

CROPS

Crop Categories

Crops can be divided into oilseeds, legumes and cereal grains. The major purpose of oilseeds is to produce vegetable oil. Legume crops grow in pods and produce foods that humans and animals eat and are high in protein. Cereal crops are mainly grasses that have an edible fruit, which is a grain.

Many different crops are grown in North Dakota. Soybeans, wheat and corn are the major ones. But this Ag Mag focuses on the other crops grown in our state since those three have their own Ag Mag issues.

North Dakota usually ranks #1 or #2 among the states in production of all these crops:

- | | |
|---------------------|----------------------|
| Dry edible beans | Great northern beans |
| Pinto beans | Small red beans |
| Canola | Lentils |
| Flaxseed | Rye |
| All dry edible peas | All sunflowers |
| Durum wheat | Non-oil sunflowers |
| Spring wheat | Oil sunflowers |
| Pink beans | All wheat |

North Dakota farmers also grow lots of sugarbeets, potatoes, barley, chickpeas, oats and other crops.

Grapes, berries, apples and other specialty crops also are grown in North Dakota, but this Ag Mag focuses on typical farm crops.

Sort each #1 or #2 crop on the left side of this page into its category. For example, Canola fits under Oilseeds

Oilseeds

Legumes

Cereal Grains

Other

WHEAT FIELD

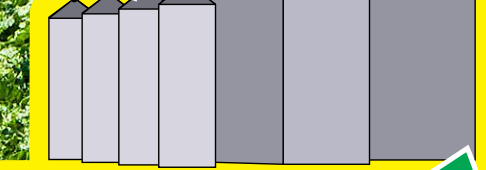
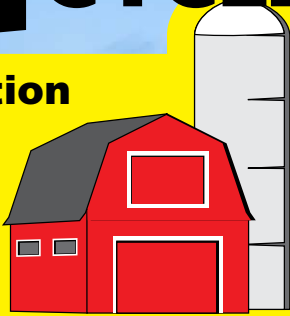
Agriculture!

It's farming and ranching and much, much more. It's the production, processing, distribution and consumption of food, fiber, feed, forestry and fuel products.

AG CYCLE

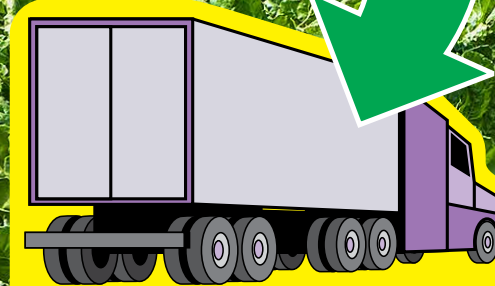
Production

planting,
growing,
harvesting



Processing

testing, changing into
useful forms, packaging



Distribution

trucking, shipping, selling



Consumption

you eat or use it

Production

The various crops grow differently.

Sunflowers come in two types: non-oil (striped) seeds and oil (black) seeds. Each head has about 1,000 sunflower seeds surrounded by big, bright yellow flower petals. Near harvest time, the heavy heads droop toward the ground. Sunflowers grow very tall, up to 10 feet high. The roots may grow 6 feet into the ground.

Canola grows 3 to 6 feet tall and blooms with a cluster of bright yellow flowers at the top of each stem in early summer. The flowers produce seed pods about 3 inches long. Each pod turns brown as it ripens and contains 20 or more tiny round black or brownish-yellow seeds.

Flax also comes in two types: seed flax for the oil in its seed and fiber flax for the fiber in its stem. Today most Midwestern producers grow seed flax. Its stems each have a single purplish-blue flower at the top when it blooms. The plant may grow up to 3 feet high. The tap root may extend 3 feet into the ground. The tiny seeds are in a boll or capsule containing 6, 8 or 10 brown or yellow seeds.

Lentil plants grow 8 to 24 inches tall and have 9 to 15 leaflets on each branch. Before flowering, new leaves develop a tendril (small vinelike structure) at the leaf tip. Lentils have flowers on top and small, round pods that contain one or two seeds. Lentils are a legume, which means they have bumps (called nodules) on their roots. The nodules contain bacteria that can "catch" nitrogen gas from the air in the soil and transform the gas into a form the plant can use for its nutrition.

Dry Edible Peas come in green and yellow. Later leaves have tendrils and a large stipule, which is a leaflike structure wrapped around the stem. Pea pods are similar to regular garden variety peas. Dry edible peas are pulses, which are legumes that are harvested for their dry grains inside a pod.

Potatoes are grown from seed potatoes, which are cut into pieces and planted. These pieces of potato grow stems and roots from the eyes. The part of the plant we call a potato grows underground. It grows on a specialized underground stem called a stolon. So, although potatoes grow underground, they are stems, not roots, and are called tubers.

Sugarbeets also grow underground, though their large green leaves are above ground for photosynthesis. Sugarbeet seeds are planted in the spring. By fall, the sugarbeets are about a foot long and weigh 2 to 5 pounds. They grow similarly to red-rooted garden beets but are about 20% sugar.

Name That Plant

From the descriptions of the plants on page 2, identify the different North Dakota crops.



Which Pulse is Which?

Beans are usually kidney-shaped or oval, while peas are round. Lentils are shaped like a lens, and chickpeas look like the beak of a baby chick. From the descriptions, identify the bean, pea, lentil and chickpea.



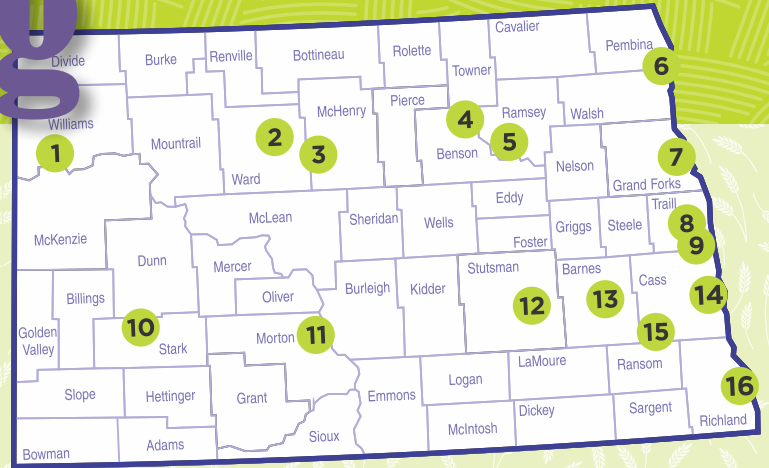
From the Field to the Fork

Determine the order in which each bean production event happens. Label them 1-9.

- _____ The farmer plants the bean seed using special equipment called a drill or row planter.
- _____ Trucks take the beans to a processing plant where the beans are tested to determine the quality and the price the farmer receives.
- _____ When the plant has grown to its full height, small flowers begin to develop on the plant.
- _____ The farmer harvests the beans and augers them into trucks.
- _____ The beans are bagged and transferred into rail cars or trucks and sent to canners and packagers all around the world.
- _____ The bean plant, including the pods, turns from a green color to yellow, indicating that harvest time is near.
- _____ The flowers turn into pods, and bean seeds begin to grow in the pods.
- _____ The beans are sorted by color, size and quality at the processing plant.
- _____ With soil, sunlight and rain, the bean plant grows for 12-14 weeks.

Processing

Many crops are processed in North Dakota. Write the number of the town from the map in front of the processing plant that is located there.



_____ Heartland Flax, Valley City — flaxseed

_____ Cargill, West Fargo — oil sunflowers, flaxseed, canola

_____ ADM, Velva — canola

_____ ADM Northern Sun, Enderlin — oil sunflowers, crambe, canola, soybeans

_____ Dakota Dry Bean, Grand Forks — dry edible peas, barley

_____ American Crystal Sugar, Drayton and Hillsboro — sugarbeets

_____ Minn-Dak Farmers Cooperative, Wahpeton — sugarbeets

_____ AGT Foods USA, Minot and Williston — lentils, chickpeas, dry edible peas

_____ Minn-Dak Growers Ltd., Dickinson and Grand Forks — buckwheat, mustard, safflower

_____ Cavendish Farms, Jamestown — potatoes

_____ JR Simplot, Grand Forks — potatoes

_____ CoJack Snack & Pack, Devils Lake — popcorn

_____ Engstrom Bean, Leeds — dry beans

_____ Copper Kettle Corn, Mandan — popcorn

_____ CHS, Grandin — sunflowers

Processing Problems

1. A potato processing plant loses about 15% of the weight of the potatoes to waste, such as low-quality potatoes and peelings. For every 1,000 pounds of potatoes that go into the factory, about how many pounds of waste will be produced?

2. The potato processor will give Mike, who raises beef cattle 13 miles from the factory, the potato waste for cattle feed if he comes to get it. If it costs Mike \$2.25 per mile to drive his large truck, how much will each trip cost?

3. One sugarbeet produces about three teaspoons of sugar. How many sugarbeets would it take to make one cup of sugar?

4. One brand of dry dog food is 28% barley. How much barley would that be in a 50-pound bag?

5. Each canola seed contains about 45% oil. One bushel of canola weighs 50 pounds. How much oil can be produced from one bushel of canola?

6. Pulses can be purchased dry in a bag or already cooked and preserved in a can. Kenyon's recipe calls for 2 cups of lentils. The bag says the dry lentils will double in volume after soaking. How many cups of dry lentils should Kenyon start with for this recipe?

7. A can of light red kidney beans is 16 ounces, and Omar's chili recipe calls for 40 ounces. How many cans does he need?

8. A one-pound bag of sunflower seeds in the shells contains about 400 seeds. How many in-shell sunflower seeds would be in a two-pound bag?

9. Sadie fills a bag with sunflower kernels (without the shells), and it weighs 1½ pounds. The kernels cost \$2.50 per pound. How much will her bag cost?

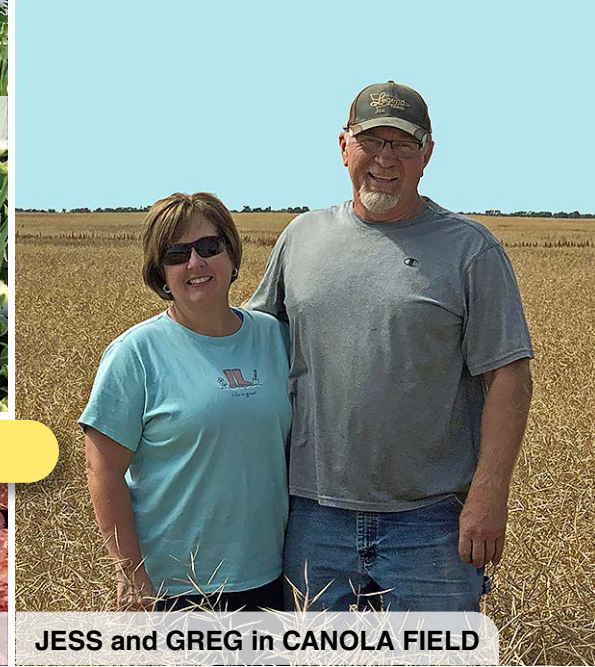
10. Suneet's oatmeal box says to add twice as much water or milk to the oatmeal before microwaving it. If he measures ¾ cup of oatmeal, how much water or milk should he add?



FLAX and CHICKPEAS

Career Corner

Greg and Jess Busch, Columbus, ND



JESS and GREG in CANOLA FIELD



PEAS and CANOLA

Use these words to fill in the blanks:

moisture, diseases, processors, balanced, companion, sieves, organisms, erosion

Greg and Jess Busch have grown more than 20 different crops on their northwest North Dakota farm. These include hard red spring wheat, durum, barley, oats, rye, winter wheat, triticale, field peas, flax, canola, mustard, fava beans, lentils, chickpeas, corn, millet, oil sunflowers, safflower and pinto beans. However, they usually grow 8 to 10 of those each year.

“We grow a wide variety of crops to help keep our soils healthy,” Greg said. “When you grow the same crop too many times without a break, certain 1 _____ can cause problems. By waiting more years in between repeating a crop, there is a much less chance of a crop disease developing.

“Think of it like eating a 2 _____ diet. If you only ate carrots or only hamburgers, you wouldn’t be very healthy. But if you eat from all the food groups in the right quantity, you have a much better chance of being healthy.”

The Busches also practice no-till to improve the soil. That means planting the crop without disturbing the soil, which reduces erosion and conserves 3 _____.

Cover crops also protect the soil from erosion and enrich the soil, but these crops aren’t harvested.

“Our cover crop is a mixture of 4 to 10 kinds of seeds planted together. One cover crop mix might include oats, peas, radishes, turnips, millet, sunflowers and clover,” Greg said.

Cover crops are seeded where a field is too wet for regular planting or after the regular crop is harvested. The cover crop roots protect the soil from wind and water 4 _____. The roots also provide food for healthy 5 _____ in the soil.

Sometimes the Busches grow two crops together, such as what they call “peaola” – peas and canola together – and “chax” – chickpeas and flax together.

“Sometimes we grow 6 _____ crops like peas and canola in the same field,” Greg said. “They are seeded at the same time in the same rows with the drill. We choose crops that grow up together and help each other out. The canola benefits from the nitrogen that the peas fix into the soil. The peas benefit from the strong stalks of the canola plant by trellising (climbing) up the plant so they don’t fall flat on the ground.

“When they are harvested, the two crops stay mixed together and get stored in a grain bin. Once harvest is over, we take the mixture to a grain cleaner that separates the peas into one truck and the canola into another truck. Because peas are large and canola is tiny, it is easy to separate them. The machine shakes the mixed grain over several 7 _____. The tiny seeds drop to the bottom rack, and big seeds stay on the top rack -- like sifting rocks out of sand. Then they can be sold or stored again in their own separate bins.”

After harvest, some of the Busches crops are stored in grain bins until they are ready to sell them, usually to the local elevator that sells them to 8 _____. Some crops are sold directly to food processors: mustard to a company that makes mustard, sunflowers to a company that bags bird food, flax to a dog food processor and oats to General Mills, the company that makes Cheerios and other cereals.

SOYBEANS BEING LOADED ON A TRUCK

Distribution

Where in the World?

Import means to bring goods into a country from abroad for sale.

Export means to send goods to another country for sale.

Many North Dakota crops are exported to other countries. On the world map, write the letter for each country that is a major importer of the ND crop.

- A. Germany – Canola
- B. Mexico – Dry edible beans and sunflower seeds
- C. Pakistan – Chickpeas
- D. Republic of Korea (South Korea) – Rye
- E. China – Barley
- F. Canada – Lentils and fresh potatoes
- G. India – Flaxseed
- H. Japan – Frozen potato products



OCEAN CARRIER BEING LOADED WITH GRAIN



Consumption

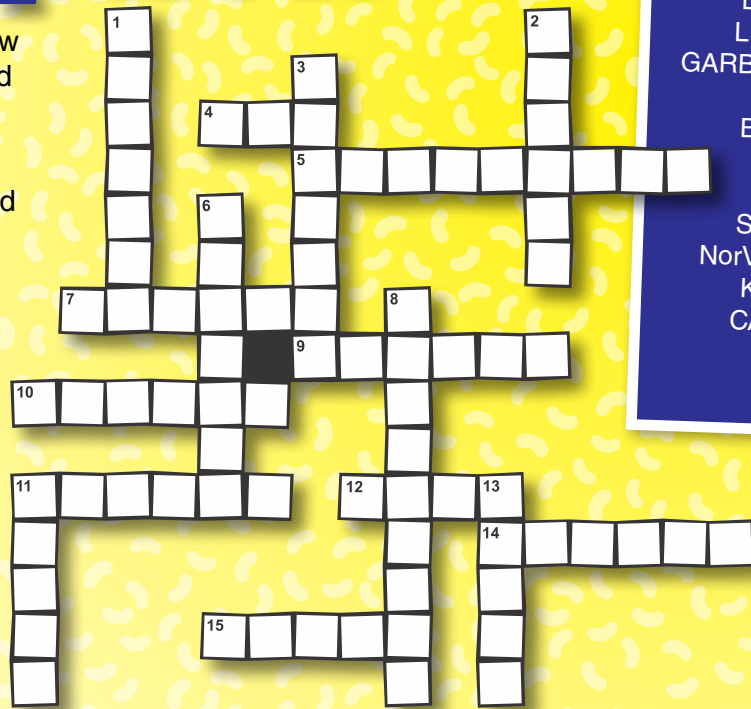
Complete this crossword puzzle to learn how many of North Dakota's crops are eaten and used in other ways.

Across:

- 4. The kind of flour in Swedish limpa bread
- 5. A potato variety developed at North Dakota State University that is used to make potato chips
- 7. This part of the sunflower is used in salads, baked goods and more
- 9. Most of a potato is this
- 10. This kind of bean is often used in chili
- 11. Canola was developed in this country that led to its name
- 12. This ND crop is cooked for breakfast and used in baked goods
- 14. This dip made from chickpeas often is served with pita bread or vegetables
- 15. The main kind of dry edible bean grown in North Dakota

Down:

- 1. The chemical name for sugar
- 2. The crop that is malted and used to change a milk shake into a malt
- 3. This legume can be black, green or red



- HUMMUS
- KERNEL
- SUCROSE
- LENTILS
- LINSEED
- GARBANZOS
- CHILI
- BARLEY
- SHELL
- RYE
- STARCH
- NorVALLEY
- KIDNEY
- CANADA
- OATS
- PINTO

- 6. The oil from flax that protects wood furniture and is used in paint
- 8. Another name for chickpeas
- 11. This dish has many variations but is usually made with beef, beans and tomato sauce
- 13. Sunflower kernels are inside this

Pack MyPlate

Review www.ChooseMyPlate.gov and list each of North Dakota's #1 or #2 crops on the cover in its MyPlate section or on the Not On MyPlate List.

FRUITS

VEGETABLES



GRAINS

NOT ON MYPLATE LIST

PROTEIN



Take this Ag Mag home to share what you've learned about North Dakota's crops.

Sources:

- AmeriFlax
- National Sunflower Association
- Northarvest Bean Growers Association
- ND Department of Agriculture
- North Dakota State University
- Northern Pulse Growers Association
- Northern Canola Growers Association
- USDA National Agricultural Statistics Service
- USA Dry Pea and Lentil Council
- U.S. Dry Bean Council



Agriculture
Commissioner
Doug Goehring

North Dakota Agriculture in the Classroom

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.

Ag in the Classroom Council:

Ag in the Classroom Specialist
ND Department of Agriculture
600 E. Boulevard Ave., Dept. 602
Bismarck, ND 58505-0020
701-328-2231 or 800-242-7535
ndda@nd.gov
www.ndda.nd.gov/aitc
www.facebook.com/ndaginclassroom

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Ag Mag Production by North Dakota State University Agriculture Communication:
Tennille Altepetter, Teacher Reviewer;
Becky Koch, Editor; David Haasser, Graphic Designer

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NORTH DAKOTA
CORN
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