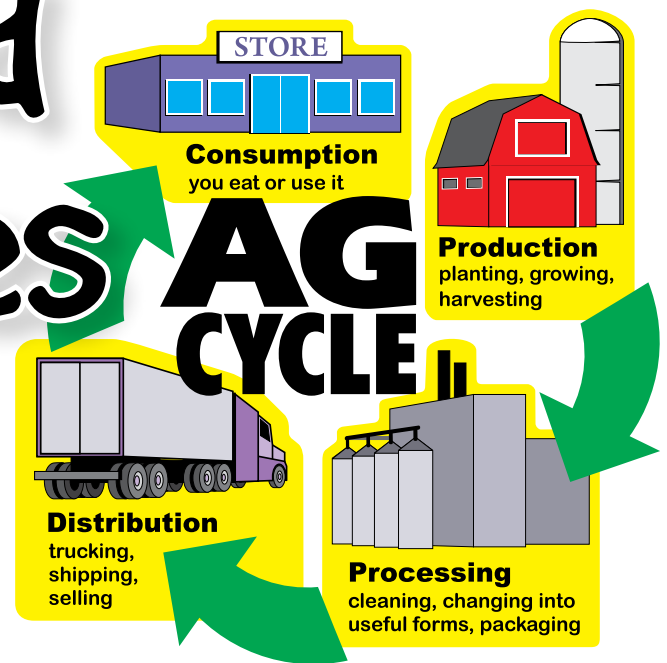


Fruits and Vegetables



This issue of the Ag Mag focuses on fruits and vegetables through the Agriculture Cycle: production, processing, distribution and consumption.

The Ag Mag's information and activities are geared 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 North Dakota Department of Agriculture at 800-242-7535 or ndda@nd.gov.

The magazine also is online at www.nd.gov/ndda/ag-classroom. 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.

Introduction

Idea: Have students explore the NDSU Extension Specialty Food Crops Field to Fork Google Classroom activities at <https://sites.google.com/ndsu.edu/fieldtofork-specialtyfoodcrops/home>. This site features lessons on fruits and vegetables, specialty crops and production, processing and distribution, and consumption and MyPlate, plus additional resources.

Idea: Have students brainstorm and list all the fruits and vegetables they can name.

Farmers and gardeners grow many types of fruits and vegetables in North Dakota. Some are grown in large farm fields, and many are grown on a small or large scale and sold as specialty crops. Some foods that are considered vegetables in nutrition (chickpeas, dry beans) have separate Ag Mags about them. This Ag Mag is about the wide range of vegetables and fruits.

Production

Answers to Potatoes!

1. Potatoes are a big industry in North Dakota. In 2021, 76,000 (akers or **acres**) were planted to potatoes.
2. This is about the size of 57,500 football (**fields** or feilds).
3. All these acres produced about 2.4 (billyon or **billion**) pounds of potatoes.
4. That would be the (wait or **weight**) of 7.6 million 315-pound football linemen.
5. The (farmer's or **farmers'**) value of the potato crop was \$248,000,000.
6. Each potato has a different (perpose or **purpose**). White potatoes are made into potato chips. Red and yellow potatoes are washed, bagged and sent to the store to be purchased. Russet potatoes are made into french fries.
7. On (avrage or **average**), each person in the U.S. eats 111 pounds of potatoes each year. That's about 1/3 pound of potatoes each day, or eating one medium-sized potato. That makes potatoes America's favorite vegetable.

Idea: Show students the four kinds of potatoes: red, yellow, white and russet. Have them write descriptive paragraphs describing the differences.

Idea: Have students brainstorm the many ways to prepare potatoes and foods made from potatoes.

Answer to Circle the vegetables and fruits that can be grown in North Dakota.

All of these vegetables and fruits and many others can be grown in North Dakota.

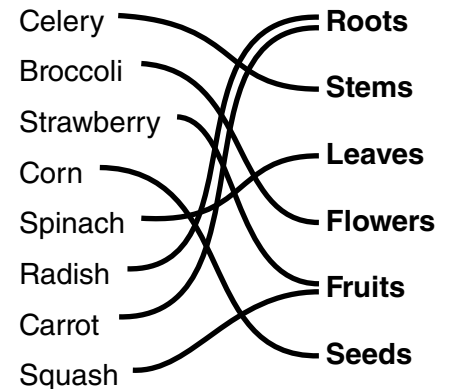
Idea: Discuss which of these fruits and vegetables the students have seen and tried. If your school has a garden or greenhouse, discuss the fruits or vegetables that are grown. Discuss why some fruits, such as pineapple, do not grow in North Dakota.

Idea: Math – Have the students rank the 12 vegetables and fruits with one being their favorite and 12 being their least favorite. List the vegetables and fruits on separate sheets of paper, and have the students write their rankings on the sheets. Divide the class into teams, and have each team figure the average scored for each fruit and vegetable. Which is the class' favorite? Take it a step further and have them graph the results.



Answers to Think Like a Plant Scientist

Explain to students that some of the food groups/classes on the right will be used more than once.



Idea: Science – Have the students think of other examples of:

Roots – *turnip, beet, parsnip*

Stems – *rhubarb, asparagus*

Leaves – *kale, cabbage, Brussels sprouts*

Flowers – *artichoke, cauliflower*

Fruits – *melons, peppers, pumpkin, cucumber, winter squash*

Seeds – *pumpkin seeds, green peas*

Idea: Art – Have students create a drawing or a collage of photos they find in magazines organized by the parts of a plant (stems, flowers, etc.).

Idea: Science – Plants Have Veins, Too

Start this experiment first thing in the morning. Many things are going on inside a plant. This experiment shows how a stem works to bring water and nutrients up from the plant's roots, through the stem and out to the tips of its leaves or petals. Ask for students to help you in all steps.

Supplies needed:

- Celery stalks with as many leaves on the tops as possible
- A white flower, such as a carnation, with stem
- 2 tablespoons of food coloring (red or blue works best)
- A clear vase
- A paring knife (for teacher to use)

Fill the vase with water and add the food coloring.

Teacher: Cut ½ inch from the bottom of the celery stalk with a knife and do the same to the flower stem. Make sure you leave the flower blossom and the celery leaves intact.

Place the cut end of each stem into the colored water.

Ask students to hypothesize what will happen.

After 6 hours, observe the outside of the plants (the celery's leaves and the petals of the flower). Does the colored water appear in the leaves and petals?

Teacher: Remove the flower and the celery from the vase, use the knife to cut the stem and look at the cross section. Observe the vein-like tubes filled with colored liquid (especially noticeable with celery).

Adapted from "Dig In" Lesson 1. U.S. Department of Agriculture.

Idea: Science – Seedling Race

(40 minutes for experiment, 5 days of observation)

Supplies needed:

- Lettuce seeds
- Paper towels
- Sealable 1-quart plastic bags
- Bowl and tray

Explain that the class will be conducting a "seedling race" to investigate how plants respond to different conditions. The seeds will have six growing conditions. Invite a different student to help with the setup of each condition. After each step, ask the students to raise their hands if they think the seed will grow.

Each 680-milligram lettuce seed packet contains about 800 seeds. For each condition, you will need a "pinch" of seeds (10 to 15 seeds). The paper towels give the seeds a surface to hold onto. For those conditions that use water, place the bags in a bowl or cup to keep them stable. Place the experiments on a tray near a window with natural light.

Condition 1: Place a pinch of seeds on a paper towel in a plastic bag. Do not seal.

Condition 2: Place a paper towel in a plastic bag, add seeds and fill the bag ¾ full of water. Do not seal.

Condition 3: Place a paper towel in a plastic bag, add seeds and about ¼ cup soil but no water. Do not seal.

Condition 4: Place a paper towel in a plastic bag, add seeds, about ¼ cup soil and 2 Tbsp. water. Do not seal.

Condition 5: Place a paper towel dipped in water in a plastic bag, add seeds, press the bag from the bottom to the top to release all extra air, and then seal the bag so all extra air and space are limited.

Condition 6: Place a paper towel dipped in water in a plastic bag, add seeds, and then cover the bag with a larger opaque plastic bag that will not allow light to come through.

Science – Keep track of the students' predictions on a chart on the classroom wall.

Language arts – Have the students keep a journal of their predictions.

Discussion: Which seeds grow? Which do not? What do plants need for growth?

Adapted from "Dig In" Lesson 4. U.S. Department of Agriculture

Processing

Answers to Match Them Up

Production – D. Growing and harvesting fruits and vegetables

Processing – B. Washing, cutting, mixing and packaging fruits and vegetables

Distribution – E. Transporting, storing, advertising and selling fruits and vegetables

Consumption – A. Preparing and eating fruits and vegetables

Composting/recycling – C. Allowing the fruits and vegetables to break down to be returned to the soil

Idea: Science – Discuss composting. Have students discuss how to cut back on food waste in their homes and at school meals. Have them research which foods can be composted (vegetable peelings, etc.) and which should not (meat) and why. See www.ag.ndsu.edu/publications/food-nutrition/how-to-compost for more information about composting.

Answers to Just Preserve It

Obviously the students can have many different answers. Discuss the options.

Idea: Health – Bring in examples of fresh, canned and dried fruits, such as a fresh apple, canned applesauce and dried apples. What are the differences in color, flavor, texture and cost? Arrange them in order from which lasts the longest to the shortest time at home (canned applesauce, dried apples, fresh apples).

If you have access to a food dehydrator, make dried apple or banana slices following the manufacturer's guidelines. Be sure to pretreat them with an antibrowning agent as directed.

Visit www.ag.ndsu.edu/food and click on "food preservation" to learn more.

Distribution

Answers to Take Your Taste Buds on a Trip Around the World

Countries such as China and India are the leading producers of many fruits and vegetables. In this activity, we focus on countries in North America and South America that lead the world in production or that are the leading suppliers to the U.S. Discuss why these fruits and vegetables grow better in other countries than in North Dakota.

Idea: Social studies – Have students select an exotic fruit or vegetable and research the countries/continents where they might be grown. Why do these fruits or vegetables grow in the region?

Idea: Nutrition at lunch – Have students name the fruits and vegetables on your school menu (or the salad bar) that can and can't be grown in North Dakota.

Idea: Health – Do a taste test of unusual fruits or vegetables available in local grocery stores in canned, fresh, frozen or dried forms.



Career Corner

Many careers related to fruits and vegetables are possible.

They include being a farmer, food inspector, farmers market vendor, food processor, grocer, greenhouse worker, compost manager or advertiser.

Idea: Learn more about Larry's Hydro Lettuce at <https://hydrolettuce.com/>.

Idea: Complete the lesson Luscious Leaves to examine the functions of plant leaves and identify leaves as edible parts of some plants — www.agclassroom.org/matrix/lesson/47/.

Idea: Complete the Lettuce Be Different activity that allows students to grow their own lettuce and examine the differences between varieties. <https://faitc.org/lessons/lettuce-be-different/>.

Idea: Have your students brainstorm other food-related jobs.

Idea: Language arts – Have the students interview a relative or friend who works in some way with food or agriculture. Ask them how they chose their career and write a short report and/or tell the class what they learned.

Consumption

MyPlate

MyPlate reminds us we should eat foods from each food group. Half of our plate should be fruits and vegetables (slightly more than one-fourth for vegetables).

Vegetables are important sources of many nutrients, including potassium, dietary fiber, folate (folic acid), vitamin A and vitamin C. Vitamin A keeps eyes and skin healthy and helps protect us against infections. Vitamin C helps heal cuts and wounds and keeps teeth and gums healthy. Vitamin C aids in iron absorption.

Idea: Vegetables are organized into five subgroups based on the nutrients they contain. Have the students list examples of each and indicate which we can grow in North Dakota:

Dark-green (broccoli, kale, spinach)

Starchy (corn, green peas, white potatoes)

Red and orange (carrots, pumpkin, red peppers, tomatoes, sweet potatoes, winter squash)

Beans and peas (black, garbanzo [chickpeas], kidney, pinto, soy)

Other (cabbage, cauliflower, celery, cucumbers, green beans, green peppers, iceberg lettuce, mushrooms, onions, zucchini)

Idea: Health/Art – Distribute a blank copy of MyPlate (available from www.choosemyplate.gov). Have the students draw and color a healthful meal with all the food groups.

More Ideas

Idea: Health – Show the video www.ag.ndsu.edu/food/videos/black-bean-salsa that demonstrates how to make this salsa recipe. Explain how to read the Nutrition Facts label.

Set up a “make your own salsa” bar with containers of chopped vegetables, small plastic cups and tasting spoons.

Have students research their nutritional needs and determine their MyPlate recommendations by visiting www.choosemyplate.gov.

In what food group(s) would you find black beans? (protein and vegetables, but you only count them in one group for your overall diet)

Idea: Science – Discuss why washing your hands with warm, soapy water for at least 20 seconds before you prepare food is important. Explain why using clean knives and cutting boards is important. (Germs or microorganisms might be on their hands, knives and cutting boards. These germs can spread to food and other people. This is called cross contamination.)

Answers to Math Challenge

1. $\frac{1}{2} \times 2 = 1$ green pepper
2. 15 ounces $\times 4 = 60$ ounces
3. $\frac{1}{2}$ cup $\div 2 = \frac{1}{4}$ cup cilantro
4. 80 calories $\times 3 = 240$ calories (a calorie is a unit of energy)
5. $19\% \times 0.5 = 9.5\%$
6. 0 grams per serving $\times 5$ servings = 0 grams (g) (Saturated fat is the type of fat we need to limit in our diet. One ounce = 28 grams.)

Idea: Service Learning – The Hunger Free North Dakota Project seeks produce donations from home gardeners, farmers markets and other growers each fall for distribution through food pantries and other venues to the hungry. Visit www.nd.gov and search for “hunger free garden.”

Idea: Work with staff to start a school composting program. Learn how at www.ag.ndsu.edu/publications/food-nutrition/how-to-compost.

Resources for this Fruits and Vegetables Ag Mag

Larry's Hydro Lettuce — <https://hydrolettuce.com/>

National Center for Home Food Preservation — <https://nchfp.uga.edu/>

North Dakota State University Extension — www.ndsu.edu/agriculture/

USDA Food and Nutrition Service Dig In! Lessons — www.fns.usda.gov/tn/dig-lessons

USDA MyPlate — www.myplate.gov/

USDA National Agricultural Statistics Service — www.nass.usda.gov/

General Ag Education Resources

North Dakota Farm Flavor — <https://farmflavor.com/north-dakota-agriculture/>

National Agriculture in the Classroom teacher and student resources — www.agclassroom.org/

North Dakota Agriculture in the Classroom teacher and student resources — www.nd.gov/ndda/ag-classroom

North Dakota Standards Related to this Ag Mag

ND Social Studies Content Standards 2007, Gr. 2, Standard 3: Economic Concepts, Benchmark 2.3.1 Differentiate between goods and services, consumers and producers.

ND Health Content Standards 2008, Gr. 3, Standard 1: Human Growth and Development, Benchmark 3.1.4 Describe the effects of healthy and unhealthy foods on the body.

ND Health Content Standards 2008, Gr. 3, Standard 2: Personal Health, Benchmark 3.2.1 Describe how personal health behaviors, e.g., proper nutrition, affect individual well-being.

Common Core English Language Arts Standards for Reading Informational Text

Gr. 4, Standard 1: Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

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

Gr. 5, Standard 1: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

Gr. 5, Standard 2: Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

E.3-5.1 Utilize fundamental and principles & concepts of economic activity (needs & wants, goods & services, opportunity cost).

E.3-5.2 Describe how goods and services are produced and distributed.

E.3-5.5 Describe and analyze how North Dakota's location and natural resources influence its economic decisions and development.

G. 3-5.3 Use maps and other representations to explain relationships between locations of places, regions, and environmental characteristics.

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, N.D. 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 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:

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 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 an application are at www.ndaginclassroom.org.

For information, contact:

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