

PULSE CROPS

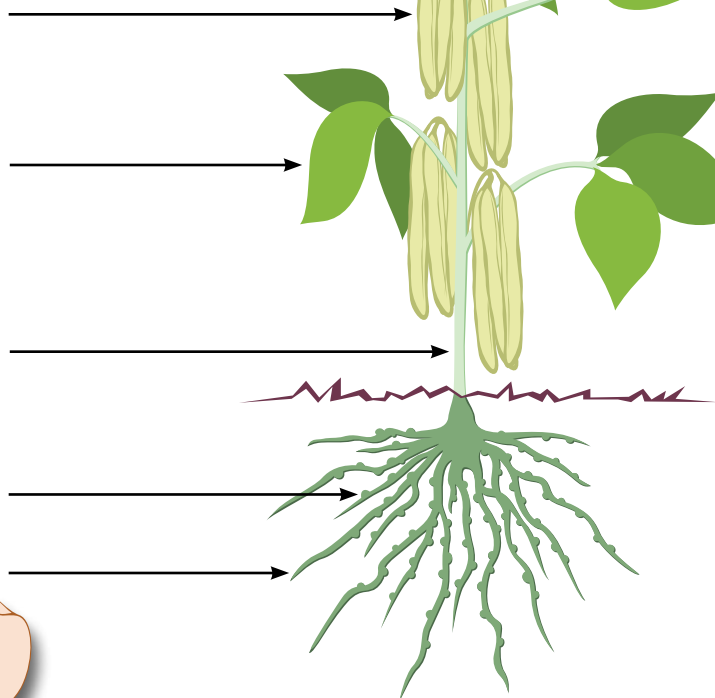
Legumes are plants that have bumps (called nodules) on their roots. The nodules contain bacteria that can “catch” nitrogen gas from the air in the soil and transform the gas into a form the plant can use. Nitrogen is a nutrient all plants need to grow.

Pulses are the legumes that are harvested for their dry grains inside a pod. Dry beans, chickpeas, lentils and dry peas are the most common pulses.

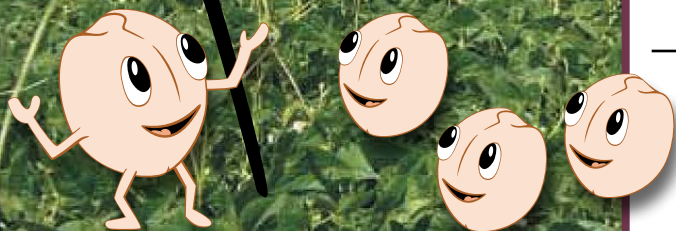
“Pulse” comes from a Latin word that means “thick soup.”

On this plant, identify the:

- Roots
- Stalk
- Leaves
- Nodules
- Pods



North Dakota ranks #1 among the states in production of dry beans and dry peas.



PRODUCTION

North Dakota produces four major kinds of pulse crops:

Dry beans – Dry beans come in many sizes, shapes and colors. They are used in main dishes, soups, salads and even baked goods.

Chickpeas – You may know these as garbanzo beans. They're ground and made into hummus, a Middle Eastern dip, or cooked for use in salads and soups.

Lentils – The size and appearance of lentils varies depending on the class, but they can have different colors, such as red, green or yellow. Lentils are used primarily in soups and stews, but also in casseroles, side dishes, baked goods and salads.

Dry peas – Dry peas become hard, mature seeds inside the plant's pod. These green or yellow dry peas are usually split and soaked for faster cooking in soups and stews. The green peas you eat as a vegetable are soft, immature seeds from a similar plant.

Name That Crop

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.



The Nine Classes of Dry Beans

Circle the correctly spelled word in each sentence.



Pinto Bean – was the (1. *first* or *furst*) bean planted in North Dakota about 60 years ago. This bean is medium-sized with small brown spots. It is used in (2. *Mexicun* or *Mexican*) foods like burritos and (3. *tacoos* or *tacos*).



Small Red Bean – is just that – a small, dark red bean that is used in a (4. *variety* or *variaty*) of dishes with rice.



Black Bean – is medium-sized and often called a (5. *turtle* or *turtel*) bean.



Great Northern Bean – is a medium-sized, white (6. *oval* or *ovel*) bean that is used in soups and stews.



Pink Bean – is a small, (7. *pail* or *pale*) pink bean that turns reddish-brown when cooked.



Navy Bean – is a small, white bean used in (8. *soops* or *soups*) or baked bean dishes.



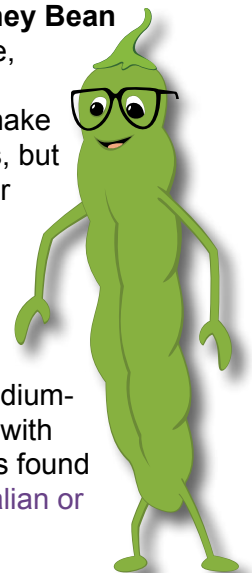
Light Red Kidney Bean – is a large, kidney-shaped bean used in (9. *chilly* or *chili*).



Dark Red Kidney Bean – also is a large, kidney-shaped bean used to make chili and salads, but is a darker color than the Light Red Kidney Bean.



Cranberry Bean – is a medium-sized tan bean with red spots that is found in some (10. *Italian* or *italian*) foods.

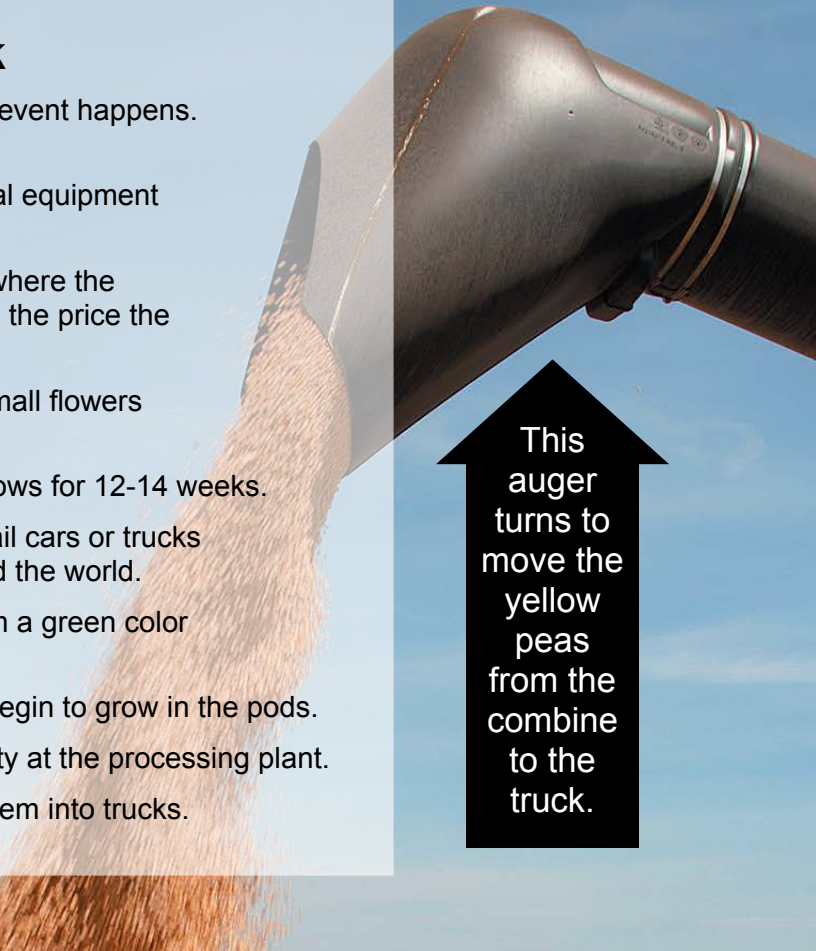


Bean photos by David Haasser, NDSU

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.
- ___ With soil, sunlight and rain, the bean plant grows for 12-14 weeks.
- ___ 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.
- ___ The farmer harvests the beans and augers them into trucks.



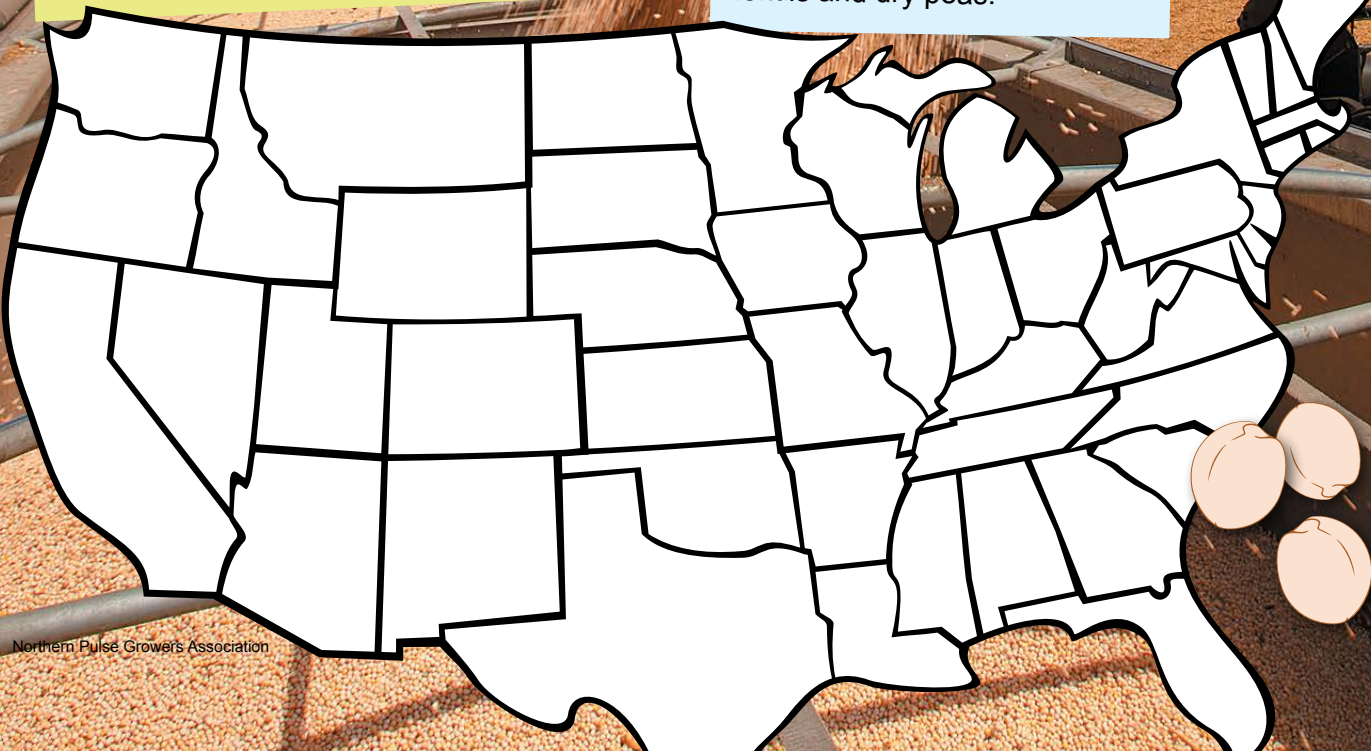
This auger turns to move the yellow peas from the combine to the truck.

U.S. Pulse Production

Nearly all U.S. chickpeas, lentils and dry peas are grown in **Idaho, Washington, Oregon, Montana, North Dakota and South Dakota**.

North Dakota grows about one-third of the U.S. dry beans with **Michigan, Minnesota, Nebraska, Montana, Idaho, Washington, Colorado** and **California** also leading producers.

On the U.S. map, write the abbreviations of the states printed in bold that produce the most dry beans, chickpeas, lentils and dry peas.

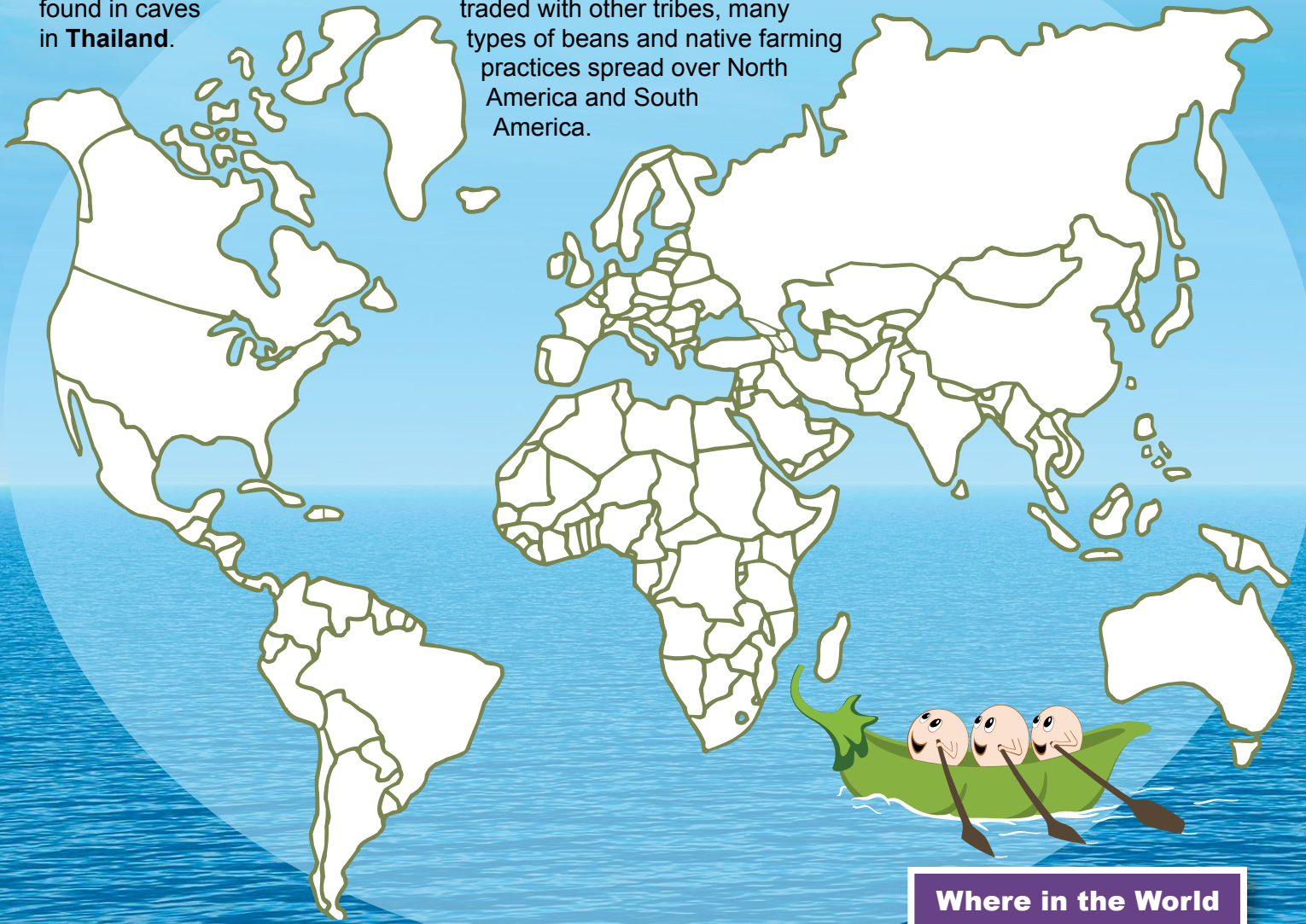


Food from Way Back

Many archeologists think some pulse crops have been grown for more than 20,000 years. Lentils, peas and chickpeas were found in pyramids in **Egypt** that were built more than 4,000 years ago. Peas more than 11,000 years old were found in caves in **Thailand**.

Growing beans for food dates back to 7,000 years ago in **Mexico** and **Peru**. Aztec and Mayan tribes in Mexico planted small-seeded beans, while tribes in Peru planted large-seeded beans. As Indian groups explored, migrated and traded with other tribes, many types of beans and native farming practices spread over North America and South America.

When explorers from **Portugal** and **Spain** arrived at America, Indian tribes already were planting beans. Early explorers shared American beans around the world, and soon beans were popular in Europe, Africa and Asia.



U.S. Pulse Exports

India, Myanmar, Canada, China, Nigeria, Brazil and Australia are the major pulse producers.

About 20 percent of the beans produced in the U.S. are exported to other countries. Major importers of U.S. beans are **Mexico, Italy, Dominican Republic, Colombia, France, Spain, United Kingdom, Angola, Ireland and Turkey**.

Many of the chickpeas, lentils and dry peas grown in the U.S. are exported to **India, Spain, Peru, Mexico, Ethiopia, Turkey, Pakistan, Colombia, Yemen, China, Philippines and Canada**.

Where in the World

On the world map, color each country that's printed in bold in Food from Way Back and U.S. Pulse Exports.

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

Export means to send goods to another country for sale.

PROCESSING

Canned vs. Dry

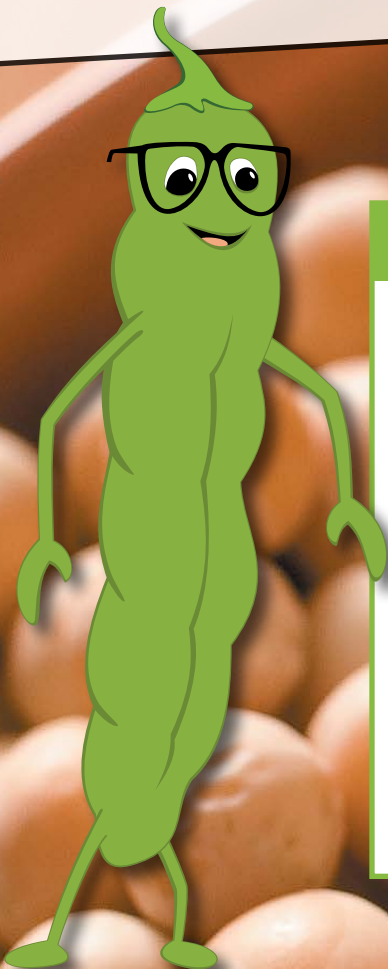
Pulses can be purchased dry in a bag or already cooked and preserved in a can. The dry products cook faster if soaked first. Dry peas and lentils need to be soaked in twice as much water as their volume. Dry beans need to soak in three times as much water as their volume.

1. Kenyon's recipe calls for $1\frac{1}{2}$ cups of lentils. How much water should he soak them in?

2. One cup of dry peas makes 2 cups of cooked peas. How many cups of dry peas should Sadie start with to have 6 cups of cooked peas?

3. 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?

4. Emily's hummus recipe calls for 3 cups of chickpeas. The label says each can contains about $1\frac{1}{2}$ cups. How many cans does she need to make the hummus?



The Many Uses of Peas

Even though peas are eaten in soups, casseroles and other dishes, they also are used as an ingredient in several other products. Circle what you think can be made with dry peas.

Baby Food

Cookies

Bird Food

Flour

Chips

Livestock Feed

Bread

Soft Drinks

Fuel

Pasta

Pet Food



DISTRIBUTION

Career Corner

Jennifer Tesch – Chief Marketing Officer
Healthy Food Ingredients, Fargo, North Dakota

Use these words to fill in the blanks: traced, social, contract, importers, demand, artificial, tortilla, marketing, motivates, energized, innovative, harvest



Jennifer Tesch has a plaque on her desk that says, “If you want to be successful, know what you are doing, love what you are doing and believe in what you are doing” – and she does all three.

“I am motivated and _____ working in the ag industry – connecting farmers to the foods that nourish our lives,” she said.

“Healthy Food Ingredients supplies specialty pulses to food manufacturers in North America and to _____ and distributors in countries such as Japan, Taiwan, New Zealand, Canada, Australia, Germany, Norway and United Kingdom,” Jennifer said. “I oversee HFI’s _____ efforts, including communications, branding, promotions, initiatives, advertising, trade shows and events, public relations, and web and _____ media.”

HFI works with North Dakota growers for production of organic pulses. Crops are classified as organic when no chemicals or _____ fertilizers are used in production. Some of these products are labeled as identity preserved, meaning each bag can be _____ back to the farmer who planted that crop.

A farmer signs a _____, or an agreement, with the company that says the farmer will deliver the crop to Healthy Food Ingredients. After farmers _____ their crop, they haul it to HFI’s facility. The pulses are cleaned and shipped in whole form to be used as an ingredient in soups or as a canned item such as baked beans. The pulses also can be processed into a flour that can be used in pasta, cereals, crackers, _____ chips and hummus.

“There has been an increased _____ for use of pulses in new food products versus traditional uses like soups and canned foods as they are a healthy plant-based protein option,” Jennifer said. “It is so rewarding to work on a project with a food manufacturer to help create an _____ solution with the ingredients we offer, and then see that product in our local supermarkets.”

Jennifer encourages students to discover what _____ them and ignites their curiosity and passion for learning. As her plaque says, that will make you successful.



CONSUMPTION

Protein Food or Vegetable?

Although they are vegetables, dry peas and beans have so much protein, they also are included in the Protein Foods Group. Your skin, bones and muscles need protein to grow and stay healthy.

Write **P** by the foods in the Protein Foods Group and **V** by foods in the Vegetables Group. Some may have both.

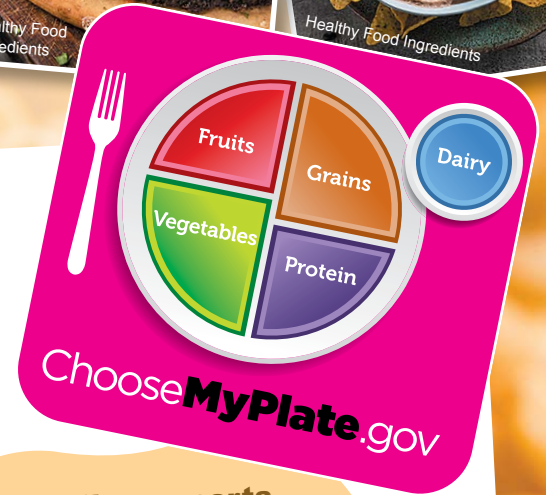
- | | | |
|---------------------------------------|--------------------------------------|-------------------------------------|
| <input type="checkbox"/> Cheese | <input type="checkbox"/> Bread | <input type="checkbox"/> Tomatoes |
| <input type="checkbox"/> Rice | <input type="checkbox"/> Potatoes | <input type="checkbox"/> Grapes |
| <input type="checkbox"/> Spaghetti | <input type="checkbox"/> Lentils | <input type="checkbox"/> Watermelon |
| <input type="checkbox"/> Chicken | <input type="checkbox"/> Pinto Beans | <input type="checkbox"/> Honey |
| <input type="checkbox"/> Yogurt | <input type="checkbox"/> Eggs | <input type="checkbox"/> Oats |
| <input type="checkbox"/> Wheat | <input type="checkbox"/> Broccoli | <input type="checkbox"/> Dry Peas |
| <input type="checkbox"/> Turtle Beans | <input type="checkbox"/> Carrots | <input type="checkbox"/> Fish |
| <input type="checkbox"/> Milk | <input type="checkbox"/> Cereal | |



Healthy Food Ingredients



Healthy Food Ingredients



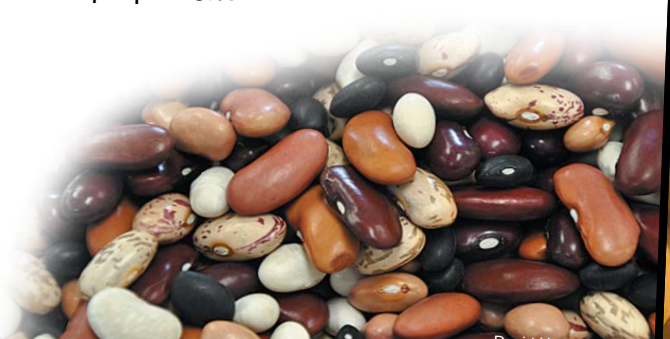
ChooseMyPlate.gov

Nutrition experts recommend that kids your age eat 1 to 1½ cups of legumes per week.

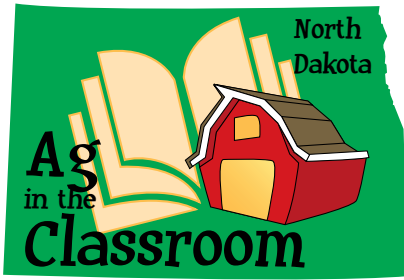
Math Challenge

- Kayla wants to buy 2 pounds of black beans. The 1-pound bag costs \$1.75, and the 2-pound bag costs \$2.50. How much money will Kayla save by purchasing the 2-pound bag instead of two 1-pound bags? _____
- Kayla wants to make a big casserole with different kinds of beans. The sale at the grocery store is 3 cans for \$2.00. Kayla purchases 3 cans of pinto beans, 3 cans of kidney beans and 3 cans of navy beans. How much will Kayla pay for all 9 cans of beans? _____
- Kayla also decides to buy 3 cans of chickpeas. Each can costs \$.99. How much will Kayla pay for 3 cans of chickpeas? _____
- What will Kayla's total grocery store bill be for the black, pinto, kidney and navy beans, and chickpeas? _____
- Andrew's family is making a huge pot of bean soup for a get-together. How many cans of each bean does he need to make the soup in this proportion?

- | | |
|-----------------------------|----------------|
| 1/6 pinto beans | _____ cans |
| 1/12 dark red kidney beans | _____ cans |
| 1/3 black beans | _____ cans |
| 1/4 navy beans | _____ cans |
| 1/12 great northern beans | _____ cans |
| 1/12 light red kidney beans | _____ cans |
| Total | 12 cans |



David Haasser, NDSU



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



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providing information for this issue
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www.northarvestbean.org

Northern Pulse Growers Association
www.northernpulse.com

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