

Grade Level: Grades 6-8

Note: Can be scaled up or down as needed.

Lesson Duration:

50 minutes

Note: Adding additional activities will add to lesson duration.

Objectives:

- Students will identify and describe the key stages of wheat production.
- Students will define essential terms related to wheat farming, harvesting and milling.
- Students will understand the path of wheat from the field to consumer products.
- Students will connect agricultural concepts to real-world applications using the supply chain model.

Materials Needed:

- 'Wheat Production' slide presentation
- 'Wheat Production Guided Notes' worksheet
- 'Vocabulary Matching' worksheet
- 'Field to Table' worksheet
 - Use either the numbering or sorting option.
- 'Mad Libs' worksheet
- 'From Field to Table' fact sheet (optional visual aid or handout)
- 'The Journey Of U.S. Wheat' video (optional visual aid)
 - Full video: <https://vimeo.com/488995184?fl=pl&fe=vl>
 - Video segments: <https://vimeo.com/uswheatassociates>
- 'The Journey of Wheat - from Field to Table' video (optional visual aid)
 - <https://www.youtube.com/watch?v=3ihTep7zMNI>
- 'The Story of the Reliable System that Transports Wheat from the U.S. Plains to Customers Around the World' video (optional visual aid)
 - <https://www.youtube.com/watch?v=U9LWwABHjXk&t=65s>
- Printed worksheets for each student (or uploaded to preferred LMS)

Lesson Outline:

Introduction (2 minutes)

- Briefly review topics covered in previous lessons.
- Ask students "What everyday foods come from wheat, and what steps do you think it takes to get there?"
- Show 'The Journey of Wheat - from Field to Table' (optional).

Direct Instruction (25 minutes)

- Present 'Wheat Production' slides.

Wheat Production Lesson Plan

- Pause briefly after each stage to check for understanding using one question per section. (See questions on page 4.)
- Use slide visuals and optional 'From Field to Table' fact sheet (can be printed for individual student use or shared on screen for students to see).
- Show video segments from 'The Journey Of U.S. Wheat' before or after each stage (optional). Can also show complete 'The Journey Of U.S. Wheat' video before or after lesson or as an extension.
- Show 'The Story of the Reliable System that Transports Wheat from the U.S. Plains to Customers Around the World' video before or after transportation and exporting wheat stages (optional).

Guided Practice (10 minutes)

- Distribute the 'Vocabulary Matching' worksheet from the handout.
- Work through the first question together as a class.
- Students work in pairs to match terms to definitions.
- Review answers together to reinforce key terms.

Independent/Group Activity (10 minutes)

- Have students complete the 'Field to Table' worksheet.
- Circulate to assist students and clarify concepts as needed.

Review and Discuss (3 minutes)

- Go over the 'Field to Table' worksheet answers as a class, allowing students to self-check and discuss any missed items.
- Highlight key facts:
 - There are many steps to the wheat production process: research, planting, growth, harvesting, storage, transportation, export and milling.
 - Winter wheat has the following stages for growth: planting, germination/emergence, tillering, dormancy, regrowth, reproductive stages, maturation/harvest.

Extension (Optional):

- Have students complete 'Mad Libs' worksheet.

Assessment:

- Participation in class discussions.
- Completion and accuracy of labeling and vocabulary worksheets (check with provided answer key).

Differentiation:

- Provide vocabulary word banks and visual aids from the PowerPoint.
- Allow verbal explanations instead of written responses when needed.
- Pair less confident readers with peers during activities.
- Provide additional visual support.
- Challenge advanced students to research wheat quality grades and factors affecting grain quality, including benchmarks (test weight, moisture content, damaged kernels, foreign materials, dockage, protein content and falling number).

Additional Activities (Optional):

Wheat Production Cycle Art

Objective:

- Reinforce learning through creative expression.

Materials:

- Paper/poster board, paints/markers, craft supplies.

Activity:

- Each student or group illustrates one stage of the wheat production and explains the significance of that stage.

Wheat Pest & Disease Research Posters

Objective:

- Learn about common diseases and pests that can impact a wheat crop.

Materials:

- Computer (for research), poster board, markers/craft supplies (can also be done digitally using presentation software such as PowerPoint, Google Slides, Canva, etc.)

Activity:

- Students work individually or as small groups to identify common wheat pests (ex. Hessian fly, aphid, armyworm) and diseases (ex. leaf rust, stripe rust, stem rust, Wheat streak mosaic virus).
- Pests and diseases can be assigned by the teacher or selected by students (if possible make specific to your region).
- Students will create a research poster explaining the pest/disease and management/mitigation strategies. Ensure students use reputable sources for their research. University sources (ex. Texas A&M University, Kansas State University, Oklahoma State University, etc.), commodity boards (ex. Texas Wheat, Kansas Wheat, etc.), (USDA) and agribusiness sources (Bayer CropScience, Crop Protection Network, etc.) are recommended.

Agriculture Industry Career Presentations

Objective:

- Better understand the different roles and responsibilities in the wheat production cycle and the agricultural industry.

Materials:

- Computer (for research & presentation design software, ex. PowerPoint, Google Slides, Canva, etc.)

Activity:

- Assign each student (or group) a career: wheat breeder, farmer, chemical sales rep, seed sales rep, grain merchandiser, export elevator superintendent, grain inspector, miller, baker.
- Students will research the career role, including education & training required, role in the industry and career statistics and outlook. The Bureau of Labor Statistics ([bls.gov](https://www.bls.gov)) and Ag Explorer ([agexplorer.ffa.org](https://www.agexplorer.ffa.org)) are recommended sources, but students may need additional sources.
- Extension: Connect with individuals in these fields and invite them to do a presentation or interview with your students.

Other Ideas:

- A lower-prep option of the 'Field to Table' worksheet would be assigning steps to student volunteers and having the class organize them correctly at the front of the room.

Guided Discussion Questions:**Wheat Breeding & Research**

- Question: Why is it important for scientists to continually improve wheat and create new wheat varieties?
- Potential Answer: Continually improving varieties helps farmers grow crops that can better handle challenges like disease, pests, drought and changing weather while also meeting milling and baking quality needs for food production.

Variety Selection

- Question: Why would a farmer choose to plant multiple wheat varieties instead of just one?
- Potential Answer: Planting multiple varieties helps reduce risk because if one variety is affected by pests or disease, the others may still grow well. Experts recommend planting 2-3 varieties based on the size of the farm.

Planting

- Question: Why do farmers try to plant wheat in time with rain?
- Potential Answer: Soil moisture helps the seed germinate and begin growing after it is planted.

Growth & Development

- Question: What is one way a farmer can tell that a wheat plant is stressed while it is growing?
- Potential Answer: Farmers can look for signs like wilting, slow growth, discoloration or damage from pests or disease.

Input Application

- Question: What are the three different types of pesticides and what does each protect against?
- Potential Answer: Herbicides control weeds and other plant growth. Insecticides kill or repel insects. Fungicides stop fungal diseases.

Wheat Production Lesson Plan

Harvest

- Question: *What are two jobs a combine does when harvesting wheat?*
- Potential Answer: *A combine cuts the wheat and separates the grain from the rest of the plant (threshing) and also cleans the grain (winnowing).*

Storage

- Question: *What are the three main tests run on wheat when it is delivered to the elevator.*
- Potential Answer: *Test weight counts how many pounds per bushels of wheat. Protein measures the quality of the grain and its milling and baking potential. Moisture determines how much water is left in the kernel.*

Transportation

- Question: *What are three ways wheat can be transported after leaving the grain elevator?*
- Potential Answer: *Wheat can be transported by truck, train or barge.*

Exporting Wheat

- Question: *How much of the wheat grown in the U.S. is exported?*
- Potential Answer: *Half the wheat grown in the U.S. is exported*

Flour Milling

- Question: *What happens to wheat at a flour mill, and why is the miller's role important?*
- Potential Answer: *The wheat is ground into flour, and the miller makes sure the flour is safe and consistent for baking and food production.*