



WHAT'S YOUR FUNCTION?

Kansas College and Career Readiness Standards

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.]

Materials

- Several wheat plants, at least three for each group of four students in the classroom
- 1 corn stem
- 1 grain sorghum stem
- Classroom set of hand lenses
- Classroom set of paper towels
- Classroom set of wheat kernels
- Classroom set of toothpicks
- Wonderful Wheat - Kansas Kid Connection magazine
- Cool Corn - Kansas Kids Connection magazine
- Chart paper
- Composition or spiral notebook, one per student, for science notebook recordings (optional)

Subjects

Science

Grade Level

4th Grade

Time Required

Three 45 minute class periods

Overview

Students explore the structures of a wheat plant to discover their function. Students compare these structures to other grasses and crops grown in Kansas.

Objective

Students explore and use evidence from their explorations to explain the function of external structures of a wheat plant that support its survival, growth, behavior and reproduction.

Preparation

Gather at least three wheat plants, one corn stem with roots, and one grain sorghum stem with roots for each group of four students in your classroom. Contact a farmer, your local Farm Bureau or the County Extension Service to obtain these plant parts.

WHAT'S YOUR FUNCTION?

Engage

Tell students that they are going to look at different members of the grass family. Pass out the wheat, corn, and grain sorghum stems with roots. These are stems only, no leaves or heads. Do these stems look like any grass they are familiar with?

Explore

Give students time to explore the stems, comparing their structures.

Student discussion:

After students have observed the stems, display the following question: What does this plant part do? Verbally ask and discuss how this part of the plant functions to help it survive, grow, reproduce.

Example responses: Holds the plant up and support the leaves, helps the plant grow.

Explain

Introduce the vocabulary words, stem and roots (not definitions, words only). Explain that what the students have explored today are the stem and roots of a plant.

Guide students to create a definition of the stem's function through their earlier observations. Teacher Definition: (DO NOT SHARE WITH STUDENTS!) The primary functions of the stem are to support the leaves, conduct water and nutrients to the leaves where they can be converted into usable products by photosynthesis, and transport these products from the leaves to other parts of the plant including the roots.

Have students record their definition of a stem in their science notebook, including a drawing of the wheat plant's stem. Example response: part that grows from the ground and holds leaves, transports water and nutrients from the roots for use by the plant.

Guide students to create a definition of the root's function through their earlier observations.

Teacher Definition: (DO NOT SHARE WITH STUDENTS!) The primary function of the roots are to provide anchorage and support. The plant root system anchors the plant body to the soil and provides physical support. Roots help with absorption of and movement of water and other nutrients.. The plant root system absorbs water, oxygen and nutrients from the soil in mineral solution, mainly through the root hairs. The roots serve as storage organ for water and carbohydrates.

Have students record their definition of roots in their science notebook, including a drawing of the wheat plant's root system. Example responses: long string like pieces that grow under the soil and hold the plant down.

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Explore

Pass out wheat stems with leaves (these are stems and leaves only, no roots, or heads). Have students draw the leaf in their notebook, then pull the leaf off the stem and record observations of the leaf structures. Example responses: student may observe that the leaves have veins, that the leaves are attached to the stem and the color of the leaves.

Display the following question: what does this plant part do? Verbally ask and discuss how this part of the plant can help it survive, grow, and reproduce. Example responses: the leaves support the growth of the plant and make the food for the plant. Record students' ideas in their science notebooks.

Explain

Introduce the vocabulary word leaf. Explain that what the students have explored today is the leaf of a wheat plant. Guide students to create a definition of the leaf's function through their earlier observations.

Teacher Definition: (DO NOT SHARE WITH STUDENTS!) Structures within a leaf convert the energy in sunlight into chemical energy the plant can use as food.

Have students record their definition in their science notebook, including a drawing of the wheat plant's leaf.

Explore

Prior to this lesson, soak wheat kernels in water for at least 6 hours.

Pass out complete wheat plants. Have students draw the head, break the head apart, and record observations of the heads. (Extension: Challenge students – who can identify the most parts of the wheat plant?) Assessment for after the students have reviewed the Wonderful Wheat Kids Connection Magazine.

Pass out hand lens, paper towels, wheat kernels that have been soaking in water for at least 6 hours, and toothpicks. Guide students in separating the parts of the wheat kernel into germ, bran and endosperm. Review the parts of the kernel and their function as noted in the Wonderful Wheat Kids Connection Magazine, prior to dissecting the kernels.

Display the following question: What is the function of each plant part? Verbally ask and discuss how each part of the plant helps it survive, grow and reproduce Example response: This is where new plant growth begins (germ).

Students' record ideas in their science notebooks.

Take remaining kernels and have students germinate them in a paper towel, allowing students to see how the seedling uses the endosperm to support growth while sprouting. It will take a few days for the seeds to germinate after being placed on a moist paper towel sealed in a plastic bag and placed in a warm, sunny place.

WHAT'S YOUR FUNCTION?

Explain

Define the following vocabulary: bran, endosperm, and germ. Guide students to create a definition of each part's function through their earlier observations. Teacher definitions can be found in the Wonderful Wheat Kansas Kids Connection magazine.

Evaluate

Students will “build a claim” by answering the following questions about the structures and functions of the wheat plant.

What are the **internal** structures of the wheat plant? Describe their functions.

What are the **external** structures of the wheat plant? Describe their functions.

Using your answers to the previous questions, create an argument about how these internal and external structures support the survival, behavior, and reproduction of the wheat plant.