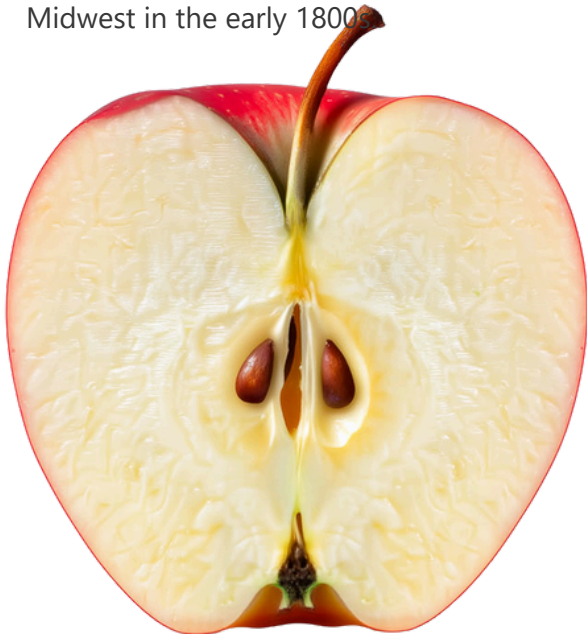




APPLES

What is It?

- Washington grows more apples than any other state in the United States with popular varieties like Gala, Red Delicious, Granny Smith, and Honeycrisp.
- Cosmic Crisp apples were developed by Washington State University and are exclusively grown in Washington state.
- Apples originated in the Tien Shan mountains of Kazakhstan and spread along the Silk Road as travelers discarded seeds.
- Crabapples are the only apples native to North America.
- Modern apples are typically grown from grafts, but early American apples grew mostly from seedlings.
- Johnny Appleseed (John Chapman) spread apple tree seedlings across the East and Midwest in the early 1800s.



Grow It

- Planting the seed from your favorite apple variety will not grow that same variety and will likely produce apples that are bitter. To get a desired variety of apple (like Gala or Honeycrisp), trees are grafted. This is a special technique that involves taking a branch from the desired variety and attaching it to a rootstock, which is the lower stem portion of another tree. The branch will eventually grow into the rootstock to form a new tree.
- To grow apples, more than one variety must be planted near each other so that the pollen from their flowers can mix, allowing fruit to develop. This process is called pollination. Purchase one-year old trees of different varieties that possess multiple branches and are certified to be disease resistant. Plant in early spring, allowing 35-45 feet of growth space for standard-size apple trees, less for dwarf varieties.
- Apple trees are an excellent long-term option for schools. Maintenance is minimal and the fruit is in season during the school year.



Apples in Grant County, credit: WSDA



Scientific Investigation of Apples

Learn It

Grades 3–10

Objectives

This activity demonstrates the process of oxidation and how to set up a scientific experiment. Students will be able to:

- Set up a scientific experiment and make a hypothesis
- Explain the process of oxidation
- Determine the effects of different liquids on oxidation

Materials

- A few slices of apples, half covered in lemon juice and half without
- Two apples of the same variety
- Knife and cutting board
- One tablespoon each of lemon juice, water, and apple juice
- Plate

Directions

1. Show students two plates with apple slices (one plate of fresh-looking slices treated with lemon juice and one with brown apple slices that are not covered in lemon juice). Ask students which of the apple slices they would prefer to eat. Call on students and have them explain why they preferred one over the other (a likely answer is that the slices with lemon juice look fresher and more appealing).
2. Ask the students why they think half of the apple slices turned brown but the other half didn't. Allow students to share their answers. Explain that you did something to the apples that didn't turn brown, and that the class is going to conduct an experiment to find out which liquids prevent apples from turning brown.
3. For students 6th grade and above, introduce the word oxidation. Explain that oxidation is a browning reaction that occurs when the apple comes in contact with the air and loses electrons. Another type of oxidation students might be familiar with is rust—this occurs due to the same chemical reaction when metal comes in contact with oxygen.
4. With younger students, introduce the experiment supplies (apples cut in half, lemon juice, apple juice, and water) and the procedure (pour 1 tablespoon of each liquid over three apple halves and do not pour anything over the fourth half. Observe the differences in browning of the apples after one hour). You may want to have older students develop an experiment to test the effect of certain liquids on browning of apples and record their data and results. Ask students to make a hypothesis about what will happen with each liquid.





Scientific Investigation of Apples

Learn It

Directions

5. Begin the experiment by following the procedure mentioned above. Set the apples in a visible spot in the classroom and allow students to observe the changes after one hour. Older students may want to observe the apples directly after applying the liquids and note the time it takes for each reaction to occur.
6. After an hour, ask which method worked the best and discuss possible reasons why. Close the lesson by reviewing the concept of oxidation and having students think about other applications of the results (could this liquid be used to prevent other fruits from turning brown? Could it be added to fruit salad?). Challenge the students to think about a reason why oxidation matters. Brown apples may not be appealing to you to eat or rust on a car may cause problems.

Lesson adapted from California Harvest of the Month, Apples, and Scientific and Health Education Partnership, "What factors affect the oxidation of apples?"



Eat It

The saying “an apple a day keeps the doctor away” has truth to it. Apples are a good source of fiber, which is important for maintaining a healthy heart and digestive system and regulating blood sugar. They also contain vitamins and minerals like vitamin C, which helps with healing, keeps skin and gums healthy, and supports immune function, and potassium, an electrolyte that helps build muscle and keeps your heart healthy. Most of the apple’s nutrients are located just below the skin and are removed when peeled.



Apples in Walla Walla, credit: WSDA

Read It

- [Apples](#), by Gail Gibbons
- [Apples for Everyone](#), by Jill Esbaum
- [How do Apples Grow?](#) by Jill McDonald
- [Amelia Bedelia’s First Apple Pie](#), by Herman Parish
- [Johnny Appleseed](#), by Lori Haskins Houran

More About It

- [Apple Fact Sheet from Washington Apple Commission: Did You Know? Apple Facts](#)
- [Harvest of the Month Information for Classrooms by Seattle Public School Educators Flyer Apples](#)
- [Classroom Lessons from Washington Agriculture in the Classroom:](#)
 - [K-2nd Grade A is for Apples](#)
 - [3rd-5th Grade: Apple Science: Comparing Apples and Onions](#)
 - [6-8th Grade: Apple Genetics: A Tasty Phenomena](#)
 - [6th-12th Grade: Apples and the Science of Genetic Selection](#)

This resource was adapted for Washington state from Montana Harvest of the Month Classroom Bites: Apples. [HOM Apples Classroom Bites](#)