“Fresh Frontiers” Apple Activity
Created by Emily Holden of Oregon State University
Adapted from Oregon Agriculture in the Classroom Foundation

Description
“Fresh Frontiers” outlines the efforts of OSU researchers to provide consumers with a safer food supply. From using pressure to using raisins, researchers are getting creative and finding ways to make our food safer, without chemicals.

The Apple Activity encourages students to reach a higher level of Bloom’s Taxonomy of Cognitive Thinking, because they will be applying the ideas they read about in their own experiments.

Time Estimate
One 45- to 50-minute class period and 5 minutes for 10 days to record the progress of the experiments

Student Outcomes and Objectives
• Students will explore alternative techniques to preserve foods.
• Students will conduct research on alternative preservation techniques.

Standards
Science
H.4D.5: Describe how new technologies lead to scientific inquiry are responsible for changes in the ways people live and work.
H.4D.6: Evaluate how ethics, public opinion and government policy influence engineers and scientists and how their results impact human society and environment.

Language Arts
EL.HS.RE.01: Read at an independent and instructional reading level appropriate to grade level.
EL.HS.RE.02: Read and understand a wide variety of informational text.
EL.HS.RE.05: Match reading to purpose.
EL.HS.RE.06: Understand and use a variety of comprehension strategies as needed such as summarizing, class and group discussions and making predictions.
EL.HS.RE.08: Understand, learn and use new vocabulary that is taught through informational text.
EL.HS.RE.15: Read magazines and news stories.

Career-Related Learning Standards
CS.PM.02: Plan, organize and complete assigned tasks on time, meeting standards of quality.
CS.HS.01: Locate, process and convey information using traditional tools.
Materials
- Copies of “Fresh Frontiers” from the 2009 issue of Oregon's Agricultural Progress magazine, a special issue on Food in Oregon
- Apples
- Plastic knives
- Lemon juice
- Water
- Tablespoon
- Measuring cup
- Vinegar
- 3 different colored strings or thin ribbons

Vocabulary
Atmospheric pressure: the pressure that is exerted by the atmosphere. It varies based on elevation.

Contaminated: exposed to a dangerous or poisonous substance.

Pathogens: bacteria, viruses and other microorganisms that can cause disease.

Pasteurization: using high heat to sterilize a food item.

Spores: one-celled organisms that are capable of reproduction.
Procedure for “Fresh Frontier” Apple Activity

1) Hand out copies of the “Fresh Frontier” article and have students read it.
2) Group students in groups of three.
3) Hand out an apple to each student, and have him or her peel and core it.
4) Each group will do one set of apples.
5) Have the students treat the apples as follows:
   a. One apple will not be treated.
   b. One apple will be dipped in a solution of 2 cups water and 2 tablespoons lemon juice.
   c. One apple will be dipped in a solution of 2 cups water and 2 tablespoons vinegar.
6) Students will then hang up their apples.
   a. You can use colored string to differentiate between the different treated apples.
7) Over the next 10 days, have students keep daily observations about how each of the different apples is decomposing.
   a. Some observations to consider are:
      i. Circumference
      ii. Weight
      iii. Color changes
      iv. Changes in shape
      v. Is anything growing on the apples?