



A TOUGH NUT TO CRACK

GRADE LEVEL: 6-8

SUBJECT: Science

NATIONAL STANDARD(S):
(6-8) SC: 14.2, 15.1-6, 16.1-3

THEME: Food and Nutrition

FOOD AND FIBER TOPIC: I-D, V-B

LEARNER OBJECTIVES:

Based on a set of criteria, students will evaluate the quality of pecans.

VOCABULARY

cholesterol—A fat soluble substance found in the fat, liver, nervous system, and other areas of the body.

congeal—To cause to solidify; to gel, to coagulate.

hickory—A chiefly North American tree having smooth or shaggy bark and bearing hard, smooth nuts with an edible kernel.

magnesium—A white metal, essential for people, animals and plants.

phosphorous—A chemical element found in soils in various mineral forms, but only small amounts are readily available to plants at any one time.

potassium—Regarded as an essential plant nutrient, potassium is present naturally in some form in all soils but in extremely variable amounts.

protein—Any large number of complex, organic compounds of amino acids which has a high molecular weight and is an essential part of all living organisms.

unsaturated—Fats of vegetable origin that have more than one double bond chain in their carbon chain.

BACKGROUND

Before recorded history, pecan trees grew wild along the river banks of what is now southern Illinois. Flood waters moved their seeds across western Missouri into southeastern Kansas, Oklahoma, central Texas and Mexico. Accounts by early Spanish and French explorers show that Native American tribes living in these areas moved around to follow the pecan harvest. The Spanish explorer Cabeza de Vaca was held captive by one of these tribes from 1529 until he escaped in 1535. In his journals he wrote that the people lived on nothing but pecans for two months of every year. During the rest of the year they pounded pecan kernels, added them to boiling water and used the mixture as seasoning for other foods.

The pecan is a form of hickory. The word “pecan” comes from the Algonquin word “paccan,” which means “a tough nut to crack.” Some of the pecans harvested today are small native pecans whose shells are very tough to crack. Most are new varieties called “papershell” varieties.

The life of pecan trees can be 100 years or more. A pecan tree will start producing nuts in its first six to eight years. There are two parts to the pecan nut. The nut has a soft outer husk. A hard, brown shell forms within this husk. The pecan meat is within the shell. It is soft and clings to the inside of the shell until the fall of the year, when it starts to congeal and separate from the shell. Ripened pecans are easier to separate from the shell than those that are not. When the nuts are mature, the husks split open into four pieces, and the nut falls out.

The price pecan growers receive for their product depends on the percentage of edible meats in a sample. The grower weighs out one pound of pecans and carefully cracks them by

hand or in a mechanical cracker. He or she picks out the edible meats, weighs them and calculates what percentage they are of the total weight of pecans. In the best pecans the edible meats make up 50 percent or more of the total weight. Some of the newer developed varieties of pecans have edible meats weighting up to 60 percent of the total weight. Those meats deemed *inedible* are those that are poorly developed, rotten, or moldy or those that have dark spots. The dark spots indicate insect damage.

After the grower has picked out the edible meats, he or she separates them into three piles according to their color and development. The best pecans (No. 1's) are bright colored, full bodied and solid. The next best (No. 2's) are bright colored but light-weight. The least best, or No. 3 meats, are brown-colored and either full-bodied or lightweight.

The use of pecans has reached outer space. NASA packs pecans for astronauts to eat because they are dry, compact, contain important nutrients and are easy to digest. Pecans are low in sodium and have no cholesterol. They are also high in energy and contain protein, vitamin A, phosphorous, potassium and magnesium. The oil in pecans is mostly unsaturated (95 percent). Unsaturated fat is the good source of fat people need because it helps lower blood cholesterol.

Most of the pecans grown in the United States are grown in Georgia, Texas, Oklahoma, Louisiana, Arkansas, Mississippi, Missouri, Tennessee, Kansas, New Mexico, Arizona, South Carolina, Alabama and Florida. Outside of the United States pecans are grown only in a few countries where the climate and soil conditions are proper. These countries include Australia, Canada, India, Israel and Mexico.

STEP-BY-STEP INSTRUCTIONS

1. Bring a gram scale and papershell pecans. Provide five pecans for each student.
2. Divide the class into groups of five and provide each member with five pecans.
3. Hand out student worksheets and share background information.
4. Have each student weigh his or her pecans and record the weight on the student worksheet.
5. Show students how to crack the pecans by putting two in your hand and squeezing them together.
6. Have each student crack his or her pecans and separate the shell fragments from the meats.
7. Have each student weigh his or her shell fragments and record the weight. Then have each student weigh the meats from his or pecans and record the weight.
8. Have students assign first, second and third prizes to the pecans within each group, based on the proportions of meat to shells.

RELATED ACTIVITIES

1. Have students locate the origins of the pecan on a map of the US and trace its path into Mexico.
2. Gather pecans from under a tree during the fall. Bring some with the husks still clinging to them and some with very loose husks so students can see the difference between a ripe and unripe pecan.
3. Acquire hard shell and paper shell pecans and let students try cracking both kinds. Provide nut crackers to help students crack the hard nuts. Then have students taste both kinds and decide which tastes better.

4. Have each group prepare the following pecan snack; using one cup unsalted pecan halves, one tablespoon vegetable oil, one tablespoon Worcestershire sauce and salt. Mix the oil and Worcestershire sauce together. Toss the unsalted pecan halves with the sauce/oil mixture. Roast in a shallow baking pan at 275 degrees for 30 minutes, stirring every five minutes. Drain the pecans on paper towels and sprinkle with salt.

RESOURCES

Student Books

- Burnie, D. (1988). Tree. Eyewitness Books, Knopf.
Dineen, J. (1988) Vegetables and Oils, Enslow.
Langley, A. (1988). Trees, Watts.

Teacher Resources

Southeastern Pecan Growers Association, P.O. Box 729, Monticello, FL 32344-0729

Related Internet Websites

Dohmann Pecan Farms-Growers of Native Pecans since 1972. Columbus, Texas. This is a pecan farm in south central Texas which utilizes 150 year old trees. Provides a history of the pecan and its utilization by cultures through time. Ordering of pecans can be done through this site. <http://www.ortech-engr.com/pecans/farm.html>

Santa Cruz Valley Orchards. Welcome to Santa Cruz Valley Orchards outside of sunny Tucson, Arizona USA. This company claims to have the 'World's Largest Irrigated Pecan Orchard'. You can follow any of the listed links to find out more about ordering their retail and wholesale products, as well as information about pecans. <http://www.azpecans.com/index.htm>

Home Nut Production-Pecans. Texas Agricultural Extension Service publication. Provides historical information regarding Texas' state tree along with production tips and agricultural requirements. <http://leviathan.tamu.edu:70/0h/mg/fruits/pecans/pecans.html>

EVALUATION

Were students able to complete their worksheets and judge the quality of their pecans?

ACKNOWLEDGMENT

This lesson adapted from Oklahoma Ag in the Classroom, Department of Agricultural Education, Communications and 4-H Youth Development, Oklahoma State University, Stillwater, OK 74078.

Name _____

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Place all of your pecans on the scale at one time, and write the weight in the space provided below.

Total weight of the pecans = _____ grams.

Crack your pecans by putting two in your hand and squeezing. Then carefully pick out the meats and place those that are edible in a pile. Edible meats are meats you can eat. Meats that are moldy or rotten or have large dark spots or many small dark spots are inedible. Put the inedible meats aside, and weigh the edible meats.



Weight of edible meats = _____ grams.

Figure out what percentage of the total weight of the pecans is taken up by edible meats. You can do this by using your calculator to divide the weight of the edible meats by the total weight of the pecans. For example:

$$\begin{array}{r} \text{Total weight of pecans} = 45 \text{ grams.} \quad 45 \\ \hline \text{Total weight of edible meats} = 25 \text{ grams.} \quad 25 \end{array} = .55 \text{ or } 55/100 \text{ or } 55 \text{ percent}$$

The edible meats of your pecans are _____ percent of the total weight.

Use the following scale to rate your pecans.

55% or higher edible meats Excellent	45 to 55% edible meats Good	30 to 45% edible meats Fair	25 to 30% edible meats Poor
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