

# Apple

## Grow

### *As American as Apple...*

Apples are grown in all 50 of the United States. The top states for apple production are Washington, New York, Michigan, Pennsylvania, California and Virginia.<sup>1</sup>

For North Carolina, apples are an important part of the agriculture economy. Apples grow best in the mountain region in the western part of the state.<sup>2,3</sup>

**Fun Fact:** New York is often called “The Big Apple”.<sup>1</sup>

Apples are a fruit that grow on trees. Apples trees can be planted to provide both fruit and shade. Young apple trees can be bought from a nursery and planted from late fall to early spring. Apple trees are generally sold as two parts of different trees that are put together through a process called grafting. The bottom half, called the root stock, determines whether the tree will be small or large, and the top half determines what type of apple will grow. It may take 3-6 years for the tree to blossom and produce apples.<sup>3</sup>

## Choose

### *Varieties Galore!*

Sweet or tart—there is an apple for every taste. Apples come in different sizes, colors and flavors. A number of different cultivars of apples are grown in North Carolina alone. Red Delicious, Golden Delicious, Granny Smith, Gala, Fuji, Honey Crisp, Empire, Rome Beauty and Pink Lady are just a few examples.<sup>2,3</sup>

**Fun Fact:** About 2,500 apple varieties grow in the U.S.<sup>4,7</sup>

### *All Year Long*

Apples can be available year round, either fresh or from cold storage. N.C. apples can be purchased July through February. Peak harvest is mid-August through October. Smaller apples are usually less expensive than and just as delicious as larger apples. Choose firm apples with smooth skin. Be mindful of bruises, wrinkles or soft spots.<sup>2,3,5</sup>



## Store

### **There is a saying—one bad apple spoils the whole bunch.**

Take care in storing apples. If stored in the best conditions, apples should stay fresh for 3-8 months. Store fresh apples in a cool, dark place (32-36°F is optimal). Apples pick up and give off odors. Some fruits and vegetables, like apples, produce ethylene gas. Ethylene gas can cause produce to ripen quickly. Avoid storing apples near produce that is sensitive to ethylene, like bananas or nectarines.<sup>3,5</sup>

Once an apple is cut, it will begin to turn brown. To avoid browning, try dipping apple slices in an acidic juice, like lemon juice.<sup>3</sup>

**Fun Fact:** Golden Delicious apples do not brown as easily as other varieties. Cut them into slices to enjoy as a snack!<sup>1</sup>

## Use

Apples can be eaten raw or cooked and can be sweet or sour, depending on the variety. Apples can be purchased fresh—whole or sliced. They can also be sold in slices canned, frozen, or dried or as sauce or juice. Apples are washed after harvesting, which removes the natural wax that preserves their shelf life. A food wax can be used on apples to replace the natural wax. Before eating, wash fresh whole apples under clean, running water that is the same temperature as the apple to prevent any wax from becoming milky or cloudy.<sup>3,4,5</sup>

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## Teach

**Did you know that commercial apples are not grown from apple seed?** Because apple seeds do not produce “true to variety”, growers use grafting to produce trees that will bear fruit of the same apple variety.

**Did you hear the buzz?** Honey bees are very important in apple production. Bees pollinate the apple tree blossom, forming an apple. Apples cannot self-pollinate so they must receive pollen from another variety of apple tree, carried by bees. A single bee can carry 100,000 pollen grains from flower to flower, cross-pollinating as it moves from tree to tree. A well-pollinated apple has an average of 5-12 seeds. Apple seeds are distributed among five seed chambers or carpels, found near the core. If an apple blossom is poorly pollinated, fewer seeds will form and the resulting apple will be small. An apple with few seeds will likely fall to the ground and not mature. If an apple develops more seeds on one side, it will be lopsided.<sup>1</sup>

**Fun Fact:** October is National Apple Month!<sup>1</sup>

### Class Activity - Apple Examination

#### Materials needed:

- Lopsided apples, cut in half

#### Steps: \*Use food safety steps. Wash hands and produce.

1. Look for the carpels. Compare the number of seeds in each half. The larger side should have more seeds.

**Fun Fact:** Cut an apple crosswise to observe how the seeds and carpels form a “star” design.

### Red, Yellow, Green...Brown?

Once you cut into an apple, the inside will begin to turn brown. This is called oxidation. When the inside of the apple comes in contact with oxygen in the air, an enzyme called polyphenol oxidase (PPO) reacts chemically with other compounds in the apple and what you see is a brown coloring of the fruit. This enzyme reaction can be prevented by inactivating the PPO by adding lemon juice.<sup>1</sup>

## Eat

One small apple has about 77 calories. One cup of apple slices has about 57 calories. Apples are cholesterol free, low in fat and sodium, and a good source of vitamin C and fiber. Vitamin C helps form collagen to hold muscles, bones and tissues together, protects us from infections and bruising, aids in healing, keeps our gums healthy, helps our body absorb iron and folate from plants, and acts as an antioxidant to prevent cell damage. Soluble fiber helps lower blood cholesterol. Insoluble fiber aids digestion. Flavonoids in apples act as antioxidants and may contribute to heart health.<sup>1,4,6-7</sup>

**Fun Fact:** One American eats about 120 apples a year!<sup>4</sup>

### Class Activity - Oxidation

#### Materials Needed:

- 3 bowls (1 filled with water, 1 filled with water and lemon juice, and 1 filled with apple juice)
- 1 apple cut into quarters

#### Steps: \*Use food safety steps. Wash hands and produce.

1. Dip 1 apple quarter into the bowl of water, dip 1 into the water and lemon juice, and dip 1 into the apple juice. Leave the 4<sup>th</sup> quarter on the table.
2. Label each apple according to exposure (air, apple juice, water and lemon juice, and water).
3. Place each apple quarter on the table for 10 minutes.
4. Observe browning reactions. The apples exposed to air and water will brown more than the apples exposed to the lemon and apple juices. The juices lower the pH of the apple and cause the PPO to become less active.

## Find

For more apple info and resources, visit:

1. U.S. Apple Association, <http://usapple.org>
2. N.C. Department of Agriculture & Consumer Services, [www.ncagr.gov](http://www.ncagr.gov)
3. North Carolina State Extension, [www.ces.ncsu.edu](http://www.ces.ncsu.edu)
4. Nebraska Extension, <http://lancaster.unl.edu/nep/fruitveggie.shtml>
5. U.S. Department of Agriculture, Food and Nutrition Service, [www.fns.usda.gov](http://www.fns.usda.gov)
6. Academy of Nutrition and Dietetics, [www.eatright.org](http://www.eatright.org)
7. Produce for Better Health Foundation, <http://fruitsandveggies.org>