

A Rainbow of Nutrition

Subjects Taught: Science, Language Arts, Arts, Physical Education, Health

Grade Levels: 3rd - 5th Grade

Brief Description: Students will research foods made from plant families (with support as needed), identify family members and common nutrients and create artwork of one family group or a food made from that family.

Objectives: Students will:

1. Sort images of fruits and vegetables into plant families.
2. Select several choices from botanical groups of fruits and vegetables, identify foods made from that fruit or vegetable and find a photo of either the raw produce or food made from it.
3. Observe one fruit or vegetable, preferably grown in the school garden, and draw or write at least five characteristics in a science notebook.
4. Create a realistic art piece to showcase one of their produce or food choices.

Life Skills: creative thinking, evaluating, following directions, obtaining information, note taking, science process skills, scientific thinking, use of artistic supplies

Materials Needed:

- Fruits and vegetables preferably from the school garden
- Copies of the fruit and vegetable pictures cut into cards
- Fruits and vegetables, preferably from the school garden
- Computers with Internet access and color printers
- Watercolor paints or markers
- White drawing paper or watercolor paper
- Science tools (measuring tape, hand lens, forceps, etc.)

- Gloves (needed if class is going to eat fruit or vegetables after activity)
- Copies of *Nutrition in Common Student Handouts*

Time:

Preparation: 30-45 minutes

Five, 30 minute sessions

Preparation:

- Fruit and vegetable collection (live, models or images), preferably harvested from school garden
- Set up of markers or paints
- Collect cleaned, empty food containers and/or labels
- Print out images of *Family Food Cards*, cut them apart and laminate them for reuse
- Copy *Nutrition in Common Student Handouts*
- Plan for computer, Internet access and printer use

Vocabulary:

Names of fruits or vegetable as needed:

Allium family: chives, garlic, leeks, onions, scallions, shallots.

Lettuce (asteraceae) family: lettuce, sunflowers, romaine, Bibb lettuce, red leaf lettuce, oak leaf lettuce, green leaf lettuce.

Cabbage (brassica) family: cabbage, Brussels sprouts, broccoli, cauliflower, bok choy, radishes, mustard.

Gourd (cucurbit) family: cantaloupe, cucumber, pumpkin, watermelon, winter squash, zucchini.

Nightshade (solanaceae) family: eggplant, sweet peppers, hot peppers, potatoes, tomatillos, tomatoes.

Background Information:

Like people, plants have families and some of the members of those families may seem odd or a challenging fit. Yet, they have much in common because their genetics are similar, and they

Florida Standards Met At-A-Glance

National Next Generation Science	3-LA1-a, 4-LS1-a
English /Language Arts	3.RI.2.4, 4.RI.2.4, 4.RI.4.10, 5.RI.4.10, 3.W.3.7, 3.W.3.8, 4.W.3.7, 4.W.3.8, 5.W.3.7, 5.W.3.8
Physical Education	PE.3.L.2.5
Health	HE.3.B.1.4, HE.3.B.4.2, HE.4.B.1.4, HE.5.B.1.4
Science	SC.3.N.1.1, SC.3.P.8.3, SC.4.N.1.1, SC.4.L.17.2, SC.5.L.14.2



provide similar nutrients. It is fairly common knowledge that tomatoes are high in vitamin C. It is less well known that this is also true for the rest of their family - the Nightshade family, scientifically known as the Solanaceae (pronounced Sō-lə-`nā-she ee) family. This includes eggplant, sweet peppers, hot peppers, potatoes, and tomatillos along with tomatoes. Most adults know that citrus fruits all provide high amounts of vitamin C but it would be a challenge for most to identify the foods that give us zinc or B6. Why? We teach nutrition using food groups rather than nutrients.

This lesson begins to help students learn about nutrients from specific foods while at the same time appreciating the beauty and flavor of foods and perhaps developing an interest in exploring food preparation beyond a box, bag or a frozen package ready to microwave. It also helps students learn that while these plants may be members of the same extended family, each individual species has a wide variety of members in that family. Some examples include:

The Allium Family – Onions, garlic, shallots, scallions, chives and leeks.

The Solanaceae (or Nightshade) Family

Tomatoes – Tiny grape tomatoes, round cherry tomatoes, pear shaped cherry tomatoes, oval plum tomatoes, medium sized slicing tomatoes, or giant one to two pound sandwich tomatoes. They can be red, yellow, pinkish, purplish, green or striped.

Peppers – (in the same Nightshade Family) have an even greater assortment.

- Bell peppers are sweet and are green, red, yellow, orange, or purple.
- Jalapenos are two to three inches long, an inch in diameter, light green and are spicy with a slight heat.
- Peperocini are about the same size with the same level of heat but a different flavor than jalapenos and are yellow in color.
- Hungarian peppers are six to seven inches long, one and a half inches in diameter are slightly hotter and yellow in color.
- Ancho chili peppers are four and a half to six and a half inches long, and turn bright red when ripe and are hot.
- Habanero peppers are even hotter, are short lived and dented in colors of yellow-orange, pink-orange or orange-red.
- Other types of peppers include cayenne, fireball, serrano, anaheim, banana, paprika, and bhut jolokia peppers. They range in size, shape, color and taste and are much hotter than a jalapeno.

The Cucurbits (or Gourd) Family - Pumpkins, winter squash, cucumbers, zucchini, cantaloupe, watermelon

The Asteraceae (or Lettuce) Family - Different types of lettuce that include romaine, Bibb, butter head, or leaf lettuce. Leaf lettuce comes in different varieties such as oak leaf, curly leaf, red leaf or green leaf.

The Brassica (or Cabbage) Family - Cabbage, broccoli, cauliflower, bok choy, Brussels sprouts, kale

The Grass (or Cereal Grains) Family - Wheat, oats, rye, rice, corn, barley

As you examine each family group, and in particular their seeds, flowers, and seedlings, the similarities will be apparent. Yet as with human families, fruit and vegetable families can be very different from one another. Specific Florida fruits and vegetables are a focus of the *Gardening for Grades* book. Please refer to it for additional information.

Family Characteristics:

Grass family: They have hollow stems called culms and their flowers are arranged in spikelets.

Allium family: They are perennial bulbs that produce a chemical compound that gives off an odor that can be offensive.

Lettuce (asteraceae) family: They have a characteristic inflorescence which is a cluster of flowers arranged on a stem. Most are herbaceous and their name is derived from the Greek term aster which means star.

Cabbage (brassica) family: Their flowers consist of four petals that resemble a cross. They are mostly herbaceous and contain phytochemicals that have anti-cancer properties.

Gourd (cucurbit) family: They are annual vines with large white or yellow flowers. Their stems are hairy and pentangular. They have tendrils that are present at 90 degrees to the leaf petiole at the node and their leaves are simple palmate lobed or palmate compound.

Nightshade (solanaceae) family: They are a flowering plant with a flower that resembles the sun and its rays.



Introduction

1. Draw a large rainbow on a poster board and ask the students to draw pictures of fruits and vegetables of the colors of the rainbow. You can assign each student a specific color or just allow the student to draw their favorite. Once they have finished drawing and coloring have them place their fruit or vegetable on the matching color of the rainbow.
2. Foods come in a rainbow of colors. Show a variety of fruit and vegetable baskets that are harvested from the school garden or show images of fruits and vegetables of all colors.

3. Ask: “What science process skills could we use to find out more information about our food item?”
4. Have students discuss science process skills. There are six basic science process skills: observation, communication, classification, measurement, inference, and prediction. (If not already posted in room, teacher may write on chart paper as students discuss.)
5. What senses will we use to observe? Discuss safety of using senses in science exploration, especially wafting/smelling differences.

Activity One:

1. Explain that like people, plants have families. Sometimes the members of a family may seem like they don't fit together, but once you examine them you will see that they are connected by many of the same traits. These food families often provide the same nutrients as well.
2. Take the *Family Food Cards*, mix them up and have students sort them into the groups that they believe represent the same family.
 - a. Offer guidance as needed with questions to eliminate specific categories for confusing foods such as eggplant, melons, or potatoes such as;
 - “Is it juicy or is it dry?”
 - “Are they the same shape?”
 - “Are the seeds visible or available? What do they look like?”
 - “Where do you think it grows? Underground? On a vine? On a bushy plant?”
 - “Does it look like any other produce?”
 - “Are the visible leaves the same color?”
 - “Are the visible leaves the same shape?”
 - “What do the flowers look like?”
 - “Have you eaten any of these vegetables? What did they taste like? What did they smell like when cooking?”
 - b. If seeds for specific plants are available, allow students to see what that particular plant's seeds look like.
3. As students begin to complete the sort, begin a discussion to allow students to move food cards as needed. Ask students to describe how many of the foods in each group look similar. “What traits do they have in common?” As needed, offer support to direct the discussion toward the flowers or seeds related to each family of fruits or vegetables.
 - a. There may be some that are difficult to place – potatoes and eggplants are examples. Show students the flowers of those plants and others from the solanaceae family.
 - b. If all images are not able to be placed, share the link with students.

4. Once all the food cards are sorted correctly, explain that because these foods are families they provide many of the same nutrients. We are also learning that they also provide food.
 - a. Ask: “How many of you like onions?” (It is likely that most students will say that they do not like onions.) Challenge them that they may like onions more than they know.
 - b. Ask: “Is ketchup, pizza or spaghetti sauce anyone’s favorite food?” All of these foods have onions in the ingredients and without onions they would not taste like ketchup, pizza or spaghetti sauce. Read food labels to confirm this.
 - c. Review that onions, garlic, scallions, leeks and shallots all belong to the same family. Poll students to find out how many have eaten any of these foods before.
5. Students choose a fruit or vegetable from the school garden (or those discussed in activity one) that they wish to observe and research.
6. Using the Internet, students research a specific fruit or vegetable from the garden or food card to find an image of a dish made with this ingredient to print out.
 - a. Have them complete the *Nutrition in Common Student Handout* for their food item and prepare to share the nutritional information.
 - b. Good websites for students to use are Fruits: www.floridaplants.com/growing.htm; vegetables: www.growincrazyacres.com/Florida-Planting-Guide.php; USDA food gallery: <http://www.ars.usda.gov/is/graphics/photos>. The illustration category has food grouping information, and the USDA nutrient database.

Activity Two:

1. Using science tools, have students observe, record and sketch characteristics of the produce and food item. Have students share their work as they finish.
2. Have students create a still life, realistic drawing or painting of the fruit or vegetable and the dish in which it’s used. (Have students share their artwork as they finish.)
3. Place completed items to dry and complete Internet research.
4. As each student gives their presentation of their artwork, research and Internet photos, have other students complete the chart on the *Nutrition in Common Student Handout*.
5. Discuss with students the nutrients that each group has in common. Ask how this influences the nutrients they receive based on their eating habits.

Evaluation Options:

1. Assess food family card sorting and cooperative work.
2. Assess student completion, accuracy, and thoroughness of drawing or writing at least five characteristics in the science notebook.
3. Assess student artwork for creativity and completeness.
4. Assess student completion of the *Nutrition in Common Student Handout*.

Extensions and Variations:

1. After the students have completed their artwork on their food item, have them create a collage or poster of all the different things their food item is made into. For example, if they had tomato they could put spaghetti or pizza on their collage.
2. Have students identify what a serving size for their food is and where their produce or finished food item fits in the *MyPlate* graphic organizer on page 58. Be sure to indicate child or adult size portions.
3. Hold a “Rainbow of Nutrition Food Fest” to showcase student artwork and healthy eating choices. If you have ripe fruits and vegetables from your garden, you could also provide samples for taste testing.
4. Ask students to research berries and determine whether they are all in the same family or not. Discuss the similarities and differences of the berries and the nutritional value of several varieties.

Resources:

Fruits: www.floridaplants.com/growing.htm

Vegetables: www.growincrazyacres.com/Florida-Planting-Guide.php

USDA food gallery: www.ars.usda.gov/is/graphics/photos
The illustration category has food grouping information.

CPalms: www.cpalms.org/RESOURCES/URLresourcebar.aspx?ResourceID=Lfxk/75OVn0=D

CPalms: www.cpalms.org/Resources/PublicPreviewResourceCollection.aspx?ResourceCollectionId=1

Rainbow of Nutrition

Sample Pre-Post Assessment

1. Which of these foods are in the same family of plants: tomato, pepper, onion, wheat, pumpkin, cabbage, potato, eggplant, lettuce? Why?
2. What is the major nutrient of foods from winter squash, cantaloupes, and watermelons?
3. Which of the vegetables listed above are high in Vitamin C?

Allium Family

Food Cards

Onions**Garlic****Chives****Leeks****Shallots****Scallions**

Nightshade Family (Solanaceae)

Food Cards

Tomatoes



Sweet Peppers



Hot Peppers



Eggplant



Potatoes



Tomatillo



Gourd Family (Cucurbits)

Food Cards

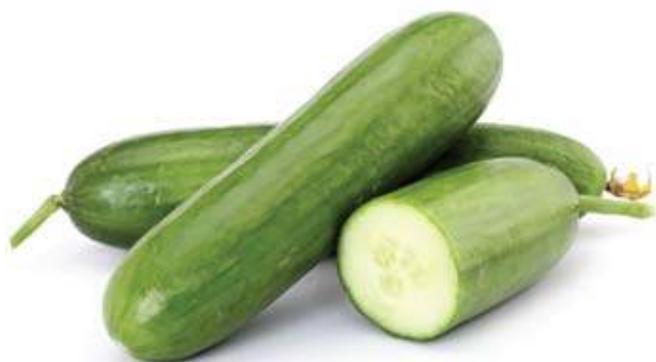
Pumpkins



Winter Squash



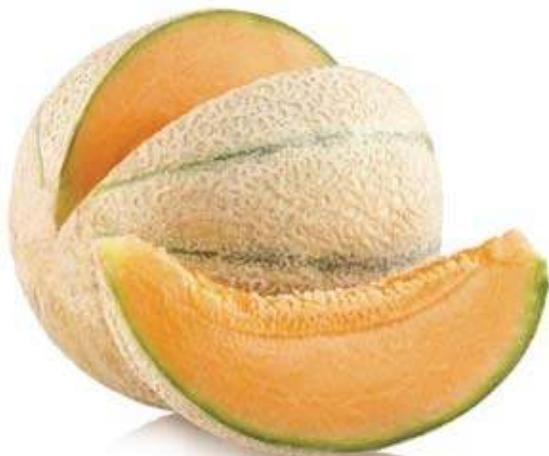
Cucumbers



Zucchini



Cantaloupe



Watermelon



Lettuce Family (Asteraceae)

Food Cards

Iceberg Lettuce



Bibb Lettuce



Romaine Lettuce



Green Leaf Lettuce



Oak Leaf Lettuce



Red Leaf Lettuce



Cabbage Family (Brassica)

Food Cards

Cabbage



Broccoli



Cauliflower



Bok Choy



Brussels Sprouts



Kale



Grass Family (Cereal Grains)

Food Cards

Wheat



Oats



Rye



Rice



Corn



Barley



Solanaceae Flowers

Food Cards

Typical Nightshade Flower



Tomato Flower



Potato Flower



Eggplant Flower



Sweet Pepper Flower



Tomatillo Flower



Nutrition in Common

STUDENT HANDOUT

Name _____

Family of Foods	Choices	Food Example	Nutrients, Health Benefits, Plus	Find a Picture Online
Allium Family: Onions Garlic Chives Leeks Shallots Scallions				
Solanaceae Family: Tomatoes Chili Peppers Sweet Peppers Potatoes Eggplant Tomatillo				
Gourd Family (Cucurbit): Pumpkin Winter Squash Zucchini Cucumber Cantaloupe Watermelon				

Nutrition in Common

STUDENT HANDOUT

Name _____

Family of Foods	Choices	Food Example	Nutrients, Health Benefits, Plus	Find a Picture Online
Cabbage Family (Brassical): Cabbage Broccoli Cauliflower Brussels Sprouts Bok Choy Kale				
Lettuce (Asteraceae Family): Iceberg Lettuce Bibb Lettuce Romaine Lettuce Red Leaf Lettuce Green Leaf Lettuce Oak Leaf Lettuce				
Cereal Grains from the Grass Family: Wheat Rye Rice Corn Barley Oats				

Name: Answer Key

Nutrition in Common

Family of Foods	Choices	Food Example	Nutrients, Health Benefits, Plus	Find a Picture Online
Allium Family: Onions Garlic Chives Leeks Shallots Scallions	Onions Garlic Chives Leeks Shallots Scallions	Soups, salads, Chinese food, ketchup, fajitas, spaghetti and pizza sauce As a baked potato topping with sour cream, as a garnish Soup Italian foods On vegetable trays, soups, salads	High in Vitamin C Anti-bacterial Antioxidants Lowers bad cholesterol Carbohydrates Fiber	
Solanaceae Family: Tomatoes Chili Peppers Sweet Peppers Potatoes Eggplant Tomatillo	Tomatoes Chili Peppers Sweet Peppers Potatoes Eggplant Tomatillo	Soups, spaghetti sauce, pizza sauce, salads, chili, sandwiches, ketchup Tex-Mex food, spicy Chinese food, Hot sauce, hot chicken wings, pepper flakes, Chili, fajitas, sweet pickles, in fresh vegetable crudites, stuffed peppers Washed, boiled, baked, scalloped, French fries, tater tots, salads, soups Eggplant parmesan, ratatouille, babaganoush Salsa verde, enchilada suizas	Carbohydrates High in Vitamin C Anti-oxidants Minerals Fiber Flavor	
Gourd Family (Cucurbit): Pumpkin Winter Squash Zucchini Cucumber Cantaloupe Watermelon	Pumpkins Winter Squash Cucumbers Zucchini Cantaloupe Watermelon	Pumpkin pie, pumpkin bread, muffins Squash, pumpkin pie Salads, sliced, pickles, relish, tartar sauce, Thousand Island salad dressing Bread, pickled, steamed Sliced, fruit salad	Vitamin A Carbohydrates Fiber Anti-oxidants	

Name: Answer Key

Nutrition in Common

Family of Foods	Choices	Food Example	Nutrients, Health Benefits, Plus	Find a Picture Online
Cabbage Family (Brassicai): Cabbage Broccoli Cauliflower Brussels Sprouts Bok Choy Kale	Cabbage Broccoli Cauliflower Brussels Sprouts Bok Choy Kale	All steamed or in stir fry	Vitamin C B Vitamins Vitamin K Magnesium Calcium Copper Potassium Iron Manganese Phosphorous	
Lettuce (Asteraceae Family): Iceberg Lettuce Bibb Lettuce Romaine Lettuce Red Leaf Lettuce Green Leaf Lettuce Oak Leaf Lettuce		In salads	Fiber Vitamin A Vitamin K B vitamins Vitamin C Iron Calcium Magnesium Potassium	
Cereal Grains from the Grass Family: Wheat Rye Rice Corn Barley Oats	Wheat Rye Rice Corn Barley Oats	Breads, pastas, cakes, cookies, cereals, tortillas, crackers Rye bread, pumpernickel bread, rye crackers Chinese food, Spanish rice, rice cakes, baby food, soups Tortillas, corn chips, breakfast cereals, soups, corn bread, corn muffins Soups, tea, vegetarian dishes Oatmeal, oatmeal bread, oatmeal cookies, granola, granola bars	Carbohydrates Protein High in B vitamins Fiber in whole grains Oils in whole grains	