

Grade 4 Science, Unit 3

Structures and Function

Overview

Unit abstract

In this unit of study, students are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. The crosscutting concept of systems and system models is called out as organizing concepts for this disciplinary core idea. Students are expected to demonstrate grade-appropriate proficiency in engaging in argument from evidence. Students are expected to use this practice to demonstrate understanding of the core idea.

Essential question

- How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals?

Written Curriculum

Next Generation Science Standards

4. Structure, Function, and Information Processing		
Students who demonstrate understanding can: 4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]		
The performance expectations above were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i> :		
Science and Engineering Practices Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). <ul style="list-style-type: none"> ▪ Construct an argument with evidence, data, and/or a model. (4-LS1-1) 	Disciplinary Core Ideas LS1.A: Structure and Function <ul style="list-style-type: none"> ▪ Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) 	Crosscutting Concepts Systems and System Models <ul style="list-style-type: none"> ▪ A system can be described in terms of its components and their interactions. (4-LS1-1)
<i>Connections to other DCIs in this grade-level: N/A</i>		
<i>Articulation of DCIs across grade-levels: 1.LS1.A (4-LS1-1); 3.LS3.B (4-LS1-1); MS.LS1.A (4-LS1-1)</i>		
<i>Common Core State Standards Connections:</i> ELA/Literacy – W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1) Mathematics – 4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4-LS1-1)		

Clarifying the standards

Prior learning

The following disciplinary core ideas are prior learning for the concepts in this unit of study. By the end of Grade 2, students know that:

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stem, leaves, flowers, fruits) that help them survive and grow.

By the end of Grade 3, students know that:

- Different organisms vary in how they look and function because they have different inherited information.
- Environment also affects the traits that an organism develops.

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*Progression of current learning***Driving question 1**

How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals?

Concepts

- A system can be described in terms of its components and their interactions.
- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

Practices

- Describe a system in terms of its components and their interactions.
- Construct an argument with evidence, data, and/or a model.
- Construct an argument to support the claim that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. (Assessment is limited to macroscopic structures within plant and animal systems.) Examples of structures could include:
 - Thorns
 - Stems
 - Roots
 - Colored petals
 - Heart
 - Stomach
 - Lung
 - Brain
 - Skin

Integration of content, practices, and crosscutting concepts

In this unit of study, fourth-grade students spend time observing plants and animals in order to gather evidence that organisms are living systems. A system is made up of structures and processes that interact and enable the system to function. Every plant and animal can be described in terms of its internal and external structures and their interactions, and these structures each have specific functions that support survival, growth, behavior, and reproduction for the organism.

Using a variety of plants and animals as examples, students need multiple opportunities to:

- Describe the internal and external structures of a plant or animal and the function of each of those structures. Description should explain how each structure serves various functions in growth, survival, behavior, and/or reproduction. (This is limited to macroscopic structures within plant and animal systems, and could include such structures as thorns, stems, roots, and colored petals for plants, and heart, stomach, lung, brain, and skin for animals.)
- Describe the interactions that occur among the structures within the plant or animal system.

As students observe the structures of an animal or plant, explain the function of each, and describe how these structures help the animal grow, survive, and/or reproduce, they should use evidence from their observations to support their explanations.

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Integration of English language arts and mathematics

English language arts

To support integration of the Common Core State Standards for English Language Arts into this unit, students use the evidence from their observations of plants and animals to support the claim that all organisms are systems with structures that function in growth, survival, behavior, and/or reproduction. Students need opportunities to observe plants and animals closely, taking notes and drawing pictures, so that they can describe various structures and their functions.

Mathematics

The Common Core State Standards for Mathematics are integrated into this unit when students describe the symmetry that can be observed in an organism's structures. For example, the leaves of many plants and the bodies of many animals display bilateral symmetry. Students should be encouraged to draw each organism that they observe, pointing out any structures that are symmetrical. Students should also trace lines of symmetry in their drawings to support their thinking. In addition, students can conduct research to determine whether the symmetry serves a function in the growth, reproduction, or survival of the organism.

Future learning

The following disciplinary core ideas are future learning related to concepts in this unit of study.

In middle school, students will know that:

- All living things are made up of cells, which are the smallest units that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.
- In multicellular organisms, the body is a system of multiple, interacting subsystems. The subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

Number of Instructional Days

Recommended number of instructional days: 9 (1 day = approximately 45–60 minutes)

Note—The recommended number of days is an estimate based on the information available at this time. Teachers are strongly encouraged to review the entire unit of study carefully and collaboratively to determine whether adjustments to this estimate need to be made.