notes on where the animals are in the terrarium and what they are doing.

ACTIVITY 8 Students set up experiments to discover what crickets eat. They observe that crickets eat plants, and learn that animals that eat plants are called primary consumers. Students will have seen anoles eat crickets by this time, and they learn that animals that eat other animals are called secondary consumers.

ACTIVITY 9 Students learn that earthworms play a role in decomposition by ingesting and breaking down dead plant and animal matter in soil. The students then discuss how, after passing through the earthworm's digestive system, the organic material is then ready for decomposers such as bacteria and fungi. Decomposers break down the organic matter into nutrients necessary for plant growth.

ACTIVITY 10 Students are given "mystery pellets" to study. After examining them closely and offering ideas about what they might be, they dissect them and discover that they contain the tiny bones of rodents. They learn that these pellets are regurgitated by owls after they eat rodents. Owls are considered tertiary consumers because they eat secondary consumers.

ACTIVITY 11 Students reinforce their understanding of the food chain concepts learned in the activities by playing a game of food-chain tag. Taking on the roles of crickets, anoles, and owls, they learn the terms predator and prey, and decide from their own experience what characteristics help both predator and prey animals to be successful.

ACTIVITY 12 Students discover that most plants and animals are actually connected in complex food webs rather than linear food chains. They create a food web using data about a variety of different organisms—from producers to tertiary consumers—and discuss the possible advantages of this complex relationship in nature.