

Apple Investigation

*A lesson from the New Jersey Agricultural Society
Learning Through Gardening program*

OVERVIEW: Fall is the time to investigate apples! In this lesson, students learn that all apples (as well as all types of fruits and vegetables) are not the same. One variety of apple can be very different from another. In this apple investigation, students test different varieties of apples for nine characteristics – including weight, shape, color texture, and taste – and rank them. They graph results of their taste tests, read about the history of apples and how they are grown, and learn the parts of an apple.

GRADES: 3-5

OBJECTIVES: The student will be able to:

- Explain the meaning of a *variety* of a fruit or vegetable.
- List the parts of an apple and their functions.
- Compare different varieties of apples by nine criteria and rank them according to their preferences.
- Graph the results of a class taste test.



Read about the history of apples and the cultivation process.

MATERIALS:

Apples of four or five different varieties, including different colors (red, pink, green, yellow), one of each variety for each group of four students.

Plastic knives for cutting apples

Apple Testing sheet – one per student

Apple Facts sheet – one per student

Parts Of An Apple chart – one per student

PROCEDURE:

Ask students in their small groups to brainstorm what they know about apples: their history, how they are grown, where they are grown, etc. Bring the whole class together and ask the groups to report their apple facts. Ask a student to record the facts.

Cut up an apple to show the students the different parts:

Calyx: what is left of the apple blossom on the bottom of the apple

Flesh: the sweet part of the apple that you can eat

Seeds: can be used to grow new apple trees, but it takes a long time

Skin: covers and protects the apple's flesh and seeds

Stem: attaches the apple to the apple tree, bringing water and nutrients to the apple

Next, explain to students that there are many different varieties of apple. There are more than 7,500 varieties or types of apples grown in the world and about 2,500 varieties grown in the United States. In New Jersey, 30 apple varieties are grown.

Explain to students that they are going to investigate a few different varieties of apples. Give each group and the *Apple Testing* sheets to each student. They will be using the sheets to fill in the chart for each variety of apple. After tasting all the apples, they should then rate them for taste, with 5 being the best taste. Explain that students can use any number from 1 to 5 to

Give each student an *Apple* chart to each student. Ask students in small groups to label the parts of an apple onto a piece of paper and label them – calyx, flesh, seeds. Students then describe the function of each part on the *Parts Of An Apple*

Give each student an *Apple Facts* sheet to each student. Ask students to read the sheet silently in their small groups. Ask the groups to discuss and list facts that were new and/or interesting to them.

Bring the whole class together. Ask each group to report on their thoughts on the *Apple Facts* sheet. Then ask the groups to report each student's results of the apple taste test. Tally the results on the board. Then ask each student individually or in their small groups to graph the taste test results.

EVALUATION:

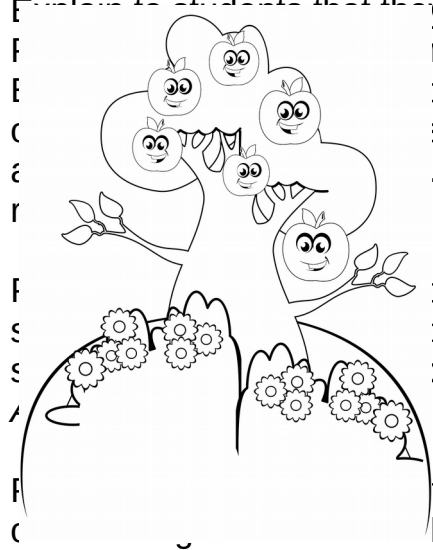
Successful completion of *Apple Testing* sheet, *Parts Of An Apple* sheet, and apple taste test results graph.

Students write a paragraph summarizing what they consider the most interesting information from the *Apple Facts* sheet.

New Jersey Learning Standards

Science: 3:LS1.B 4:LS1.A 5:LS2.A

English Language Arts: 3:RI.3.1,2,4; W.3.2.A-D; W.3.4,8
4:RI.4.1,2,4, W.4.2.A-E, W.4.4,8
5:RI.5.1,2,4, W.5.2.A-E; W.5.4,8



EXTENSIONS:

Read books about the life cycle and the history of apples such as:

An Apple Tree Through The Year, by Claudia Schnieper

Apples, by Phyllis Limbacher Tildes

The Life and Times of the Apple, by Charles Micucci

Make applesauce.

Tour a local apple orchard.



NAME

Parts of An Apple

Beside each word, write what this part does for the apple.

Calyx	
Flesh	
Leaf	
Seeds	
Skin	
Stem	

APPLE FACTS

The average American eats about 65 apples a year. There are more than 7,500 varieties or types of apples grown in the world and about 2,500 varieties grown in the United States. In New Jersey, 30 apple varieties are grown. Apples are the fruit of apple trees. They have green, red, pink, or yellow skin and are used to make apple juice, cider, vinegar, applesauce, and many kinds of salads and desserts.

Apple trees grow in all 50 states, but for efficient fruit production they require a cold period called *vernalization*. Vernalization takes place during the cold winter months while an apple tree is dormant. Without this cold period, apple trees will not develop flower buds to produce a good crop of apples. The top three apple producing states in the United States are Washington, New York, and Michigan. All three of these states have a significant winter season.

Apple trees are not typically grown from seed because it takes about 15 years for an apple tree to grow from a seed and produce an apple. Instead, most apple trees are grown by *budding* or *grafting* onto *root stocks* – sections of tree roots still attached to a part of the tree trunk.

Budding involves taking one bud from an existing tree branch and attaching it under the bark of a root stock with special grafting tape or glue. *Grafting* is similar, but rather than a single bud, a section of a stem with multiple leaf buds is attached to the root stock with grafting glue and tape. Grafted or budded trees usually grow in a nursery for about one year before being planted in an orchard.

An apple can be divided into several parts. The skin covers and protects the apple's flesh and seeds. The flesh is the sweet part of the apple. The stem is what attaches the apple to the apple tree, bringing water and nutrients to the apple. The seeds can be used to grow new apple trees. The calyx at the bottom of an apple is what is left of the apple blossom.

Honeybees are commonly used to pollinate apple trees. Almost all varieties of apples require cross-pollination, meaning that pollen from a different variety is needed to produce fruit. Apple trees require full sunlight and well-drained soil. Most apples are ready to harvest in the late summer or early fall.



We've all heard the saying, "An apple a day keeps the doctor away." While eating apples does not guarantee good health, apples do have healthy benefits. Apples are naturally free of fat, sodium, and cholesterol, and are an excellent source of fiber and antioxidants. A medium apple contains about 80 calories and is loaded with vitamin C and beta-carotene. Be sure to eat the skin. Most of the fruit's antioxidants, vitamin C, and fiber are located in, or just under, the skin.

Did you know?

- On average, Americans eat more apples than any other fruit.
- It takes about 36 apples to create one gallon of apple cider.
- 25% of an apple's volume is air; that's why they float in water.

Classroom Applesauce Recipe

Ingredients	Equipment
12 tart apples	Apple peeler
1 1/2 cup sugar	Slicing knife
1 1/2 teaspoon cinnamon	Crock pot
3 cups water	Liquid measuring cup
3 tablespoons lemon juice	Measuring spoons
Plastic cups, 1 per student	Wooden spoon
Plastic spoons, 1 per student	

1. Before beginning this activity, students should wash their hands.
2. Explain to the students that apples are used to make apple juice, cider, vinegar, applesauce, and many different kinds of salads and desserts. Today they will be making and tasting homemade applesauce.
3. Explain the process of making applesauce to the students. Show the students the applesauce recipe, pointing out the ingredients list and directions.
4. The apples need to be peeled, cored, and sliced. Show the students how the apple peeler works and which parts are sharp. Allow students to take turns using it to peel the apples. An adult should use the knife to core and slice the apples.
5. Allow students to place the apples into a large slow cooker and mix in cinnamon and sugar. Several students can take turns mixing with a wooden spoon. Pour water and lemon juice over the apples. Cook on high for 3–4 hours until the apples are soft.
6. When the apples are ready, allow students to take turns mashing the apples into applesauce using the wooden spoon. Give each student a cup of applesauce to taste.