



APPLE SCIENCE

Preserving
Experiment

Carly and Adam



Water



Co

APPLE EXPERIMENT

Teacher Instructions

Materials for each group:

- apples (4-6 slices per group)
- apple slicer
- plastic baggies
- lemon juice
- 3-4 other substances to test (ex. water, oil, lemon lime soda, vinegar)

*The substances you test may vary depending on what you have on hand.

- Pencils
- tape
- scissors
- STEM journal

Instructions:

- This experiment can be completed in groups of 3-4 or as a whole class investigation.
- Review the vocabulary words with students.
- Have students read the task instructions (purpose) or read them aloud.

APPLE EXPERIMENT

Instructions (Continued):

- Have students read the research about apple oxidation or read it aloud.
- Students will then make a prediction about which substance they think will slow down the apple oxidation keeping the apple from turning brown.
- Set up the experiment by cutting the apple into slices (this step should be done by the teacher). Place one apple slice in each labeled bag and lightly cover it with each substance.
 - *The substances in the bags can vary but there must be one bag with lemon juice and one bag with only an apple slice (this is the control group).
- Leave the apples in the bags for at least 1 hour. Then have students record their observations and analyze the results.
- At the end of the experiment students should reflect on their results.
 - *The results of the experiment should show that the lemon juice was the best at preventing the apples from turning brown. This is because the citric acid in the lemon juice prevents oxidation and browning.

APPLE EXPERIMENT

Instructions (Continued):

- As an optional extension activity have students write a letter to Danny (the boy from the task instructions) explaining what he should do in order to keep his apples from turning brown in this lunchbox.
 - **Keep the learning going by trying one of these other apple experiments:**
 - Repeat the experiment with a different type of apple and see if you get similar results.
 - Complete an experiment to see if temperature impacts the speed of apple oxidation. Put an apple slice in the refrigerator, place one in a warm area (ex. near a window on a sunny day), and have one at room temperature to be the control.
- *Your results should show that the apple slices in the fridge slow down apple oxidation because the enzymes that are responsible for oxidation slow down when they get cold.

APPLE EXPERIMENT

Teacher Instructions: EXAMPLE



Plastic Bag Labels

Directions: Cut out the labels and attach them to each plastic bag.



Control



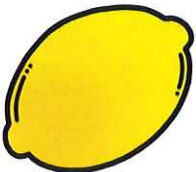
Vinegar



Water



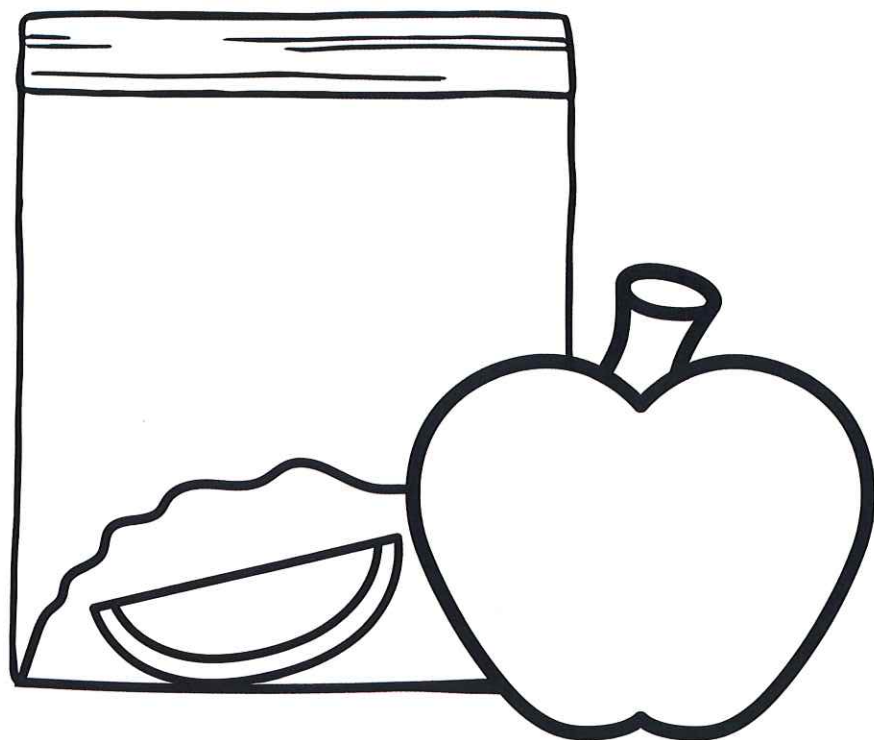
Oil



**Lemon
Juice**



Soda

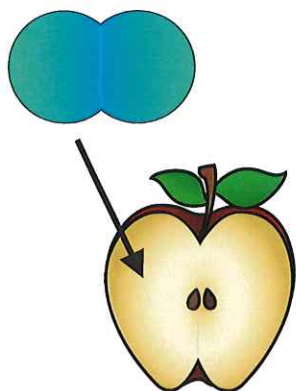


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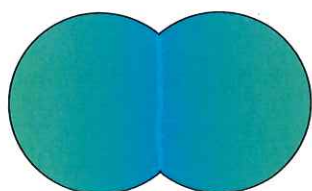
APPLE SCIENCE JOURNAL

Vocabulary

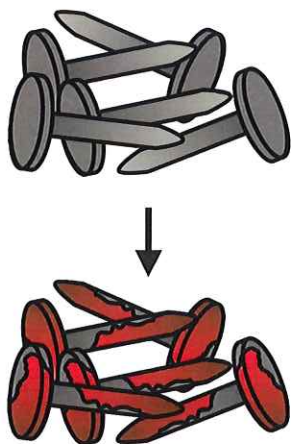
Directions: Use the vocabulary cards to pre-teach the science vocabulary words before completing the activities.



Chemical Reaction: a process where a substance goes through a chemical change to form a different substance.



Oxygen: an element found in the air that we breathe.



Oxidation: a chemical reaction that takes place when a substance combines with oxygen. This is why metal rusts.

Name: _____

PURPOSE



Danny loves to pack apple slices in his lunchbox. However, he noticed that his apples turn brown before he gets a chance to eat them.

What should Danny do in order to keep his apples from turning brown?

Conduct an experiment to find out if adding another substance to the bag of apple slices can prevent Danny's apples from turning brown.

RESEARCH



The skin of an apple acts as a protective covering. When the skin is cut or bruised the flesh inside the apple comes in contact with the **oxygen** in the air. When this happens a **chemical reaction** occurs causing the apple to turn brown. This is called **oxidation**.

This reaction can be slowed down by adding certain substances to the apple slices that prevent oxygen from reacting with the apple.

Name: _____

HYPOTHESIS



Which substance do you think will be the most effective at keeping the apples from turning brown?

EXPERIMENT



Draw a picture showing what each of your apple slices looks like at the end of the experiment.

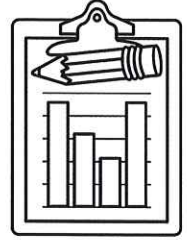




Notes:

Name: _____

ANALYSIS



Which substance was the best at preventing the apple from turning brown?

Which substance was the worst at preventing the apple from turning brown?

Do you think your results are accurate? How do you know?

CONCLUSION



Write a letter to Danny to let him know what he should do in order to prevent his apples from turning brown. Talk about the results of your experiment in the letter.

