

OVERVIEW

STRUCTURES OF LIFE

CONTENT AND GOALS

The **Structures of Life Module** consists of four investigations dealing with observable characteristics of organisms. Students observe, compare, categorize, and care for a selection of organisms. In so doing, they learn to identify properties of plants and animals and to sort and group organisms on the basis of observable properties. Students investigate structures of the organisms and learn how some of the structures function in growth and survival.



FOSS EXPECTS STUDENTS TO

- Observe and compare properties of seeds and fruits.
- Investigate the effect of water on seeds.
- Observe, describe, and record structures of germinated seeds and learn their functions for the growing plant.
- Compare different kinds of germinated seeds.
- Grow plants hydroponically and observe the life cycle of a bean plant, focusing on structures and functions.
- Observe and record crayfish and land snail structural and behavioral adaptations.
- Use knowledge of crayfish and snail life requirements to maintain the organisms in the classroom.
- Organize data about crayfish territorial behavior.
- Become familiar with the diversity of organisms in different environments in terms of their structural and behavioral adaptations.
- Discuss what can happen to organisms when the environment changes (some survive, some die, some move).
- Know examples of how living things change their environment and how these changes can be detrimental or beneficial to organisms.
- Know examples of extinct animals; know examples of animals alive today that resemble extinct animals.
- Collect, organize, and analyze data from life science investigations to build explanations.

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STRUCTURES OF LIFE MODULE MATRIX

SYNOPSIS

CA SCIENCE CONTENT STANDARDS

1. ORIGIN OF SEEDS

Students conduct a seed hunt by opening fresh fruit and locating the seeds. They describe and compare seed properties and structures. They investigate the effect water has on the seeds by setting up seed sprouters and observing and recording changes over a week. Students systematically find out how much water lima beans soak up in a day and read about seeds.

LS3a	Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.
LS3c	Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.
I&E5a	Repeat observations to improve accuracy and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in the things being investigated, methods being used, or uncertainty in the observation.
I&E5c	Use numerical data in describing and comparing objects, events, and measurements.
I&E5d	Predict the outcome of a simple investigation and compare the result with the prediction.
I&E5e	Collect data in an investigation and analyze those data to develop a logical conclusion.

2. GROWING FURTHER

Students examine germinated seeds to determine similarities and differences in the way the plants grow. They set up a hydroponic garden to observe the life cycle of a bean plant. Through direct observations and readings students learn about plant structures and functions.

LS3a	Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.
I&E5a	Repeat observations to improve accuracy and know that the results of similar scientific investigations seldom turn out exactly the same because of differences in the things being investigated, methods being used, or uncertainty in the observation.
I&E5e	Collect data in an investigation and analyze those data to develop a logical conclusion.

3. MEET THE CRAYFISH

Students observe and record some of the structures of a crustacean, the crayfish. They investigate crayfish behavior and map where the crayfish spend their time within their habitat. Through readings, organism cards, and a video, students learn about adaptations of organisms in different environments.

LS3a	Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.
LS3b	Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.
I&E5d	Predict the outcome of a simple investigation and compare the result with the prediction.
I&E5e	Collect data in an investigation and analyze those data to develop a logical conclusion.

4. MEET THE LAND SNAIL

Students study snail structures and behaviors and set up an appropriate habitat for the animals. They compare the structures and behaviors of the snail (a gastropod) to the crayfish (a crustacean). Through readings students study examples of organisms that change the environment. And they read about what can happen to organisms when environments change.

LS3c	Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.
LS3d	Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.
LS3e	Students know that some kinds of organisms that once lived on Earth have completely disappeared and that some of those resembled others that are alive today.
I&E5c	Use numerical data in describing and comparing objects, events, and measurements.

CONCEPTS

- Seeds develop in the plant structure called a fruit.
- Different kinds of fruits have different kinds and numbers of seeds.
- Seeds have a variety of properties.
- Seeds undergo changes in the presence of water.
- A seed is an organism, a living thing.
- A seed contains the embryo plant and a store of food and water.

- Germination is the onset of a plant's growth.
- Plants need water, light, and nutrients to grow.
- The life cycle is the process of a seed growing into a mature plant, which in turn produces seeds.
- The fruit of the plant develops from the flower.

- Crayfish have observable structures such as legs, pincers, antennae, eyes, swimmerets, tail, and mouthparts. These structures have functions that help the organism survive in its environment.
- Behavior is what an animal does.
- Some animals claim a territory that they defend from other animals.
- Different organisms can live in different environments; organisms have adaptations that allow them to survive.

- Land snails have a coiled shell, a large foot on which they glide, and a body with a variety of structures.
- An organism's structures have functions that help it survive in its habitat.
- The structures found on different kinds of organisms show some similarities and some differences.
- Some organisms that lived on Earth died out when environments changed.
- Organisms can change their environment; this can be detrimental or beneficial.

READING AND WRITING

- *The Reason for Fruit*
- *The Most Important Seed*
- *Barbara McClintock*
- Science Notebook: Students record properties and structures of seeds and how they change during germination. They record numerical data on the amount of water lima beans soak up.

- *Germination*
- *Life Cycle*
- *Summary: Growing Further*
- Science Notebook: Students describe the life cycle of a bean plant.

- *Crayfish*
- *Adaptation*
- *Life on Earth*
- *Summary: Meet the Crayfish*
- Science Notebook: Students record observations about crayfish structures and behaviors and write about animal adaptations. Students record observations of an investigation on crayfish territory.

- *Inside a Snail's Shell*
- *A Change in the Environment*
- *Frogs*
- *Life in Los Angeles*
- *Summary: Meet the Land Snail*
- Science Notebook: Students compare structures and functions of two organisms. They write about the results of changes in the environment.

ASSESSMENT

Pretest

Embedded Assessment

- Response sheet
- Teacher observation

Benchmark Assessment

- I-Check 1

Embedded Assessment

- Teacher observation
- Notebook sheet

Benchmark Assessment

- I-Check 2

Embedded Assessment

- Notebook sheet

Benchmark Assessment

- I-Check 3

Embedded Assessment

- Teacher observation
- Notebook sheet

Benchmark Assessment

- I-Check 4

Posttest



FOSS AND CALIFORNIA STANDARDS

FOSS supports the following Life Sciences Content Standards for grade 3.

STD	TEXT OF STANDARD	PRIMARY CITATIONS	SUPPORTING CITATIONS
3	Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:		
3.a	<i>Students know</i> plants and animals have structures that serve different functions in growth, survival, and reproduction.	Structures of Life Teacher Guide Inv. 1: pp. 55, 59-60 Inv. 3: pp. 118-120, 130-133 (video: <i>All about Animal Adaptations</i>) Grade 3 Science Resources Book <i>The Reason for Fruit</i> pp. 83-87 <i>Germination</i> pp. 98-99 <i>Adaptation</i> pp. 115-120	Structures of Life Teacher Guide Inv. 2: pp. 90, 92-93 Benchmark Assessment Items 18, 28-29, 32, 44, pp. 303, 307-309, 314 Notebook Sheets nos. 7, 10-12, pp. 191, 194-196 Grade 3 Science Resources Book <i>Crayfish</i> pp. 109-114 <i>Inside a Snail's Shell</i> pp. 139-140
3.b	<i>Students know</i> examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.	Grade 3 Science Resources Book <i>Life on Earth</i> pp. 121-133 Structures of Life Teacher Guide Inv. 3: pp. 128-132, 134, 144	Structures of Life Teacher Guide Notebook Sheet no. 10, p. 194 Benchmark Assessment Item 37, p. 312 Inv. 3: pp. 146-147 CA FOSSWEB CD-ROM Structures of Life: Habitat activities
3.c	<i>Students know</i> living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.	Grade 3 Science Resources Book <i>A Change in the Environment</i> pp. 141-144 <i>Frogs</i> pp. 145-148 <i>The Most Important Seed</i> pp. 90-91 Structures of Life Teacher Guide Inv. 4: pp. 174-175, 182	Structures of Life Teacher Guide Benchmark Assessment Items 34, 39, 45, pp. 310, 313-314 Grade 3 Science Resources Book <i>Summary: Meet the Land Snail</i> pp. 154-156
3.d	<i>Students know</i> when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.	Grade 3 Science Resources Book <i>When Environments Change</i> pp. 155-156 <i>A Change in the Environment</i> pp. 141-144 <i>Frogs</i> pp. 145-148 Structures of Life Teacher Guide Inv. 4: pp. 174-175, 182	Grade 3 Science Resources Book <i>Life in Los Angeles</i> pp. 152-153 Structures of Life Teacher Guide Benchmark Assessment Items 30-31, 41, pp. 309, 313
3.e	<i>Students know</i> that some kinds of organisms that once lived on Earth have completely disappeared and that some of those resembled others that are alive today.	Grade 3 Science Resources Book <i>Life in Los Angeles</i> pp. 150-153 <i>Summary: Meet the Land Snail</i> p. 156 Structures of Life Teacher Guide Inv. 4: pp. 181-182	Structures of Life Teacher Guide Benchmark Assessment Item 43, p. 314