

# Bad Fruit

**Grades:** K-5

**NGSS:** PS1.B: Chemical Reactions

**Subject:** Chemical reactions  
Acids  
Oxidation

**Skills:** Critical thinking, observation,  
experimentation

**Materials:** Apple, knife, glass of water, three  
bowls, lemon juice

## BACKGROUND

*Oxidation* is a chemical reaction that happens when a chemical combines with oxygen. One type of oxidation occurs when the inside of fruit is exposed to the oxygen in the air. This is the reason that apples and avocados start to turn brown after you cut them open.

## ACTIVITY

1. Go over the background information with your students.
2. Cut three, thin slices from the apple. Ask students to predict whether water, air, or lemon juice will best preserve the apple slice.
3. Then, put one apple slice in each bowl. Pour water into one bowl, just covering the apple. Pour lemon juice into the second bowl, just covering the apple. Leave the third slice in a bowl by itself.
4. Let the bowls sit for a minimum of 30 minutes. Then, ask students what they notice. Were their predictions correct?

## HOW IT WORKS

When water is poured onto the apple slice the air is slower to oxidize with the apple because the water is in the way. Still, the apple will turn brown because there is oxygen in water. Lemon juice is acidic, and contains the chemical ascorbic acid, which most people know as Vitamin C. Oxygen is drawn more to acid than it is the cells in the apple, so the lemon juice oxidizes before the apple slice. When the Vitamin C in the lemon juice is completely oxidized, the apple slice will begin to turn brown.



## DISCUSSION

Ask students if they have heard of the term “preservatives.” A preservative is a substance which protects food, wood, and other materials from decay, making it last longer. Ask students if lemon juice is a preservative. Answer: yes. Many chemicals are used as preservatives. Some, like Vitamin C, are called antioxidants because they stop oxidation from occurring.



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