WHEAT-A MEMBER OF THE GRASS FAMILY

Next Generation Science Standards

1-LS3-1 Make observations to construct an evidence-based account that young plants and animals are alike, but not exactly like their parents.

Subjects
Science
Language Arts
Mathematics

Grade Level
1st Grade

Time Required
5 lesson plans approximately 30 minutes each. The teacher may choose how lessons are presented either together or separately

Cross curricular Educational Standard(s) KCCRS Connections (ELA):

- (RI.1.1) Ask and answer questions about key details in a text. (1-LS1-2),(1-LS3-1)
- (RI.1.2) Identify the main topic and retell key details of a text. (1-LS1-2)
- (RI.1.10) With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)
- (W.1.7) Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1),(1-LS3 -1)
- (W.1.8) With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)

Mathematics

- (1.NBT.B.3) Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)
- (1.NBT.C.4) Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
- (1.NBT.C.5) Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
- (1.NBT.C.6) Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1- LS1-2)
- (1.MD.A.1)Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)

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Standards of Mathematical Practice

- (MP.2) Reason abstractly and quantitatively. (1-LS3-1)
- (MP.5)Use appropriate tools strategically. (1-LS3-1)

Materials Needed

- Kansas Kid Connection Magazine- Wonderful Wheat
- Wheat stalk
- 1 cup of hard red winter wheat kernels
- 1 cup of wild wheat
- 2-cotton balls for each child
- 2 small plastic bags for each child
- White copy paper
- Drawing supplies
- 12” x 18” paper

Objectives

The student will be able to compare and contrast traits of different wheat types.

Background Information

Students need to have a basic understanding of what resources plants need to survive.

Check out the Wonderful Wheat Kansas Kids Connection Magazine to get background material about wheat plant parts and about hard red winter wheat growth cycle.

Vocabulary

Traits- features that we get from our parents
Roots- the part that holds the plant in the ground and keeps the plant from falling over
Leaves- the part of the plant that makes the food
Stem or Stalk- the part of the plant that holds the plant up and holds the head upright
Head- the part of the wheat that holds the seeds
Sprout- the beginning of a plant
Seedling- a young plant

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Instructional Format

Lesson 1 - Parts of a Wheat Plant

Materials

- Kansas Kid Connection Magazine- Wonderful Wheat
- 1 blank index card per student
- Wheat stalks - Get Hard Red Winter Wheat stalks from a local wheat farmer in the summer, then spray the head with hair spray to make sure the kernels stay in the head

Engage

Display photos of ancestral wheat and modern wheat. Pass out one index card per student and have them label one side as “Similar Traits.” Give students one minute to list out the similarities of the wheat pictured. After the minute is up ask students to share with a partner what they observed. Allow students to add to their index cards after collaborating with a peer.

Next, have students turn their index cards over and label this side “Different.” Repeat the first step with students, observing the differences in the wheat pictured. Give students one minute to list out the similarities of the wheat pictured. After the minute is up ask students to share with a partner what they observed. For example, they may notice difference in the size of the seed head or height. Allow students to add to their index cards after collaborating with a peer.

Have students share what questions they have about wheat. Record these questions on an anchor chart that you will refer back to throughout the unit.

Explore

Pass out domesticated Hard Red Winter Wheat stalks and have students examine them. Let the student break apart the stalks and look at them with a hand lens. Have students record their observations by drawing pictures in their science journals. Remind students to record color, shape and how the wheat feels.

Explain

Hand out the Kansas Kid Connection Magazine - Wonderful Wheat. Display the diagram on page 3. The teacher will point to a wheat plant part and ask the students to label it using a word from the word bank. The teacher can make a copy of the wheat plant and plant parts by downloading a poster from the KFAC website under education and resources.

Discuss with students the parts of the plant. Explain that all plants need to have certain parts in order to grow and survive. Discuss the function of each plant part as stated on the poster.

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Lesson 2 - Wheat Life Cycle

Materials

- Kansas Kid Connection Magazine- Wonderful Wheat
- Drawing Paper
- Drawing Supplies

Engage

Look at the diagram found on page 2 of Wonderful Wheat, then ask students the following discussion questions. They can discuss these as a group or with partners.

Is it important for the plant to change?
What if the plant stayed like the sprout until the head appeared?
What if the plant was always this short? Would other plants grow over it and cover it up? Would it be harder to harvest with a combine?

Explore

Put away the magazine and have students draw the stages of wheat growth and label them. Students could do this activity individually or in a small group, sharing their new knowledge.

Explain

Open Wonderful Wheat, page 2 and read the descriptions of each growth stage aloud. As the teacher reads, students should record on their diagrams the explanations in their own words. Explain that just like people grow, plants do to.

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Lesson 3 - Teacher Led Germination Activity

Preparation

Germinate both wild (ancestral) and domesticated hard red winter wheat (modern) - this will take approximately 3-4 days in a sunny window. Sprout both wild (ancestral) and domesticated Hard Red Winter Wheat (modern). Make one copy of the following worksheet for each student.

Explore

Display the germinated seeds for students to observe. Have students share with the class and record on the class anchor chart their observations.
Discussion questions:

- How many seeds germinated?
- Which type of wheat germinated the least? Most?

Display a picture of the teacher's grandparents and explain that the picture is of your grandparents. Then tell students that plants have grandparents too. Show students a picture of a wild wheat plant and Hard Red Winter Wheat plant, explaining that the wild wheat is the grandparent to the Hard Red Winter Wheat plant. The sprouts we observed were wild wheat and domesticated wheat.

Explain

When discussing how many seeds germinated in the two types of wheat, ask students why farmers might not want to plant wild wheat and why the Hard Red Winter Wheat is better for planting. Have students record their claims in their science journals.

Talk about how farmers have worked to make the plants more productive so that they can make more food for everyone. Show this short video to the class: https://bit.ly/gmowheat1. As the class watches the video, pause and explain that photosynthesis is the process plants use to make food. This process requires carbon dioxide, which there is now more of in our atmosphere due to the burning of fossil fuels. These scientists have created a way for the plants to take advantage of this change by adapting sooner than they would naturally. Currently in the U.S. we do not have GMO wheat. Instead, scientists have used traditional plant breeding to select new, more productive varieties.

Extension

To integrate literacy into this lesson, consider using The Boy Who Changed the World, by Andy Andrews. This is the story of Norman Borlaug, an American agronomist and humanitarian who led initiatives worldwide that contributed to the extensive increases in agricultural production that was called the Green Revolution.

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Lesson 3

Picture of ancestorial (Wild) wheat compared to modern bread wheat

Triticum urartu

Aegilops tauschi

Modern Wheat

KFAC

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Lesson 4 - Germination of Wheat

Materials

- Two sealable plastic bags per student (one marked with a R and the other with a W)
- Cotton balls
- Water
- Hard Red Winter Wheat seeds
- Wild wheat seeds
- Seed Sprout Observation Log

Engage

Review anchor charts and summary statements from Lesson 3. Talk about how each plant was different or had different traits. Discuss how traits are the features we get from our parents.

Explore

Tell students that they are going to design their own Seed Buddy Observation Experiment to answer the question: “What traits did each of these plants get from the parent plants? “

Students will be working with a partner and planting a seed in a plastic bag with cotton balls. The cotton balls will be holding moisture needed for germination. Students will choose a Hard Red Winter Wheat and a wild wheat for their germination experiment.

Give each child two plastic bags. One should be marked with an **R** for Hard Red Winter Wheat and the other a **W** for wild wheat. Have students take two cotton balls and soak them in water. Squeeze almost all of the water out and place them in the plastic bags. Put at least three kernels of wild wheat in the bag marked W. Put at least three kernels of Hard Red Winter Wheat in the bag labeled R. Seal both bags and place in a window where they will have access to the sun. The kernels should sprout or germinate within 3-4 days.

Students should record their prediction of how many days it will take for their seeds to germinate (sprout) on their observation log. Then, have students record observations each day in their observation log. Observation logs will be used in the next lesson.

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Lesson 5 - Constructing an Evidence-based Account

Materials

- Germination observation log from previous activity

Explain

Use the following discussion questions to talk about the discoveries they made while observing.
Which kind of wheat sprouted first?

Did all the seeds sprout?

Which type had the most seeds sprout?

Conclusion Question

“Now that we have more data about which seeds sprout the best, do we need to change our claim or do we now have more evidence to support our original claim?”

Original Claim/Question from Lesson 3: Which sprout would be the best for farmer to plant and why?

Compare the two different kinds of wheat sprouts by making a list of things the students noticed. Remind them to look at the posters of the adult plants to see if they can see any traits showing up in their sprouts.

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Name:_____

Looking at the pictures of the adult wild and domestic wheat, which traits do you see in both. Draw a picture and label the similarities between the two.

Hard Red Winter Wheat

Wild Wheat

My Claim:

I think the farmer should plant the _____ wheat because of these traits:

_____

_____

_____

Lesson 4 - Seed Sprout Observation Log

Name:_____

DAY ____	DAY ____	DAY ____	DAY ____	DAY ____