Explore an ear of corn

Focus question	What do you know about this plant? How do the parts of the corn plant work to produce an ear of corn?
Learning target	Students can identify the parts of a corn plant and explain the function of each part.
Vocabulary	Commodity, tassel, leaf, shank, silk, husk, ear, kernel, stalk, roots

MS-LS1: From Molecules to Organisms: Structures and Processes

Performance expectation MS-LS1-5	**Classroom connection:** This activity is an introduction to the structure and function of the corn plant.

Science and engineering practices

Constructing Explanations and Designing Solutions	**Classroom connection:** Students begin to construct an explanation by determining the roles of various parts of the corn plant in its growth. **Classroom connection:** Students begin to design solutions to improve plant health and yield and reduce the impact of humans and/or the environment.

Disciplinary core ideas

LS1.B: Growth and Development of Organisms	**Classroom connection:** Students make observations about the impact environment has on corn plants.

Cross-cutting concepts

Cause and Effect	**Classroom connection:** Students will figure out that biotechnology techniques have improved the survival of seeds in adverse conditions.

This lesson focuses on Constructing Explanations and Designing Solutions as a means to identify the parts of a corn plant and understand how those parts contribute to the functionality of the plant. Students will identify and explore the functions of each plant part. Students will create an explanation for how each part contributes to the growth of the ear for yield production.

Background

Corn growth and development for commodity agriculture is dependent upon our understanding of corn anatomy and functionality. To gain a good understanding of corn anatomy and functionality you can visit the University of Minnesota All About Corn E- learning modules: **allaboutcorn.umn.edu/lessons/biology-corn** and The Ohio State University: **agcrops.osu.edu/specialization-areas/corn-growth-and-development**

Materials

- Student handout
- Corn plant that students have grown in class for at least 2–3 weeks or one pulled from a field (with permission from the grower), including ear (if available)
- Dried ear of corn (squirrel corn)
- Electronic scale

Teacher preparation

1. Make copies of the student handout.
2. Determine if the students should investigate a real corn plant to identify anatomy and/or the image of a corn plant below.
3. Determine if your students should investigate the anatomy of the corn plant with or without the aid of names and/or definitions.
4. Ask students to explain what a plant needs to grow and develop. Most students will say roots, leaves, stems, as these are the most common parts. Ask students to explore the corn plant and identify how a corn plant produces and stores energy, transports water and nutrients throughout the plant, and reproduces. What parts are necessary? What parts might be less necessary? Allow the students to investigate a corn plant and determine how each part of the plant contributes to ear production.

GROWING CORN LESSON 1

Explore an ear of corn

Focus questions	What do you know about this plant? How do the parts of the corn plant work together to produce an ear of corn?
Vocabulary	Commodity, reproduce, tassel, leaf, shank, silk, husk, ear, kernel, stalk, roots

Corn is an important food and fuel crop in the world today. It undergoes a series of developmental stages as it grows from a seed at planting to a tall plant with an ear at harvest. **Commodity** corn growth and development is dependent upon our understanding of corn structure and function. How does each part of the plant contribute towards the production of an ear of corn?

Procedure

1. What does a corn plant require to grow and be productive? How does a plant **reproduce** to create more corn plants?

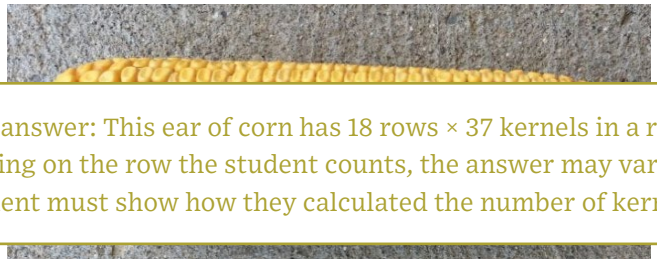
Answers will vary.

2. Look at the corn plant and identify its parts and their functions that you know. How does each part of the corn plant contribute to the energy necessary to produce an ear of corn?

Student handout

3. Were there any parts of the plant that you did not know? Look at the functions for the corn parts below. Research the descriptions to determine the correct names and add them to the diagram above.
   - Male part of the plant that contains pollen — Tassel
   - Structure that provides surface area where light is intercepted and photosynthesis takes place — Leaf
   - A hollow tube that transports the pollen to the kernel — Silk
   - Leaf-like structure that wraps around the ear for protection — Husk
   - Female part of the corn plant that contains the kernels forming after fertilization — Ear
   - Corn seed that produces another plant — Kernel
   - Place where the leaf breaks away from the plant — Leaf collar
   - Main body of the corn plant — Stalk
   - Place where the ear attaches to the stalk — Shank
   - Underground structure that provides support and conveys water and nourishment to the rest of the plant via numerous branches — Roots

4. Investigate the ear of corn. How many kernels are on the average ear of corn below?



Possible answer: This ear of corn has 18 rows × 37 kernels in a row = 666 kernels.
(Depending on the row the student counts, the answer may vary).
The student must show how they calculated the number of kernels.

Cross-section of ear **Lateral view**

5. Construct an explanation for how environmental and genetic factors influence the growth of the corn plant.

Answers will vary.

Rubric for self-assessment

Skill	Yes	No	Unsure
I can identify the parts of a corn plant.			
I can describe the function of each part of the corn plant.			
I can explain how the parts and functions of the corn plant work together to produce an ear of corn.			

Differentiation

Other ways to connect with students with various needs:

- **Local community:** Students may investigate local farm fields to see if the stage of growth corn is the same across fields.
- **Students with special needs (language/reading/auditory/visual):** Create flashcards with the corn parts on one side and definitions on the other. Teachers can also create copies of the photos to pass out to the students, so that they can write on the slides as they identify the potential harm and possible remediation to that harm on that slide.
- **Extra support:** Have students complete this e-learning module: `allaboutcorn.umn.edu/lessons/biology-corn`
- **Extensions:** Students may grow corn under varying conditions in the classroom or in a greenhouse to determine the effect of differing variables.

Assessments

Rubric for assessment

Skill	Developing	Satisfactory	Exemplary
Constructing Explanations	Students can identify the parts of a corn plant.	Student can identify the parts of a corn plant and explain each part's function.	Student can identify the parts of a corn plant and explain each part's function. Student can explain how the parts of the corn plant work together to create an ear of corn.

Rubric for self-assessment

Skill	Yes	No	Unsure
I can identify the parts of a corn plant.			
I can describe the function of each part of the corn plant.			
I can explain how the parts and functions of the corn plant work together to produce an ear of corn.			