



Lesson Title: Pulse of the United States

Grade: 3-4

Duration of Lesson: 5 -30 minute classes

Brief: Students will understand agriculture pulse crops.



Materials:

Several bags of 13 or 16 bean soup (very inexpensive!)

Patterns of the Pea Family (Appendix A)

One copy of the United States map (appendix B) for each student on bright colored paper

White glue such as Elmers glue

Key Terms

agriculture, annual, legume, peas, beans, lentils, pulse crops, annual, nitrogen, dry grain. Parts of the pulse plant: wings, keels, banners, and nodules

Standards / Objectives

Montana State Standards:

Art: Content Standard 1- Students create, perform/exhibit, and respond in the Arts.

Content Standard 2—Students apply and describe the concepts, structures, and processes in the Arts.

Content Standard 3—Students develop and refine arts skills and techniques to express ideas, pose and solve problems, and discover meaning. Content Standard 5—Students understand the role of the Arts in society, diverse cultures, and historical periods. Content Standard 6—Students make connections among the Arts, other subject areas, life, and work.

Science: Content Standard 3: Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment. Content Standard 6: Students understand historical developments in science and technology, Benchmarks 2 & 3

<u>Understanding(s) /Big Ideas:</u> Students will understand the link between pulse crops, agriculture, and food.	<u>Essential Question(s):</u> What is a pulse crop? Who grows pulse crops? Who eats pulse crops?
<u>Students will know:</u> Students will know the dietary value of pulse crops on the USDA food pyramid, and will know how to identify pulse crops.	<u>Students will be able to:</u> Identify pulse crops grown in the states in the US. Students will be able to identify dried peas, beans, and lentils as pulse crops.
Performance / Observations	
<u>Performance Task(s):</u> Map out the states in the US where pulse crops are raised by farmers.	<u>Other Evidence:</u> Students will create artwork based upon pulse crop growing states with Montana being filled in with specific pulse crops.
Learning / Inquiry Activities	

Introduction: Display “Patterns of the Pea Family” on the board or on the overhead.

Many gardeners grow peas and beans in their gardens for fresh and frozen vegetables. Dry peas and beans come from the same type of pea and bean plants as fresh ones, but the seeds are left in the pods until they are ripe and dry, and then harvested for dry edible peas and beans. People have been eating dry beans and peas for a long time. Archaeologists have found evidence of dry peas in caves that are over 11,000 years old in Thailand. Lentils and chickpeas were found in pyramids built more than 4000 years ago. When explorers came to the United States from Spain and Portugal, Indians were already cultivating beans.

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

Pulse crops are legumes that grow for one year (annuals) and are harvested for the dry grain or seeds inside the pod. “Pulse” comes from a Latin word for a thick soup. Legumes are so important of a food source that they are listed on the USDA My Pyramid food guide as both a vegetable and a protein! Montana farmers raise pulse crops for families all over the world. In 2010 Montana became the largest U.S. producer of lentils, which are a food staple in the Middle East and India. The crop is short in stature,

and therefore cannot be grown on rocky ground. Montana farmers also raise other types of pulse crops, like garbanzo beans (also known as chickpeas) and pinto beans.

Flowers from plants in the legume family have similar patterns, while leaf patterns can vary. Some plants like alfalfa and clover have many flowers bunched together on the end of each stem, while others like the pea have more singular flowers. The flowers from plants in the legume family, such as peas, have distinct flower parts called banners, wings, and keels. The seeds of plants in the legume family are produced in pods.

Learning / Inquiry Activities:

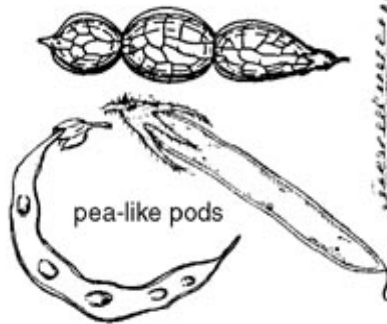
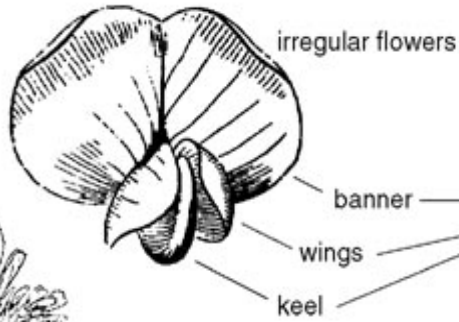
1. Ask students if they eat legumes and pulse crops. Display the contents of the bags bean soup on several trays for students to observe. Let students know that the contents of the bag are pulse crops which are part of the legume family. Read the label on the back of the container of soup mix and write the name of each pulse crop on the board. Ask students to identify each pea or bean using Appendix C as a guide. Some mixes may vary and have other beans and peas that are not listed in Appendix C. The following web sites may be of help identifying other pulse crops: Pictures and uses for each bean: <http://www.foodsubs.com/Beans.html>
Peas and lentils: <http://www.timelessfood.com/lentils.html>
2. Introduce each type of legume by holding up one of the pulse crops for students to see. Ask students to find the same pulse crop in the tray.
3. Ask students again if they have ever eaten any of these pulse crops. Ask student to name the foods they eat which contain pulse crops. Examples: Chili, bean burritos, split pea soup, bean salad, refried beans, etc.
4. Let students know that they will be creating a work of art with the seeds from the pulse crops. When they finish they will have a bulletin board that shows which states in the United States grow pulse crops for the world.
5. Pass out the sheets of colored paper with the US outline and let students know they will fill in the following states with the seeds on the trays: Montana, North Dakota, South Dakota, Nebraska, Wyoming, Idaho, Washington, Oregon, Michigan, Minnesota, California, and Colorado. Each of the states listed produces pulse crops for the world. Students must fill in Montana with lentils as Montana is the #1 producer of lentils in the U.S. Students may fill in the other states with any of the other pulse crops. There will be enough variety so students can use just one pulse crop for each state. Ask students to outline each state with just one type of pulse crop before filling in all the states above. This will help keep the states separated on the artwork map.
6. Display student work on a bulletin board. Sample titles for bulletin board:

The pulse of the United States! or Who grew your pulse?

Extensions for this lesson: A workbook on pulse crops can be found at:

http://www.ag.ndsu.edu/agmag/agmag_pulse-beans/agmag_pulse-beans.pdf

Patterns of the Pea Family (Pea Subfamily)



Appendix B

