



The Inputs and Outputs of a Wheat Farm

Week 2 – Day 2

Lesson Overview

The purpose of this lesson is to teach students about the basic inputs and outputs of a wheat farm in the inland Pacific Northwest. This lesson explores more deeply the concepts that students explored in the agricultural timeline exercise.

Lesson Vocabulary

input, output, nitrogen fertilizer, soil moisture, cost, yield, drill, tractor, harvest, combine, grain elevator, kernel, and bushel

Standards and Learning Targets for Lesson

Learning Targets

- I can describe the major inputs and outputs of a wheat farm in the inland Pacific Northwest.

Next Generation Science Standards

- 5-LS2-1 – Ecosystems: Interactions, Energy, and Dynamics
 - Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. A system can be described in terms of its components and their interactions.

Idaho Science Standards

- 5.S.1.3.1 – Understand Constancy, Change, and Measurement
 - Analyze changes that occur in and among systems.

Common Core ELA Standards

- RI.5.1 – Reading Informational Text
 - Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

Materials

- Map for projecting in the Engage portion of the lesson
- Computer and projector for displaying map
- Text “The Ins and Outs of a Wheat Farm” (Print one copy for each student.)
- Graphic organizer “Inputs and Outputs of a Wheat Farm” (Print one copy for each student.)

Lesson Duration

Approximately 2 hours



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Lesson Description

This workshop lesson is a text-based model designed to assess students on both science content and on literacy skills related to quoting and citing textual evidence. Students will be able to clearly articulate the major inputs and outputs of a wheat farm and cite source material.

Engage (5 minutes)

- Project the map:
https://www.nass.usda.gov/Charts_and_Maps/graphics/WW-PR-RGBChor.pdf
- Ask students to look at the map and try to figure out what it is saying.
- Ask students to share their inferences. Clarify that the map shows where wheat is planted throughout the inland Pacific Northwest.

Initial Reading (25 minutes)

- Have students independently grapple with the text “The Ins and Outs of a Wheat Farm” and conduct a close-reading protocol:
 - All students will underline important details, circle unknown or interesting vocabulary, write the gist of each paragraph in the margin, and write down one question about the text.
 - Option: for the first read, students can read aloud with a partner or small group, switching off readers every paragraph.

Discussion (20 minutes)

- Have students get into small groups and discuss the following focusing question (5 minutes):
What are the major aspects of a wheat farm?
- After the small group discussion, have all the students circle up for a whole-class discussion of the focusing question (10 to 15 minutes).
- Have students bring their text on a clipboard and a pencil to the circle.

Focus (20 minutes)

- Introduce and unpack the vocabulary of the learning target.
- Unpack the learning target: *I can describe the major inputs and outputs of a wheat farm in the inland Pacific Northwest.* Write the learning target on the board or on chart paper. Discuss the meaning of key words. Discuss the purpose of the lesson in terms of what students will be able to do by the end of the lesson.
- In this mini-lesson, explain the major inputs and outputs of a wheat farm and clarify new vocabulary that students identified in the Initial Reading portion of the lesson.
- Pass out the graphic organizer “Inputs and Outputs of a Wheat Farm” and explain the directions for the Application portion of the lesson; rereading the text and using the graphic organizer to cite evidence from the text.



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Application (30 minutes)

- Ask students to go back to the text and work through the graphic organizer.
- Monitor student progress and engagement. Note: the major inputs are seeds, soil moisture, nitrogen fertilizer, drill, tractor, combine, and grain elevator. The major outputs are wheat (kernels, and bushels), wheat products (bread, pasta, etc.), income for farmers/families, and jobs.

Synthesis (10 minutes)

- Whole-class discussion and debrief: have students circle up and have each one share their thinking on the reflection question at the bottom of the graphic organizer.

Exit Ticket/Assessment (10 minutes)

- Ask students to write a response to the following prompt: *What are the major inputs and outputs of a wheat farm in the inland Pacific Northwest?*
- Ask them to cite at least three pieces of evidence from the text and use their graphic organizers to guide their writing.

Extension Activity Ideas

- This would be a great spot for a guest to visit the class to share pictures and stories about wheat farming.
- Field work visits to a local wheat farm would be another excellent addition to this lesson.

Resources Used in Lesson Development

https://www.nass.usda.gov/Charts_and_Maps/graphics/WW-PR-RGBChor.pdf

https://www.nass.usda.gov/Charts_and_Maps/graphics/SW-PR-RGBChor.pdf

<http://www.wheatworld.org/wheat-info/producing-wheat/>

<http://wagrain.org/all-about-wheat/varieties-of-wheat/types-of-wheat/>

<http://idahowheat.org/>

<http://www.wheatfoods.org/sites/default/files/attachments/agriculture.pdf>



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The Ins and Outs of a Wheat Farm

Wheat is an important ingredient in many foods. Wheat is grown around the world and the United States is one of the top wheat-producing countries. Wheat is grown in 42 of the 50 states on approximately 64 million acres of land. Many inputs go into growing this important food source. Inputs are all the things that farmers need to grow wheat, and outputs are all the things that farms produce.

Wheat farmers are busy year-round. There is always something to be done around the farm even when it isn't the growing season. Before the wheat seed is planted there is work to be done to prepare the fields. Farmers have to make sure the fields have the proper soil moisture content because if the soil is too wet the seeds will rot and if the soil is too dry the seeds will not germinate. This requires farmers to get their timing for planting seeds just right. Farmers also make sure that the soil contains enough of the nutrients plants require to grow such as nitrogen. In some instances, farmers may have to apply nitrogen fertilizer before they plant the seeds.

Farmers have a few different methods to use when it comes time to plant the seeds. The most commonly used method is drilling. Farmers use a drill machine attached to a tractor to place the seeds in the ground and cover them with soil.

Two main kinds of wheat are grown in the inland Pacific Northwest—winter wheat and spring wheat. If the farm is growing winter wheat, the seed is planted and germinates in the fall, the wheat is dormant through the winter, and then it continues to grow in the spring and is harvested in the summer. If the farm is growing spring wheat, the wheat seed is planted in the spring and it continues to grow for weeks until it is harvested in the summer.

After the seed is planted there is still work to be done on the farm. Farmers check the fields for weeds, pests, or any diseases that could possibly affect their wheat yield. Farmers also apply nitrogen fertilizer while the wheat is growing and make sure that all their equipment is in perfect condition for the next time they need to use it. Checking equipment is very important because if something breaks while in the field it can stop the entire wheat-producing process until it is fixed.

After the wheat has gone through its entire life cycle, it is ready to be harvested. The total amount of wheat that a farm produces is called the yield and is measured in bushels per acre of land. Wheat farmers harvest their crop with a combine. A combine is a very large machine that cuts the wheat from the field, separates the kernels from the head of the wheat plant, and stores them in a storage container on the machine. Once the storage container on the machine is full, it is unloaded into a truck that drives the wheat kernels to a grain elevator



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where they are stored. This process is repeated until all the wheat in the field is harvested. Combines are amazing pieces of farm equipment because they can harvest up to 1,000 bushels of wheat per hour. If 1 bushel of wheat weighs about 60 pounds how many pounds of wheat can be harvested each hour?

When the wheat arrives at a grain elevator it goes through a process of drying, cleaning, and blending before it is stored. Once stored, the wheat awaits transport to a port or a processor. At a port, the wheat will be loaded onto a cargo ship and exported around the world. At a processor, the wheat will be milled into flour and then turned into the many different products that we get from wheat such as bread and pasta.

You can see that farmers put a lot of hard work into producing wheat! They help produce food for the world to eat, make money to support themselves and their families, and help the economy by providing jobs to people who help them in every step of the process.



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Inputs and Outputs of a Wheat Farm

Name: _____ **Date:** _____

Learning Target: *I can describe the major inputs and outputs of a wheat farm in the inland Pacific Northwest.*

Directions: Reread the text “The Ins and Outs of a Wheat Farm” and select words or phrases that describe the major inputs and outputs of a wheat farm. Add each piece of evidence to this graphic organizer and cite it by paragraph number (§ #). Afterward, think about and answer the reflection question.

Major Inputs	Citation (§ #)	Major Outputs	Citation (§ #)

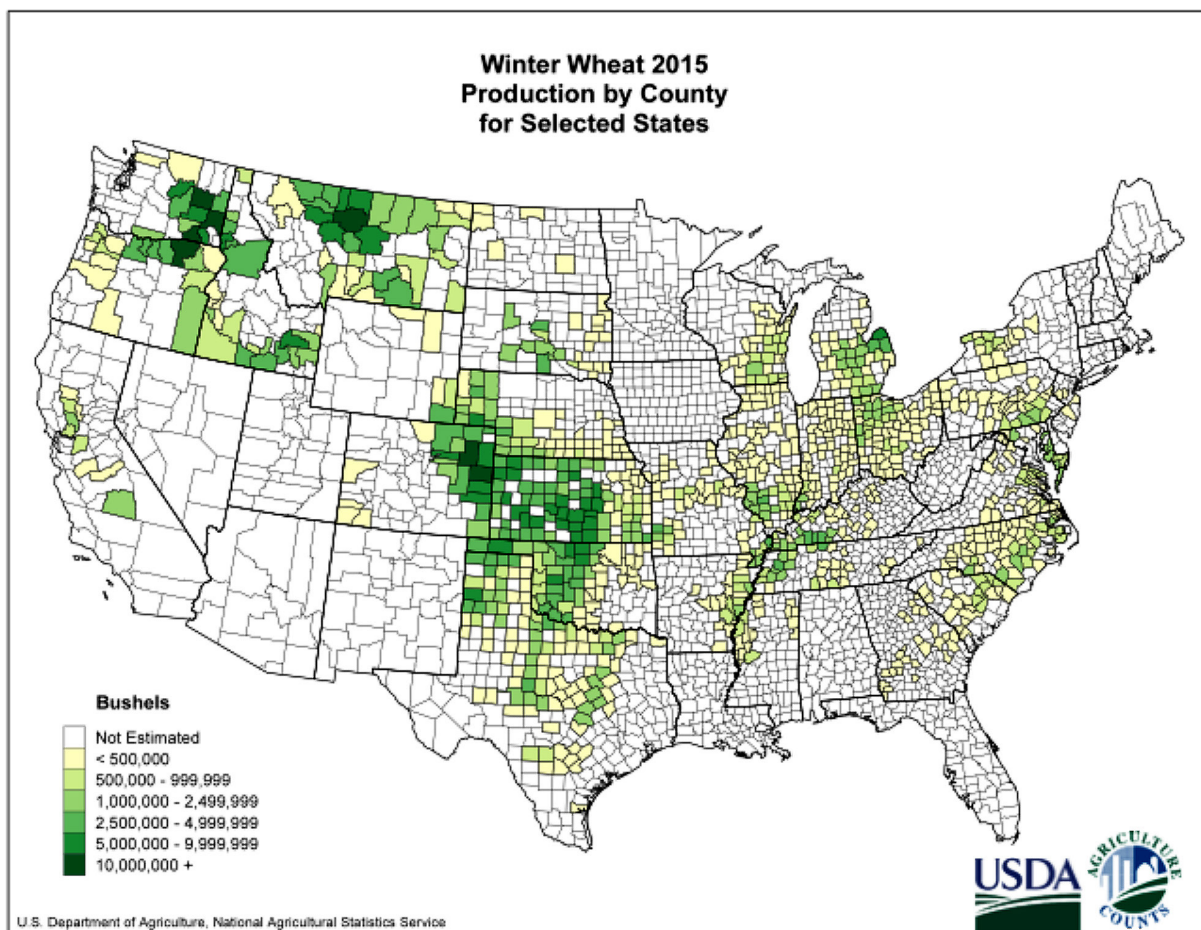
Reflection question: Based on the inputs and outputs of a wheat farm, what do you think would be the greatest challenges of farming wheat when weather patterns are unpredictable?



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Map for Engage portion of lesson



Color images available for download at reacchpna.org/education/elementary-curriculum