

NORTH DAKOTA Ag Mag

A Magazine about Agriculture for North Dakota Students

Fall 2018



North Dakota's OILSEEDS

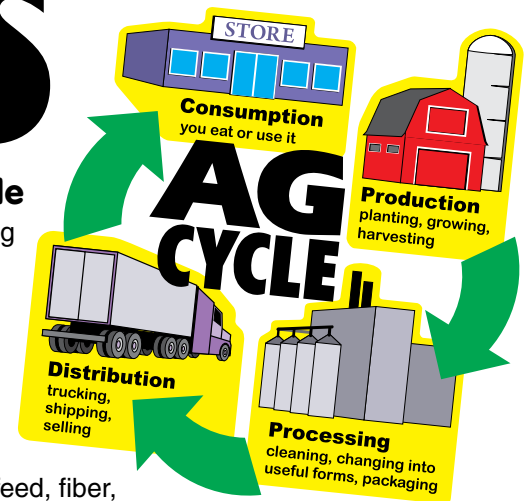
This issue of the Ag Mag focuses on North Dakota's oilseed crops. The Ag Mag's information and activities are geared primarily toward the state's third, fourth and fifth graders. The Ag Mag is distributed three times per year. Subscriptions are free, but if you're not on the mailing list or if you know someone who wants to be added, contact the N.D. Department of Agriculture at 1-800-242-7535 or ndda@nd.gov.

The magazine also is on the web at www.ag.ndsu.edu/agmag or through the North Dakota Agriculture in the Classroom website at www.nd.gov/ndda/ag-classroom/ag-mag.

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

The Agriculture Cycle

Idea: Introduce this Ag Mag issue with the concept of the agriculture cycle. Talk about how agriculture is farming and ranching, the production part of agriculture, but also the processing, distribution and consumption of food, feed, fiber, forestry and fuel products. Talk about some agricultural products grown in your region, and follow them through their cycles.



North Dakota's Oilseeds

Idea: Introduce oilseeds by asking students about different kinds of edible and inedible oils. You might take a field trip to a grocery store to see what kinds of oils are on the shelves or ask students to bring samples of or labels from edible oils from home or use the grocery advertising supplements to identify different kinds of edible oils.

We're #1

North Dakota usually ranks #1 or #2 among states in production of 14 agricultural commodities: spring wheat, durum wheat, flaxseed, pinto beans, dry edible beans, dry edible peas, oil sunflowers, non-oil sunflowers, canola, lentils, honey, navy beans, black beans and Great Northern beans. Oil sunflowers, canola and flaxseed are oilseeds.

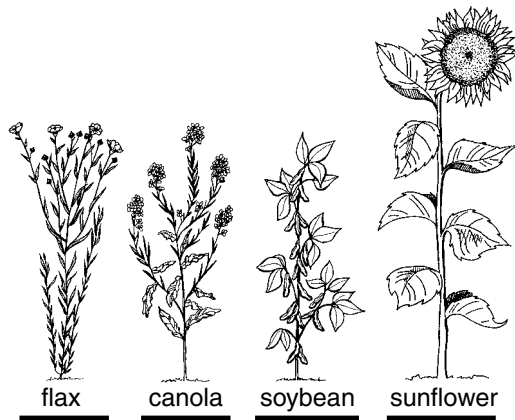
Idea: Ask students to look up the definition of "commodity" and give examples of commodities.

Teacher's Guide

N.D. Agriculture in the Classroom Mission: *To increase agricultural literacy through K-12 education*

Oilseed Production

Answers to Name That Oilseed Plant



Idea: Make Beanie Babies to demonstrate seed germination.

Materials: small plastic jewelry bags, one for each student; yarn cut into 24-inch lengths; soybeans (one for each student) or canola seeds (2 or 3 per student); cotton balls, one for each student; medicine droppers; hole punch

1. Get untreated seeds from a local grain dealer.
2. Have students place a cotton ball and the soybean or canola seeds inside their bags and moisten the cotton ball with a few drops of water using a medicine dropper. Have students punch a hole in their bags with a hole punch, string the yarn through and knot the ends.
3. Talk about the conditions necessary for seeds to germinate (moisture, warmth, darkness). Ask students where they might place the bags to provide the best conditions for germination. Have students hang the bags around their necks and tuck them inside their clothes. Instruct students that they are responsible for providing their beanie babies with the best possible care until the seeds have sprouted.
4. Have students record the progress of their seeds. Each day discuss the changes taking place in their seeds. At the end of three days, chart as a class how many seeds have sprouted.
5. Have students predict what their beanie babies will look like two weeks later. Have some students plant their sprouted seeds in potting medium and others hang their bags in a window, taking care to keep them watered and keeping the tops of the bags open. Record observations and chart them as a class.

Adapted from the Ohio Soybean Council

Idea: Have students look up what a tap root is and find examples of other plants with tap roots.

Idea: Use kernels from oilseeds and other grains to create mosaics.

Idea: Compare oil and non-oil sunflower seeds.

Idea: Learn how to grow all kinds of plants at www.kidsgardening.org. You can subscribe to their email newsletter, order gardening materials, download activities and more.

Answers to Acres and Acres of Oilseeds

Which oilseed had the most acres planted in 2017?

Soybeans

Which oilseed had the fewest acres planted in 2017?

Flaxseed

How many acres of flaxseed were “lost” from the time the crops were planted until they were harvested?

245,000 acres planted – 229,000 acres harvested = 16,000 acres lost

Challenge: Which oilseed had the fewest acres of crop lost from planting to harvest.

Canola: 1,590,000 – 1,560,000 = 30,000 acres

Flaxseed: 245,000 – 229,000 = 16,000 acres

Soybeans: 7,100,000 – 7,050,000 = 50,000 acres

Oil Sunflowers: 438,000 – 426,000 = 12,000 acres

Why do you think that none of the crops harvested as many acres as were planted? Possible answers include seeds didn't germinate well, lack of rain or too much rain, hail or storms damaged the crops, disease or insects destroyed the crops, wet fields prevented harvest.

Idea: Production units vary with the crop: tons, bushels, pounds, hundredweights. Discuss with your students what these different measurements are and why they might be used.

Soybean Producers!

Even though Iowa, Illinois, Minnesota and Indiana are the nation's top soybean-producing states, five North Dakota counties were in the top 10 of soybean acres harvested in the U.S. in 2017 (the latest year for which statistics by county are available). Ask students why they think this might be.

Idea: Look at a U.S. map with counties, and compare the size of North Dakota's counties with those of other Midwestern states. North Dakota's counties are larger so can grow more acres of soybeans.

Idea: Have students find Cass, Stutsman, Barnes, Richland and LaMoure counties on a North Dakota map. Why are soybeans grown in that part of the state instead of elsewhere?

Idea: Grow soybeans in milk cartons under different growing conditions: light and dark; fertilized and unfertilized; watered too much, not enough and just the right amount; etc. Chart plant growth and compare plants grown under different conditions. Also, study the

root systems to identify nodules that capture nitrogen for the plant.

Idea: Print or project the North Dakota's Rank in U.S. Agriculture and Ten Leading States and North Dakota's Rank page from www.nass.usda.gov/Statistics_by_State/North_Dakota/Publications/Miscellaneous/Top_Commodities/2018/ND_rank18.pdf.

What state ranks after North Dakota in canola production? **Oklahoma**

What state ranks behind North Dakota in flaxseed production? **Montana**

Where does North Dakota rank among the states in safflower production? **Sixth**

Where does North Dakota rank among the states in soybean production? **Ninth**

Which state ranks above North Dakota in oil sunflower production? **South Dakota**

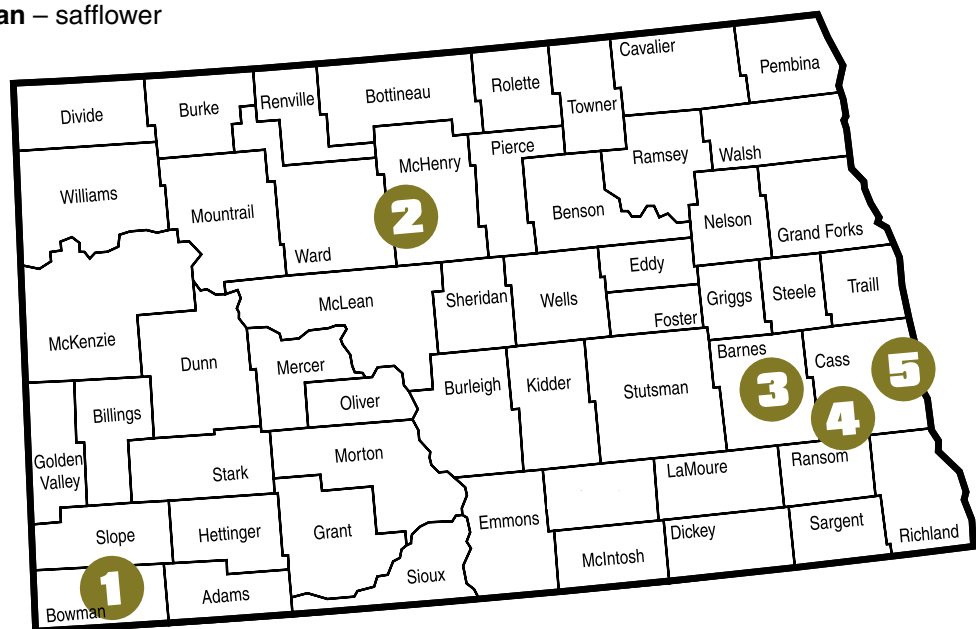
Oilseed Processing

Answers to Where Does That Oil Come From?

Help students use a North Dakota map to find the cities that have oil processing plants.

- 3** Heartland Flax, Valley City – flaxseed
- 5** Cargill, West Fargo – oil sunflowers, flaxseed, canola
- 2** ADM, Velva – canola
- 4** ADM Northern Sun, Enderlin – oil sunflowers, crambe, canola, soybeans
- 1** 17Thistles, Bowman – safflower

Idea: 25 acres of soybeans can produce 1,366 gallons of soybean oil, 10,973 pounds of shortening, 13,148 pounds of margarine or 13,073 pounds of mayonnaise. Have students research what the difference is between these four products: how they're made and what they're used for.



Oilseeds Then and Now

1. East
2. Stems
3. Lubricants
4. Human
5. Linens
6. Abdominal
7. Hay
8. Car

Answer to Who Am I? George Washington Carver

Idea: Have students research George Washington Carver or Henry Ford and some of the products each developed.

Idea: Download pages of the USDA George Washington Carver Coloring and Activity Book from www.dm.usda.gov/oo/colorbook.htm.

Idea: Have students research more about an oilseed: history, production, current uses, etc.

Idea: Have students complete the North Dakota Oilseeds web worksheet at the end of this teacher guide. Student answers will vary in this critical thinking exercise, but examples include soybeans: biodiesel and soy sauce, flax: linseed oil and muffins, sunflowers: cooking oil and Sunbutter, canola: lubricant and cooking oil.

Idea: Have students complete the Word Triangles worksheet at the end of this teacher guide.

Commodity: a raw material or primary agricultural product that can be bought and sold, such as corn, alfalfa or beef cattle

Oilseed: a crop that produces edible oils (that people and animals can eat) and/or inedible oils (used for lubrication)

Biodiesel: a fuel that can be used in diesel engines that is made from vegetable oils, animal fats and recycled grease

Career Corner

Idea: Ask a farmer or oil processor to come speak to the class about his or her operation.

Oilseed Distribution

Answers to Where in the World?

Idea: Have each student research one of the countries from “Where in the World?” Develop booklets or give presentations to have students learn from each other.

Idea: Use the lesson “Step by Step” from Project Food, Land & People to have students study the sequence of production steps to discover the resources required and the variety of careers involved in taking a raw food from the field to the consumer.



Think About It

Idea: Ask students to bring food labels from home. Read the ingredients lists to see what kinds of oils are in different products.

Oilseed Consumption

Idea: Especially if a student in your class has peanut allergies, talk about why that might be and why SunButter is a substitute. Possibly make SunButter Overnight Oats in a Jar at SunButter Overnight Oats -- <https://sunbutter.com/recipes/overnight-oats> or SunButter Berry Power Balls -- <https://sunbutter.com/recipes/sunbutter-berry-power-balls>. And if a student is gluten intolerant, make Gluten-free SunButter and Banana Muffins at <https://sunbutter.com/recipes/gluten-free-sunbutter-banana-muffins-recipe/>.

Idea: Make salad dressing to reinforce the idea that oil and water don't mix and to create a food product using both oil and water. This activity is used with permission from the Soybean Science Kit: Polymers and Oil, copyright 1997, Indiana Soybean Board and Purdue Research Foundation.

Materials

For each student:

- clear or translucent film container
- vegetables for dipping

For each group of 4 to 6 students:

- 2 tablespoons (28 g) sugar
- 1 tablespoon (15 ml) vinegar
- 3 tablespoons (45 ml) soybean oil
- 2 tablespoons (30 ml) water
- 1.5 teaspoons (7.5 ml) ketchup

Vocabulary:

mixture — matter that can be separated into its parts by physical means

solution — a mixture that looks the same throughout

soluble — able to form a solution

Activities:

Divide the class into small groups of 4-6 members per group. Discuss the terms *mixture* and *solution*.

Tell the students that they will each be making a small amount of salad dressing that they will use as a dip for vegetables after finishing the experiment. The recipe has many ingredients, including soybean oil and water. Ask the students what they predict will happen when the ingredients are combined or mixed together. Will this mixture be a solution?

Allow the students to begin making the salad dressing according to the recipe given. Each student should add all the ingredients directly to his/her container. After adding each ingredient, the students should observe the mixture, shake 10 times and discuss whether they have made a solution.

The students first add sugar, then vinegar. After shaking, the sugar dissolves in the vinegar, creating a solution. The students then add oil to the container and shake. Is this a solution? (No.) The students should see a line of separation because vinegar and oil are immiscible (will not mix). Oil droplets also can be seen as a sign of insolubility. The students then will add water. They should now be able to see that there are three ingredients that have not mixed. After shaking, the vinegar will mix with the water because vinegar is water-based. The students will then add the ketchup and shake. What happened to the ketchup? It too is water-soluble, so it mixed with the other water-soluble ingredients. If the containers are left to sit a minute or so, the oil will again separate and the students will see the water-soluble ingredients on the bottom of their containers and the soybean oil on the top. The students are now ready to shake up their salad dressing, dip their vegetables and enjoy eating this recipe of immiscible liquids.

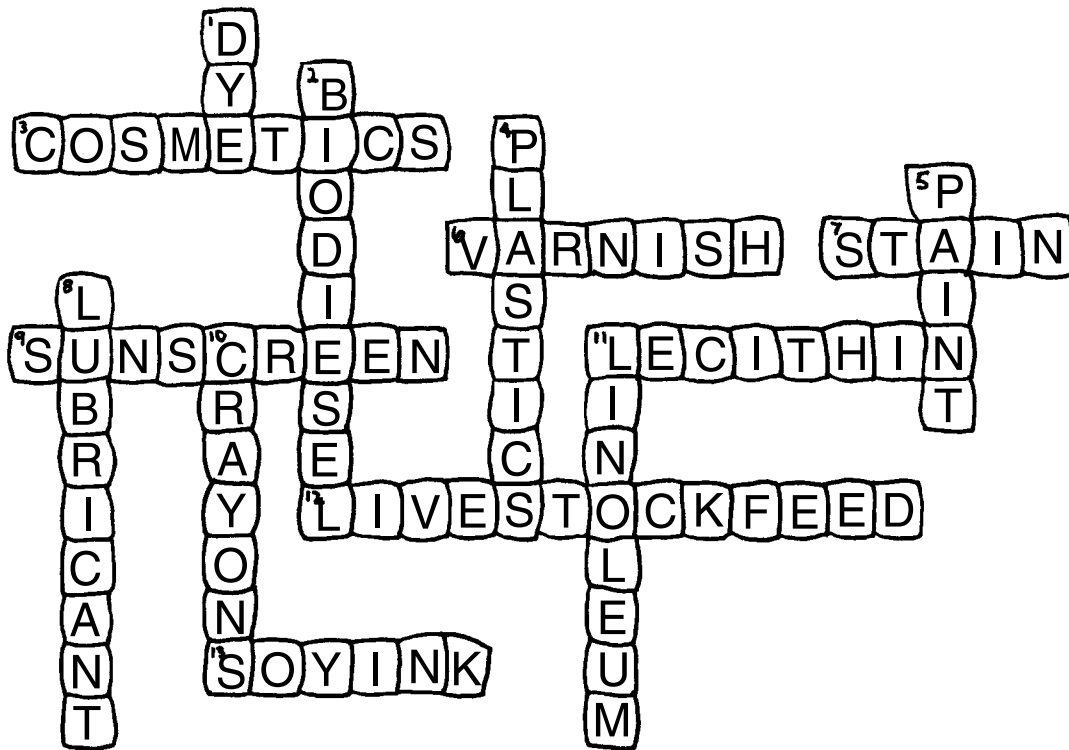
Soy Ink

Soybean oil-based inks are replacing many petroleum inks. Soy inks come from a renewable resource, produce rich colors, and are cleaned off the printing presses safely and inexpensively.

Idea: Ask students to bring samples of other publications printed with soy ink.

Idea: Use the Project Food, Land and People "Don't Use It All Up!" lesson that teaches about renewable and non-renewable resources.

Answers to Oilseeds are More than Oil



Idea: During harvest, ask a producer to donate a few sunflower heads. During the winter, place them outside your classroom window for a natural bird feeder.

Idea: Make a pine cone bird feeder.

Materials Needed:

- Sunflower, canola, flax or other seeds
- Pine cone
- 2-foot piece of string
- 1/4 cup peanut butter
- 1 tablespoon shortening or lard
- Pie pan

1. Tie string tightly to top of pine cone.
2. Mix peanut butter and shortening or lard until it's all one color.
3. Spread peanut butter mixture on pine cone.
4. Put sunflower seeds in pie pan. Roll sticky pine cone in seeds.
5. Hang the feeder from a tree where the cats can't get to it but where the birds can enjoy this sunflower seed treat.

From National Sunflower Association

Tying It All Together

Idea: Go to the Pride of Dakota website at www.prideofdakota.nd.gov/ and do a scavenger hunt to find at least five oilseed products.

Resources

Organizations

National Sunflower Association

2401 46th Avenue SE, Suite 206
Mandan, ND 58554-4829
701-328-5100 or 888-718-7033
www.sunflowernsa.com

- “The Story of the Sunflower,” an educational coloring book for K-4, can be downloaded from www.sunflowernsa.com/all-about/coloringbook

AmeriFlax

125 Slate Drive Ste. #4
Bismarck, ND 58503
701-663-9799
scoleman@ndpci.com
www.ameriflax.com

North Dakota Soybean Council

4852 Rocking Horse Circle S.
Fargo, ND 58104
701-566-9300
swolf@ndsoybean.org
www.ndsoybean.org

Northern Canola Growers Assn.

125 Slate Drive Ste. #4
Bismarck, ND 58503
701-223-4124 or 877-585-1671
www.northerncanola.com

- See Canola Kids’ at www.northerncanola.com/kids

Lesson Plans

National Ag in the Classroom’s National Agricultural Literacy

Curriculum Matrix — www.agclassroom.org/teacher/matrix/index.cfm and search for soybeans to find Topsy-Turvy Soybeans, From Soybeans to Car Parts and other lessons. Search for other oilseeds, too.

Grains and Legumes of the World Journal and Kit — This hands-on activity explores grains and legumes common in global agricultural production – barley, dent corn, popcorn, oats, rice, wheat, soybeans, lentils, and pinto beans. The kit contains enough seeds for 35 students. \$10 <http://utah.agclassroom.org/matrix/resources.cfm?rid=447>

Websites

Choose My Plate — www.ChooseMyPlate.gov – USDA’s food guidance system website provides information about oils. Students can enter the foods they eat and get a nutrition profile. Ideas for physical activity are included, too.

USDA for Kids — www.usda.gov/our-agency/initiatives/usda-kids – Links to multiple agency websites.

Science4Kids — www.ars.usda.gov/oc/kids/index/ – Sci4Kids is an interactive series of stories about USDA agricultural research.

World Initiative for Soy in Human Health (WISHH) — www.wishh.org/ – This program brings the benefits of U.S. soy protein to developing countries and may be a service project for students.

YouTube Clips

10 Fun Facts about Agriculture — from KFYR AgriInternational – talks about canola, sunflowers – Go to www.youtube.com and search for KFYR AgriInternational 10 Fun Facts about Agriculture

How It’s Made: Canola Oil — Go to www.YouTube.com, search for How It’s Made Canola Oil and choose the official Discovery Channel version

Books

[Backyard Sunflower](#) by Elizabeth King

[The Sunflower](#) by Christel Rosenfeld and Marliese Dieckmann

[Auntie Yang’s Great Soybean Picnic](#) by Ginnie Lo

[Soybeans A to Z](#) by Susan Anderson & JoAnne Buggey

[Soybeans in the Story of Agriculture](#) by Susan Anderson & JoAnne Buggey

[Why the brown bean was blue: The story of a soybean frown turned upside down](#) by Susan M. Pankey

[A Field of Sunflowers](#) by Neil Johnson

[A Seed in Need](#) by Sam Godwin

[The Life Cycle of a Sunflower](#) by Linda Tagliaferro

[The Great Sunflower Book](#) by Barbara Jeanne Flores

[Coolbean: The Soybean](#) by Shawn Conley

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. See past issues at www.ag.ndsu.edu/agmag.

Send feedback and suggestions for future Ag Mag issues to:

Becky Koch
NDSU Agriculture Communication
701-231-7875
becky.koch@ndsu.edu

Another AITC teacher resource is **Project Food, Land & People** (FLP). Using the national FLP curriculum, N.D. Ag in the Classroom provides credit workshops in person and online 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 (FLP) is a curriculum with many lessons developed for K-12 educators to integrate easily into the classroom. The instructional units address core content and North Dakota state standards and benchmarks with inquiry-based learning activities.

Participants receive the entire curriculum plus North Dakota specific materials and information about available resources.

See details at www.ndfb.org/edusafe/flp.

For information, contact:

Jill Vigesaa
FLP Coordinator
701-799-5488
jill.vigesaa@gmail.com

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 N.D. 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 application information are at www.nd.gov/ndda/ag-classroom.

Applications are due Sept. 21 each year.

For information, contact:

Tam Maddock
N.D. FFA Foundation
tmaddock@ndffa.org
www.teamabovo.com/ndffa

The N.D. 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:

Jeff Beck
North Dakota Geographic Alliance
701-858-3063
jeff.beck@minot.k12.nd.us

The North Dakota Ag Mag is a project of the North Dakota Agriculture in the Classroom Council, which is organized through the North Dakota Department of Agriculture.

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North Dakota Agriculture in the Classroom Council

Kim Alberty – Agassiz Seed and Supply, West Fargo
Aaron Anderson – N.D. Dept. of Career and Technical Education
Nancy Jo Bateman – N.D. Beef Commission
Sheri Coleman – Northern Canola Growers Association
Kirk Olson – McKenzie County Farm Bureau
Nicole Wardner – NDSU Extension Sheridan County
Statutory Member: Superintendent of Public Instruction Kristen Baesler (Bob Marthaller, representative)

Oilseeds Ag Mag Common Core Standards

English Language Arts and Literacy Content Standards for Reading Informational/ Nonfiction Text

Gr. 3, RI.1 Ask and answer questions to demonstrate understanding of a text (textual evidence), referring explicitly to the text as the basis for the answers.

Gr.3, RI.2 Determine the main idea of a text and recount the key details to explain how they support the main idea.

Gr.3, RI.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

Gr.4, RI.1 Refer to details and examples in a text (textual evidence) when explaining what the text says explicitly and when drawing inferences from the text. Summarize the text.

Gr.4, RI.2 Determine the main idea of a text and explain how it is supported by key details.

Gr.4, RI.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

Gr.5, RI.1 Quote accurately using textual evidence when explaining what the text says explicitly and when drawing inferences from the text. Summarize the text.

Gr.5, RI.2 Determine two or more main ideas of a text and explain how they are supported by key details.

Gr.5, RI.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

North Dakota Mathematics Content Standards

Number and Operation in Base Ten

3.NBT.2 Using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction, fluently add and subtract within 1000.

Science Standards and Benchmarks

Standard 4: Students understand the basic concepts and principals of life science

3.4.1. Structure and Function: Identify parts of an organism that have specific functions (e.g., roots absorb water, heart pumps blood).

3.4.2. Life Cycles: Describe the life cycles of plants and animals (e.g., birds, mammals, grasses, trees, insects, flowers).

3.4.3. Organisms and Their Environments: Identify the needs of living things (e.g., food, shelter, soil, space, water).

4.4.4. Organisms and Their Environments: Identify ways that an organism's pattern of behavior is related to the nature of the organism's environment (e.g., the availability of food, space, and resources).

Standard 7: Students understand relations between science and personal, social, and environmental issues.

4.7.2. Science and Social Issues: Identify ways in which science and technology have greatly improved human lives (e.g., food quality and quantity, transportation, health, sanitation, communication)

5.7.2. Science and Social Issues: Explain ways humans benefit from Earth's resources (e.g., air, water, soil, food, fuel, building materials).

Standard 8: History and Nature of Science

4.8.1. People in Science: Identify a variety of careers in the field of science.

ND Social Studies Standards and Benchmarks

Standard 1: Skills and Resources: Resources

3.1.3 Use a variety of resources (e.g., maps, charts, bar graphs, Internet, books) to gather information about people, places, and events

3.1.4 Describe current events using print and electronic media (e.g., newspaper, children's news magazines, television, Internet).

4.1.4 Interpret current events using print and electronic media (e.g., newspaper, children's news magazines, television, Internet).

5.1.3 Evaluate current events using print and electronic media (e.g., newspaper, children's news magazines, television, Internet.)

Standard 3: Economic Concepts: State Economics

4.3.2 Identify ways that natural resources (e.g. soil, people, trees) contribute to the economy of the local community and of North Dakota.

4.3.4 Identify principal exports of North Dakota (e.g., crops, energy, livestock).

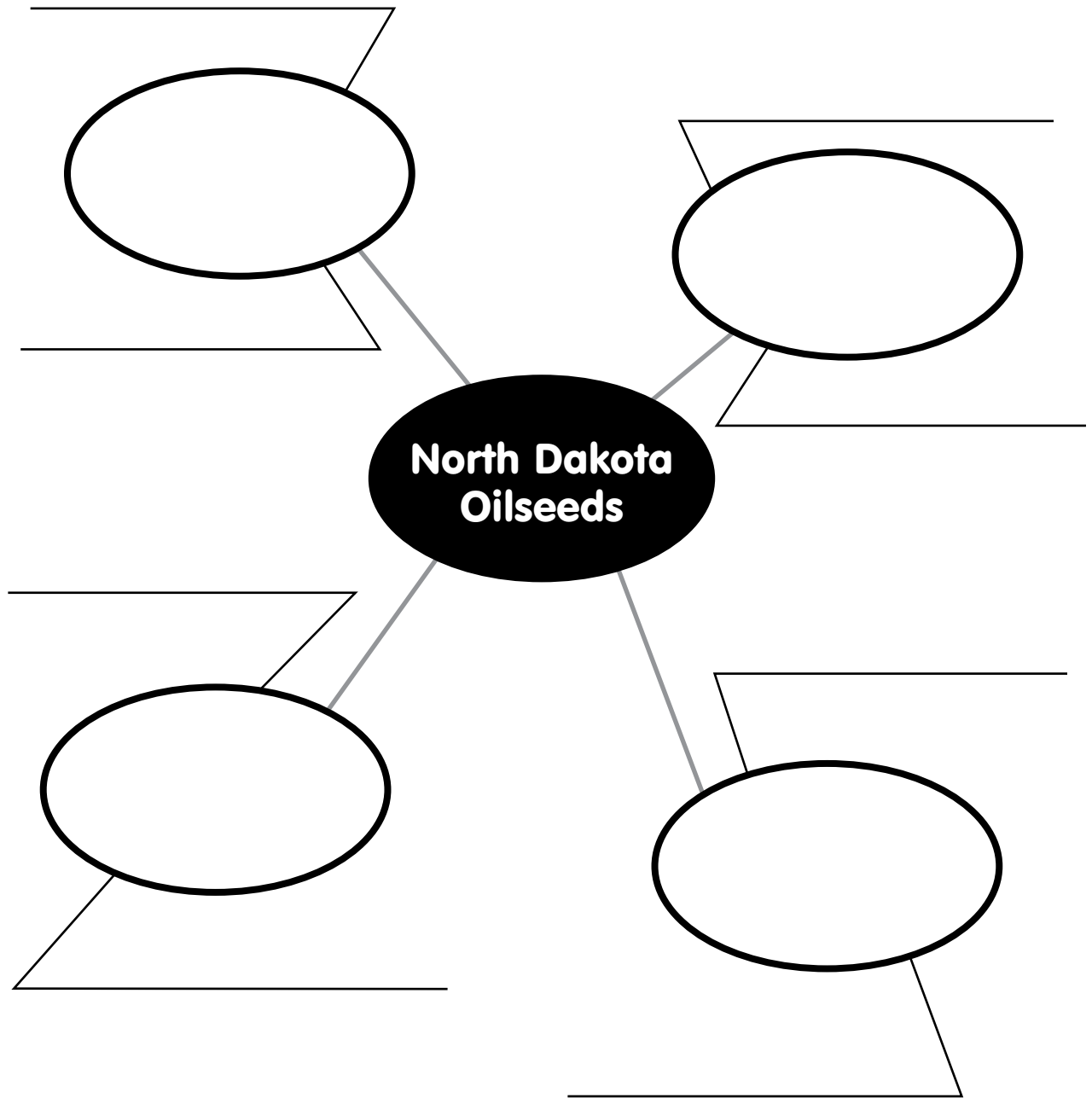
Standard 5: Students understand and apply concepts of geography: Human Geography

4.5.6 Describe ways geography has affected the development (e.g., the development of transportation, communication, industry, and land use) of the state over time.

Name: _____

Oilseed Web

Directions: Read page 4 Oilseeds Then and Now. Label each bubble with one type of oilseed produced in North Dakota. Then on the outer legs of the web, add 2 products made from that oilseed.



Name: _____

Word Triangles

Directions:

1. Write the definition to the term in the bottom section of each triangle.
2. In the middle section, write a sentence in which the term is used correctly.
3. In the top section, draw a small picture to illustrate the term.

Commodity:

Oilseed:

Biodiesel: