Nuts and Seeds

Unit: Preparing Foods

Problem Area: Seasonings and Flavorings

Lesson: Nuts and Seeds

Student Learning Objectives.

Instruction in this lesson should result in students achieving the following objectives:

1. **Differentiate between nuts, seeds, and legumes.**
2. **Explain the culinary uses of common nuts, seeds, and legumes.**

Resources.

The following resources may be useful in teaching this lesson:

Ashworth, Suzanne, and Kent Whealy. *Seed to Seed: Seed Saving and Growing Techniques for Vegetable Gardeners*, 2nd ed. Seed Savers Exchange, 2002.

"Difference Between Seed and Nut," *Difference Between.com*. Accessed Oct. 12, 2011. <http://www.differencebetween.com/difference-between-seed-and-vs-nut/>.

"Fruits Called Nuts," *W.P. Armstrong*. Accessed Oct. 12, 2011. <http://waynesword.palomar.edu/ecoph8.htm>.

McGreal, Michael J., and Linda J. Padilla. *Culinary Arts Principles and Applications*. American Technical, 2008.

"Natural Food Guide–Nuts: Part One," *The Natural Food Hub*. Accessed Oct. 12, 2011. <http://www.naturalhub.com/natural_food_guide_nuts_common.htm>.

"Nut vs. Seed," *Argonne National Laboratory*. Accessed Oct. 12, 2011. <http://www.newton.dep.anl.gov/askasci/gen01/gen01874.htm>.

Rosengarten, Frederic Jr. *The Book of Edible Nuts*. Dover, 2004.

Equipment, Tools, Supplies, and Facilities

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

Key Terms.

The following terms are presented in this lesson (shown in bold italics):

- culinary nuts
- drupes
- fruit
- hulls
- kernels
- legume
- nuts
- seed
- seed coat

Interest Approach.

Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

> *Ask students straight out what the difference is between nuts and seeds. The difference can be confusing; it is subtle. There is a botanical definition and a culinary (more practical) definition of each. Describe the difference in the most basic and clear fashion, perhaps with physical examples. With that in mind, decide if you will provide examples of real nuts and seeds for students to see, smell, examine, and taste or if you will use pictures.*

CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Differentiate between nuts, seeds, and legumes.

Anticipated Problem: What is the difference between nuts, seeds, and legumes?

I. Nuts, seeds, and legumes

A. The terms "nuts" and "seeds" are often confused, and some people use the terms interchangeably. According to the *DifferenceBetween.com* website, the main differences between nuts and seeds are:

1. All nuts are seeds. However, all seeds are not nuts.
2. Nuts are fruits; nuts are part of the flower. Seeds are not fruits, but they can be seen in fruits.
3. Nuts typically have one seed. Seeds are small embryonic plants that, if planted, can produce new plants. Generally, seeds are smaller than nuts.
4. True nuts do not open on their own (indehiscent). Seeds, however, often disperse when pods open and wind, water, or animals spread the contents.
5. Nuts are rich in protein, vitamins, minerals, and fats. In contrast, seeds are rich in protein, vitamin B, minerals, fat, and dietary fiber.

B. ***Nuts*** (in French "noix;" pronounced n–WAH) are items that consist of a single seed enclosed in a tough shell. Nut—the nutshell or part of the plant that contains the seeds—is the name for numerous types of fruit with a woody, tough, and hard outer shell surrounding and protecting a soft inner skin that encloses an edible kernel. The ***kernels*** (literally seeds, especially seeds within fruit) are the soft, edible portion inside the hard shell of a nut or stone fruit.

1. Botanically speaking, it is important to understand that nuts are the ***fruit***—the usually edible reproductive part of a seed plant. Most nuts grow on trees and bushes.
2. Culinary nuts may not meet the botanical definition of nuts—items with a single seed enclosed in a tough shell. ***Culinary nuts*** are edible parts of seed plants that include true nuts, drupes, and seeds.
   a. ***Drupes*** are any of several fleshy fruits with a thin skin and a central stone (e.g., peach, cherry, and olive).
   b. Although chefs may consider walnuts, pecans, and peanuts to be nuts, all are botanically considered drupes, seeds, and/or fruits.
   c. Walnuts and pecans fit the definitions of seeds and drupes.
   d. Lychee nuts are actually small oval fruits (drupes), and peanuts are actually legumes.

3. Almonds and walnuts are generally thought of as not having edible shells—a characteristic of true nuts. Yet, while undesirable, the shells of almonds and walnuts are actually edible. Most chefs and cooks consider almonds and walnuts to be culinary nuts despite the technical definition.
    a. Most nuts contain very little starch. Chestnuts and cashews are the exceptions.
    b. Chefs and cooks prize nuts for their oils. The rich flavors of oils and their aromas in confections and desserts make them valuable. Nuts are also prized for their texture and the various ways in which they can be toasted, ground, and used as toppings.
    c. The nutritional value of nuts
        (1) They are cholesterol-free.
        (2) Nuts are low in saturated fat.
        (3) Nuts are nearly sodium free (unless salted during processing).
        (4) They are a good source of protein, manganese, magnesium, fiber, zinc, and phosphorus.
        (5) Nuts are associated with weight control.
        (6) They are cited by FDA scientific evidence (not proof) as reducing the risk of heart disease when consumed in moderation (about 1.5 ounces per day). The "nuts" in this healthy heart study are limited to walnuts (a seed and a drupe), almonds (a nut and a drupe), peanuts (a legume), hazelnuts (a true nut), some pine nuts (a seed), and pistachio nuts (a nut and a drupe).
    d. Recipes often list nuts as an optional item because the product would probably taste fine without them.

C. A ***seed*** is the ripened ovule of a flowering plant: its reproductive unit protected in a seed coat. A ***seed coat*** is the membrane that grows, covers, and protects the embryo after germination. A seed coat can be paper-thin, like that surrounding a peanut, or as tough as a hull. ***Hulls*** are the husks or thin hard shells that cover some seeds; they are often inedible.

1. Botanically speaking, all seeds sprout and reproduce the same plant from which they emanated. This is the pivotal defining element about seeds.
2. Culinarily speaking, some seeds are seeds (sunflower, pumpkin) and some "nuts" are really seeds (Brazil nuts, walnuts, pine nuts). Edible seeds, such as sunflower, poppy, and pumpkin seeds, are used in numerous culinary preparations.
    a. Some seeds are inedible: apple, orange, lime, etc.
    b. Seeds are prized for their oils, aroma, and texture.
    c. Seeds are sources of protein, vitamin B, minerals, fat, and fiber in the diet.
    d. Recipes often list seeds as a part of the batter or dough as well as for a visual appeal as a garnish. They are also easy to toast, grind, and use as a garnish for numerous dishes.

D. A ***legume*** is the fruit or edible part of a member the bean, pea, and lentil family. The main difference between a nut and a legume is that a nut typically has one or perhaps two seeds and a legume has multiple seeds (think of a soybean or a sweet pea pod).

Teaching Strategy: *Use VM–A, VM–B, and VM–C to aid in a discussion. Assign LS–A and LS–B.*

Objective 2: Explain the culinary uses of common nuts, seeds, and legumes.

Anticipated Problem: What are the culinary uses of common nuts, seeds, and legumes?

II. Culinary uses of nuts

A. Nuts

1. Most nuts are available whole, halved, broken, sliced, slivered, or chopped. Nuts are used in cakes, cookies, stuffing, filling, candy, nougat, and ice cream, used as garnishes, or simply eaten plain as a raw or salted snack. Most nuts can be eaten raw, but are commonly blanched or roasted as well. Common types of nuts for culinary applications are:
   a. True nuts
      (1) Chestnuts (must be cooked; used in purée; also known as marrons)
      (2) Hazelnuts (best if toasted; a cousin of the filbert)
      (3) Filberts (a cousin of the hazelnut; smaller than a hazelnut)
   b. Drupes or culinary nuts
      (1) Almonds (in French, Amande; pronounced ah–mond)
      (2) Cashews
      (3) Coconut
      (4) Lychee nuts
      (5) Macadamia nuts
      (6) Pecans (very expensive)
      (7) Pistachio nuts
2. Cooking nuts extends shelf life and improves flavor, but also kills the living element in the nut if that nut is technically a seed (e.g., Brazil and pine nuts). Varieties of this nature will sprout and grow if planted. Nuts are cooked by:
   a. Blanching
   b. Roasting
   c. Toasting
3. Nuts are high in fat, specifically healthy monounsaturated fat, and also contain protein, B vitamins, and antioxidants. Coconut contains unhealthy saturated fat, with minimal levels of other nutrients. Because of their high fat content,

the best way to store nuts is in their shells. Shells protect nuts from light, heat, air exposure, and moisture—factors that cause rancidity.

4. Nut products
   a. Oils—The naturally high fat content of nuts makes them a source for cooking and salad oils, such as peanut and walnut oils.
   b. Flavorings—Almond oil and extract, coconut milk, etc.
   c. Pastes include:
      (1) Almond
      (2) Kernel (made from apricot kernels)
      (3) Macaroon (a blend of almond and kernel pastes)
      (4) Marzipan (a sweetened almond paste)
   d. Flours—almond and hazelnut
   e. Nut butters—peanut (a legume), cashew (a drupe), pine nuts (a seed), macadamia (a drupe), and almond (a drupe)
5. Peanuts (a legume) and some tree nuts can cause allergic reactions in some people; the reactions range from mild itching or swelling of the tongue and mouth to death.
6. Storage and shelf life
   a. Shelled nuts last about 2 months at room temperature tightly covered and up to 1 year in the freezer. Unshelled nuts can be held at room temperature up to one year.
   b. Unsalted nuts have a longer shelf life than salted varieties.
   c. One pound of nuts in the shell is equal to approximately 8 ounces out of the shell.

B. Seeds

1. Many seeds are edible, such as poppy and sunflower, while others like apple, pear, and avocado seeds are not. Some seeds are referred to as nuts; a single dried fruit inside a hardened shell in many cases is actually a seed. Walnuts are an example of a seed that is often referred to as a "nut." The number of seeds is almost endless. Virtually all plants go "to seed" or go through a phase when they produce and drop seeds to reproduce, (e.g., trees, weeds, grasses), or grow around seeds which are capable of reproducing when the flesh is cut into the seeds returned to the earth, (such as potatoes).
2. Seeds commonly used in culinary applications as fillings, purées, garnishes, include:
   a. Mustard
   b. Pine nuts (often used in pesto)
   c. Poppy
   d. Pumpkin
   e. Sesame
   f. Sunflower
   g. Walnuts (a seed and a drupe)

3. Seed products include:
    a. Oils—All seeds contain some nutrients as a food source for the sprouted seedling, but generally their fat and other nutrient levels are somewhat lower than those found in nuts. Still, the fat in seeds is typically monounsaturated, and seeds are a great source of food oils such as:
        (1) Canola (from the canola plant not from rapeseeds)
        (2) Corn
        (3) Cottonseed
        (4) Flax seed
        (5) Safflower
        (6) Sesame
        (7) Sunflower
    b. Snacks—pine nuts, walnuts, etc.
    c. Fillings (poppy and sesame seed), purées, garnish (cereals, salads,) ground into flour, and as an ingredient in cookie and bread dough.
    d. Butters—pine nut (for cookies, etc.), sesame (used to make hummus), etc.
4. Some seeds may come from drupes or single seeds in a fruit, like an avocado or have many seeds within the fruit or vegetable like melons and squashes (pumpkins).

Teaching Strategy: *Many techniques can be used to help students master this objective. Use VM–D and VM–E. Assign LS–C.*

Review/Summary.

Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at the ends of chapters in the textbook may also be used in the Review/Summary.

Application.

Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.

Evaluation.

Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

Answers to Sample Test:

Part One: Short Answer

1. Drupes are fruit with a single pit or seed.
2. Peanuts are part of the legume family. Answers will vary but should include two of the following legumes: beans, peas, and lentils.

3. Seeds sprout and are the reproductive tools of the plant; they can reproduce a plant. Nuts cannot reproduce a plant.

Part Two: Multiple Choice

1. b
2. c
3. c
4. d
5. a
6. b

Part Three: True/False

1. F
2. F
3. T
4. T
5. F
6. T

Sample Test

Name _____

Nuts and Seeds

Part One: Short Answer

Instructions: **Answer the following.**

1. What is a drupe?

2. To which family do peanuts belong? List two other foods in that family.

3. What is the primary activity that seeds perform that nuts do not?

Part Two: Multiple Choice

Instructions: **Circle the letter of the correct answer.**

1. Macadamias are _____.

   a. seeds
   b. culinary nuts
   c. hulls
   d. legumes

2. Hazelnuts are _____.

   a. legumes
   b. seeds
   c. true nuts
   d. None of the above

3. Of the following, _____ is not a seed.

   a. safflower
   b. canola
   c. fruit
   d. flax

4. Which statement is *true*?

   a. Avocado pits are edible.
   b. Pistachios are seeds.
   c. Most oil from seeds is unhealthy.
   d. Some culinary nuts fit the definition of a seed.

5. The outer shell of a nut _____.

   a. is part of the fruit
   b. is never edible
   c. is also called the husk
   d. protects the seedling

6. Peanuts are _____.

   a. true nuts
   b. legumes
   c. drupes
   d. seeds

Part Three: True/False

Instructions: **Write *T* for true or *F* for false.**

_____1. Cashews are seeds.
_____2. Seeds are also called kernels.
_____3. All seeds are edible.
_____4. Nuts (including culinary nuts) tend to have more nutrients than seeds.
_____5. A pecan is a reproductive unit.
_____6. Nuts can be ground into flours, pastes, and butters.

NUTS AND CULINARY NUTS: FRUITS

- Almonds are marketed shelled and unshelled and are among the most utilized nuts in the culinary arena: raw, roasted, toasted, ground for flour, as a paste, and as oil.
- Cashews are typically marketed shelled.

SEEDS

- Seeds germinate and are able to reproduce a plant identical to the one that produced them. Regardless of variety and size, this is the goal of all seeds—to sprout and reproduce.

- Poppy, mustard, and sesame seeds are all tiny and all provide texture, color, and flavor to foods.

- This mature sunflower shows how tightly packed the seeds are as they grow.

IS IT A FRUIT, A NUT, A SEED, OR A LEGUME?

- Coconuts are a fruit, a nut, and a seed. Do a bit of research to find out why.
- Peanuts are marketed shelled and unshelled. Peanuts are legumes.

CULINARY APPLICATIONS OF NUTS

Chestnuts must be cooked before use in a culinary application whether boiled, braised, or roasted on an open fire. Cooked chestnuts can then be cooked for jam, purée, soufflé, or chestnut soup.

CULINARY APPLICATIONS OF SEEDS

The Mediterranean dessert, baklava, contains many seeds and nuts, including Brazil nuts (seeds), pistachios, and cashews between layers of phyllo. Is this a dessert that people with a nut allergy should avoid?

Name _____

Nuts, Seeds, or Legumes?

Purpose

The purpose of this activity is to test your knowledge of common ingredients.

Objectives

1. List the names of the common ingredients.
2. Sort the ingredients into one of three categories.

Materials

- lab sheet
- writing utensil

Procedure

In the space provided, name each of the 16 common ingredients shown and state if they are nuts or culinary nuts, seeds, or legumes.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____

Nuts, Seeds, or Legumes?


Brown flax seeds


Sunflower seeds


Peanuts


Poppy seeds


Pistachios


Almonds


Sesame seeds


Walnuts


Hazelnuts


Pine nuts


Wheat germ


Ground flax seeds


Golden flax seeds


Brazil nut


Cashew nuts


Pumpkin seeds

Nuts and culinary nuts: pistachios, almonds, hazelnuts, and cashews

Seeds: brown flax, sunflower, poppy, sesame, walnuts, pine nuts, wheat germ, ground flax, golden flax, Brazil nuts, and pumpkin

Legumes: peanuts

Name _____

This Is Nutty!

Purpose

The purpose of this activity is to practice recognizing different nuts through peripheral descriptive clues.

Objective

Identify specific nuts, seeds, and legumes through descriptive clues.

Materials

- lab sheet
- writing utensil
- class notes, reference texts, and/or Internet access

Procedure

1. Work individually or in pairs.
2. Read each set of clues. Then use your class notes, reference texts, and/or Internet websites to identify each set of clues as a nut, seed, or legume.
3. Place your answer in the space provided.

   a. This expensive, very high fat, cream-colored and flavored kernel grows in several places in the world, but it is famous for growing in Hawaii.

   _____

   b. This small flavorful nut is greenish in color, but the shell is often dyed red and even green during the holidays!

   _____

c. The brown and particularly hard shell on this nut makes it tough to crack. Before the shells are cracked, they are shaped like orange wedges.

_____

d. It has a light brown shell and a cream-colored "seed" that is a classic flavor used in pastries and liqueurs. It also makes a great spread mixed with chocolate in the product Nutella™.

_____

e. This nut is as American as apple pie and is famous for growing in Georgia.

_____

f. These "nuts" don't grow on trees; they grow underground and have paper-thin seed coats.

_____

g. Chefs call them "pignoli," but they are more commonly known by another term.

_____

h. They can be ground into a butter that is a common replacement for peanut butter. Somewhat sweet in taste, they are also the basis for marzipan, which is a classic European candy.

_____

i. It is not crunchy. It is commonly roasted on an open fire—especially during the holidays!

_____

j. You can find these in two varieties: black and English.

_____

k. Crescent in shape, these tender and rich edibles grow on trees only found in the southern hemisphere. A favorite of many, they are commonly found in Asian dishes and American snack bowls.

_____

4. In your own words, what are nuts?

5. In your own words, what are seeds?

6. In your own words, what are legumes?

7. Participate in a class discussion to determine the correct answer to each set of clues.

8. Turn in your completed lab sheet to your instructor.

This Is Nutty!

4a. Macadamia nuts (drupes)

4b. Pistachio nuts (drupes)

4c. Brazil nuts (seeds)

4d. Hazelnuts (true nuts)

4e. Pecan nuts (drupes)

4f. Peanuts (legumes)

4g. Pine nuts (seeds)

4h. Almonds (drupes)

4i. Chestnuts (true nuts)

4j. Walnuts (seeds and drupes)

4k. Cashews (drupes)

NOTE: Answers will vary for questions 5, 6, and 7.

5. Nut is the name for numerous types of fruit with a woody, tough, and hard outer shell that surrounds and protects a soft inner, skin that encloses an edible kernel.

6. Seed is the ripened ovule of a flowering plant: its reproductive unit protected in a seed coat.

7. Legumes are the fruit or edible part of the family of beans, peas, and lentils. Legumes generally grow underground.

Name _____

Culinary Applications of Nuts and Seeds

Purpose

The purpose of this activity is to answer high-level questions and three-dimensional problem solving regarding the culinary applications of nuts and seeds.

Objective

1. Identify traits directly related to nuts and seeds.
2. Differentiate between nuts and seeds.
3. Explain how cooking nuts and seeds effects their taste, aroma, and texture.

Materials

- lab sheet
- writing utensil
- class notes, reference texts, and/or Internet access

Procedure

1. Work individually or in pairs to complete these questions.
2. Respond in a complete sentence or two to each question.
   a. What is the primary difference between nuts and seeds?

b. Some people enjoy eating roasted pumpkin seeds. How does roasting affect the seed?

c. Are all seeds edible? Support your answer.

d. What is a seed coat? Describe how seed coats differ from seed to seed.

e. Is a kernel of corn a seed? Explain your answer.

f. Seeds all contain important nutrients, and it is no fluke. Why are they there?

g. Can seeds and nuts grow from the same seed? Think logically and explain.

h. Why are hulls softer than shells? Think about this question logically, too.

Culinary Applications of Nuts and Seeds

2a. A nut is a fruit or a part of the flower. A seed is a reproductive unit.

2b. Roasting improves and deepens the flavor of the pumpkin seeds. Roasting lengthens shelf life, and it kills the seed's ability to grow.

2c. Absolutely not! Apple, pear, lime, and avocado seeds are inedible, whereas pumpkin, zucchini, and sunflower seeds are edible.

2d. Seed coats are protective coverings of seeds. Some seed coats can be paper thin and flimsy, such as the type on peanuts; to somewhat firm and hard like a mini-shell on a sunflower seed.

2e. A kernel of corn is a seed. If allowed to dry and then planted or provided sunlight and moisture, it will sprout and grow into a new stalk of corn.

2f. Nutrients in seeds are designed to feed the seedling when it sprouts and begins to grow.

2g. Absolutely! Plants grow from seeds, and plants all "go to seed" or produce seeds to drop, in an effort to reproduce. When a plant produces a nut as a "flower," the seed has produced both seeds and nuts.

2h. Seeds are reproductive units designed to sprout and grow and the protective hull must be hard enough to protect the seed, but soft enough for the sprouting seed root to break the hull open. Nutshells are part of the fruit, fully designed to protect the kernel inside, and that protection is quite hard.