

Welcome to the Wheat North Dakota Ag Mag

This issue of the North Dakota Ag Mag focuses on wheat. The information and activities are geared primarily for the state's third, fourth and fifth graders.

North Dakota Ag Mag is distributed three times each school year. Subscriptions are free, but if you're not on the mailing list or know someone else who wants to be added, contact the North Dakota Department of Agriculture at 800-242-7535 or ndda@nd.gov.

Ag Mags and many other teacher and student resources are online at www.ndda.nd.gov/aitc.

This magazine is one of the ND Agriculture in the Classroom Council activities that helps K-12 teachers integrate information and activities about North Dakota agriculture across the curriculum in science, math, language arts, social studies and other classes. It's a supplemental resource rather than a separate program. See page 6 for other AITC programs.

Teachers Guide

Wheat

The Staff of Life

This Ag Mag focuses on wheat — North Dakota's #1 crop. On average, 7 million acres of wheat are harvested in the state each year.

The North Dakota Wheat Commission has many educational materials. See www.ndwheat.com and click on "consumers." These include activity booklets that can be downloaded or ordered from the Wheat Commission:

"The Story of Wheat" for grades 3-5 —

<https://ndwheat.com/uploads/6/story-of-wheat16.pdf>

"Sammy Spaghetti and Becky Bread" for Grades K-2

Kernel of wheat flyer.

The Agriculture Cycle

Idea: Ask students to define agriculture. Most will probably say things related to farming and ranching. Explain that agriculture is production but also processing, distribution and consumption of food, fiber, forestry and biofuel products.

Wheat Production

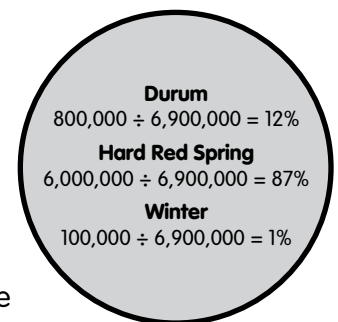
Classes of Wheat

Help your students draw a pie chart illustrating the percentage each class of wheat makes up of the state's total wheat production. Older students can figure the percentage of each class by dividing the number of acres harvested of that class of wheat by the total number of acres harvested. Younger students can be provided with the percentages.

Rounding can be discussed since all percentages are rounded up to the nearest whole number.

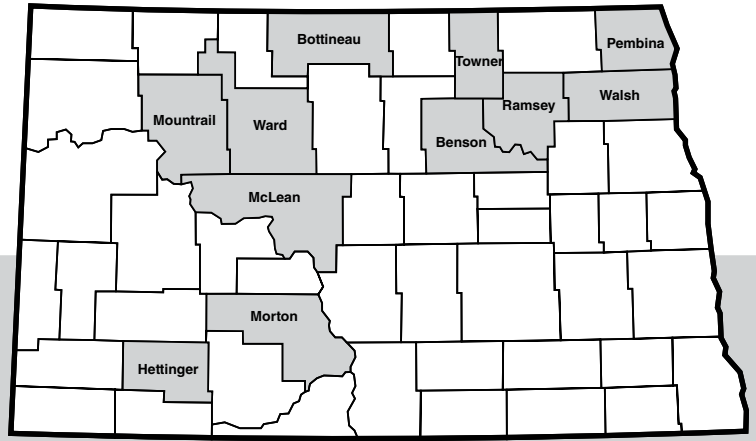
Idea: Ask a wheat grower to come to your class to talk about the kinds of wheat he or she grows and the many steps required to produce wheat.

Idea: Grow wheat plants. Soak kernels of wheat overnight in three times their volume of water until they are saturated. Drain off water that hasn't been absorbed. Lightly pack soil into Styrofoam cups or small milk cartons ahead of time, and have students press the soaked kernels into the soil. Space seeds evenly, covering lightly with about ½ inch of soil. Place in a sunny location.



Keep soil moist (not wet), and give extra water on Fridays. Seeds sprout in 6 to 8 days. Students might also chart daily growth, document how much water is used and identify the plant's parts. (Source: Amazing Wheat Teacher's Guide)

Idea: Find the daily cash price of wheat in the newspaper, and graph how the price changes.

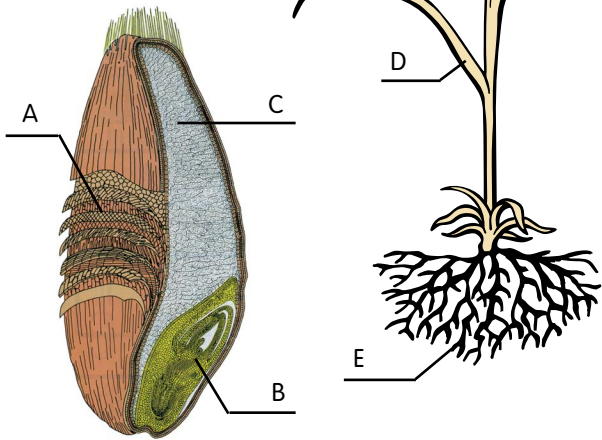


Where the Wheat Grows

Ask your local Farm Service Agency or NDSU Extension staff to provide wheat production data for your county. The students could chart annual production.

The Wheat Kernel and Wheat Plant

Idea: Check the quality of wheat seeds by conducting a germination test. Place 100 seeds on paper towels in a tray, and place towels on top, sandwich style. Keep towels moist by adding water every day. After one week, count the seeds that have sprouted. The number of sprouted seeds is the germination percentage.



Source: Amazing Wheat Teacher's Guide

Wheat Processing

Idea: Ask students to bring labels of wheat foods from home. Remember that the bran and germ are in food products too. Make a bulletin board. You might even categorize the labels by the class of wheat from which the product is made.

Idea: Place different shapes of pasta in different sizes and shapes of jars. Have students estimate how many pieces of pasta are in each jar. You might have students bring a few pieces of pasta they have at home to show the variety.

Idea: Have students brainstorm other wheat-related careers. Older students might select and research one career area.

Wheat Processing Story

 milling is the process of grinding the wheat into flour or semolina. To make white flour, the bran and germ must be carefully separated from the endosperm . Whole wheat flour includes the endosperm, bran and germ.

Gluten is the protein in wheat flour that helps yeast breads stretch when they rise. Gluten works like bubble gum. The gluten traps the air bubbles from the yeast and keeps them in the dough. The tiny holes in a slice of bread are formed by gluten bubbles .

When durum is milled, the product is called semolina rather than flour. Semolina resembles fine sand or sugar and is yellow or amber. Semolina and water are mixed together to make pasta dough. The dough is kneaded and then forced through dies (metal disks with holes) to create more than 300 pasta shapes. The wet pasta is carefully dried before packaging and shipping. When good-quality pasta is cooked in water, it retains its yellow color, its shape and its firmness.

Wheat Distribution

The Journey of Wheat

- 3 Elevator sells wheat to mill or to a foreign country
- 1 Farmer produces wheat
- 5 Bakery or pasta manufacturer packages products to sell at grocery store
- 2 Farmer delivers wheat to elevator
- 6 You buy wheat foods at the grocery store
- 4 Mill bags flour to sell at grocery store or sells flour or semolina to bakery or pasta manufacturer

Around the World

- | | |
|------------------------|----------------------|
| <u>H</u> Matzo | A. Mexico |
| <u>E</u> Pita | B. Ireland |
| <u>C</u> Hamburger Bun | C. America |
| <u>A</u> Tortilla | D. Norway |
| <u>F</u> Scone | E. Greece |
| <u>G</u> Wonton | F. Scotland, England |
| <u>M</u> Fry Bread | G. China |
| <u>J</u> Croissant | H. Jewish |
| <u>L</u> Naan Bread | I. Italy |
| <u>B</u> Soda Bread | J. France |
| <u>D</u> Lefse | K. Morocco |
| <u>K</u> Couscous | L. India |
| <u>I</u> Spaghetti | M. Native American |

Adapted from: AgVenture: Exploring Ohio Agriculture, Ohio Agricultural Council and Ohio State University Extension

Idea: Use a world map to find the locations mentioned in Around the World.

Idea: Conduct research to learn more about each kind of wheat food in Around the World or others.

Idea: Complete the Breads Around the World lesson from the Project Food, Land and People resource book. Project Food, Land and People is a program supported by the N.D. Agriculture in the Classroom Council.

Wheat Consumption

Bread in a Bag

Bread in a Bag is a simple way to make 2 large loaves or 4 small loaves of bread with students. Ask a few adult volunteers for help with measuring and mixing and the school cafeteria staff for help with baking. Before beginning, have students wash their hands and cover a few desks with paper for quick cleanup of the work area. Fill large pitchers with warm water and warm milk (105-115F) for students to measure out the amount needed.

Combine in 1-gallon heavy-duty resealable freezer bag:

- 1 cup bread flour
- 2 packages yeast
- 1 cup warm water
- 2 tablespoons sugar

Squeeze upper part of bag to force out air. Close top of bag tightly and mix well by working bag with fingers until ingredients are completely blended. Allow mixture to rest 15 minutes.

Add:

- 1 1/4 cups warm milk
- 1 tablespoon salt
- 2 tablespoons shortening, softened

Mix well by working bag with fingers.

Gradually add:

- 5-6 cups flour, half bread flour and half whole wheat flour

Add enough flour to make a stiff dough or until dough pulls away from bag. Turn dough onto floured surface. Divide dough in half. Knead each half 5 minutes or until dough is smooth and elastic. Add more flour if dough is too sticky.

Cover with plastic bag and let rise for 10 minutes.

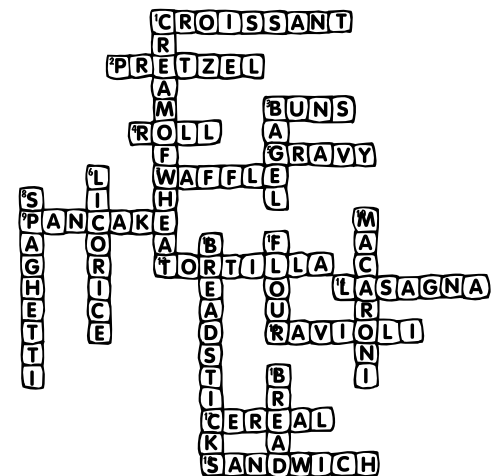
Flatten dough into a 12x7-inch rectangle. Starting from a narrow end, roll dough toward you. Pinch edges to seal. Tuck ends under. Press each end to seal.

Place seam side down in greased 9x5x3-inch pan. Repeat for other loaf. Cover loosely with plastic bag and let rise in warm place until doubled (about 45-60 minutes). Uncover. Bake in 400 degree F oven 35-45 minutes. Remove from pans. Cool on wire racks.

If preferred, this amount of dough can be flattened into four 7 1/2 x 5-inch rectangles and placed in four 5 3/4 x 3 1/4 x 2-inch mini loaf pans. Baking time will be slightly shorter.

Source: North Dakota Farm Bureau

Wheat Foods Crossword Puzzle



MyPlate

Idea: Have students brainstorm foods that fit in the Grains group. Which foods are made from wheat?

Idea: Have students keep a food diary, listing all the foods they eat for one day, a few days or a week. In which segment of MyPlate does each food fit?

Idea: Have students go to **MyPlate.gov** to learn more.

More Ideas

Idea: Especially if any students in your class have celiac disease or are gluten intolerant, discuss that gluten is a protein in wheat and some other grains that is responsible for the elastic texture of dough. Some people's bodies react to that protein.

Idea: Read "The Little Red Hen" with students and maybe complete a related activity. Discuss the moral of the story and how students can practice that lesson.

Idea: Use the Krokotak Wheat Kids Craft at <https://krokotak.com/2019/08/wheat-kids-craft> for an art project that makes a wheat head.

Additional Resources:

Books

Wheat (A True Book) by Elaine Landau,
ISBN: 0-516-26792-2

From Wheat to Bread by Kristin Thoennes Keller,
ISBN-13: 978-0736826389

The Little Red Hen by Diane Muldrow,
ISBN-13: 978-0307960306

Lesson Plans

Go to www.agclassroom.org and search for "wheat" and grade level.

Tying It All Together

Idea: Have students write descriptive paragraphs about:

- the aroma of bread baking at a bakery or in someone's home
- the sound, smell and feel of wheat harvest on a hot summer day
- why one kind of cereal is their favorite
- the steps wheat goes through from production to consumption

Idea: Check out the following Web sites.

North Dakota Wheat Commission
www.ndwheat.com

Wheat Foods Council
www.wheatfoods.org

Whole Grains Council
www.wholegrainscouncil.org

North Dakota Agricultural Statistics
www.nass.usda.gov/nd/

National Pasta Association
www.ilovepasta.org

Home Baking Association
www.homebaking.org

North Dakota Standards for this Ag Mag

English Language Arts

3.F.10, 4.F.10, 5.F.10 Determine the meaning of multi-meaning words and phrases, choosing from a range of strategies with varying texts. Ex: gluten, beard, roots

3.F.11 Use new academic, content-specific, grade-level vocabulary to make connections to previously learned words and relate new words to background knowledge. Ex. durum, milling.

3.R.6 Use text features (diagrams, bold words) and previously learned text features to read and understand a text or passage.

Math

4.NO.NBT.1 Read numbers to the millions place, including word, standard, and expanded form. Write numbers to the millions place, including standard and expanded form.

4. MD.2 Represent and interpret data using the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature measurement scales.

3.DPS.D.3 Analyze data and make simple statements to solve one-and two-step problems using information from the graphs.

5.DPS.D.2 Utilize graphs and diagrams to represent, analyze, and solve authentic word problems using information presented in one or more tables or line plots including whole numbers, fractions, and decimals.

Science

Standard 4: Students use the basic concepts and principles of life science. 3.4.2 Life cycles: Describe the life cycles of plants and animals. Ex: wheat

Standard 7: Students understand relations between science and personal, social, and environmental issues. 4.7.2 Science and Social issues: explain ways humans benefit from Earth's resources. Ex: air, water, soil, food.

Social Studies

Standard 1: Students use social studies skills and resources, Benchmark 4.1.4 Interpret current events using print and electronic media (newspaper, children's news, magazines, TV, internet).

Standard 3: Economic concepts, Benchmarks 4.3.2 Identify ways that natural resources (Ex: soil, people, trees, plants) contribute to the economy of the local community and of North Dakota.

Standard 5: Students understand and apply concepts of geography, Benchmark 4.5.5 Identify different patterns of land use in North Dakota (land use in urban and rural areas, agriculture, manufacturing).

North Dakota Agriculture in the Classroom Activities

This **Ag Mag** is just one of the North Dakota Agriculture in the Classroom Council projects. Each issue of the Ag Mag focuses on an agricultural commodity or topic and includes fun activities, bold graphics, interesting information and challenging problems. Send feedback and suggestions for future Ag Mag issues to:

Becky Koch
NDSU Agriculture Communication
701-866-6162
becky.koch@ndsu.edu

Another council teacher resource is **Project Food, Land & People (FLP)**. Using the national FLP curriculum, ND Ag in the Classroom provides 600-level credit workshops for teachers to instruct them in integrating hands-on lessons that promote the development of critical thinking skills so students can better understand the interrelationships among the environment, agriculture and people of the world. Teachers are encouraged to adapt their lessons to include North Dakota products and resources.

Project Food, Land & People's 55 lessons include:

- Amazing Grazing
- Cows or Condos?
- By the Way
- Seed Surprises
- Schoolground Caretakers
- Could It Be Something They Ate?
- What Piece of the Pie?
- and many more.

For information, contact:

Jill Vigesaa
N.D. Farm Bureau Foundation
701-799-5488
jill.vigesaa@gmail.com

The ND Geographic Alliance conducts a two-day **Agricultural Tour for Teachers**. The tour includes farm and field visits, tours of agricultural processing plants to see what happens to products following the farm production cycle, and discussions with people involved in the global marketing of North Dakota farm products.

For information, contact:

Jeffrey Beck
North Dakota Geographic Alliance
701-240-9231
jeff.beck@minot.k12.nd.us

Educators may apply for **mini-grants for up to \$500** for use in programs that promote agricultural literacy. The Agriculture in the Classroom Council, working with the ND FFA Foundation, offers these funds for agriculture-related projects, units and lessons used for school-age children. The mini-grants fund hands-on activities that develop and enrich understanding of agriculture as the source of food and/or fiber in our society. Individuals or groups such as teachers, 4-H leaders, commodity groups and others interested in teaching young people about the importance of North Dakota agriculture are welcome to apply.

Examples of programs that may be funded: farm safety programs, agricultural festivals, an elementary classroom visiting a nearby farm and ag career awareness day. Grant funds can be used for printing, curriculum, guest speakers, materials, food, supplies, etc. More ideas and an application are at www.ndffaoundation.com/applications.

For information, contact:

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