

Which Liquid Prevents Apple Browning the Most?

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Due: Dec 2nd

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Due: Dec 17 (Trial 1)
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Due: Jan.27th

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Assigned: Jan.12th ____/100

Due: Jan 27th

Science Fair Topics - Draft

Write down the topic you chose:

Which liquid presents fruit browning the most?

What made you want to pick this topic?

I wanted to choose this topic because when my mom packs apples for me they always turn out brown, so I want to find a way how to prevent that.

Do you find these topics interesting? Why?

I find this topic interesting because I could help my family with this experiment and that could be interesting.

Science Fair Topic and Question - Final

Which topic did you choose?

Why do apples turn brown?

What question(s) are you testing?

Which liquid prevents apple browning the most?

How are you going to test your hypothesis?

By setting up apple slices, pouring liquid on them, and then observing which liquids prevent the apple from browning the most.



Background Summary

Find information and record the sources you use that help you make an educated guess to your testable question.

Write a 1 paragraph summary for each of your sources.

Tip: Make your hypothesis after this is done

Step 3 Background Research Source 1

Source 1

Fruit and vegetables: enzymic browning

Summary:

What's the big idea about the article?

Fruit browning is caused by leaving it out with no cover, since phenols and the enzyme phenolase create that brown color on your apple by being exposed to oxygen. It can also happen due to over ripening, since most fruits contain enzymes.

In complete sentences, describe a few details (who, what, where, when, why, and how)

Fruit browning is caused by several factors, including exposure to oxygen. See, when you leave a fruit like an apple outside, the molecules inside an apple, like phenols and enzyme phenolase, make that brown color appear when it is exposed to oxygen. Another reason is that if you leave a fruit to over-ripen. Enzymes are found in fruits, which act as biological catalysts, speeding up chemical reactions. Normally, enzymes are in the fruit tissue, by when the fruit is damaged or over-age, it turns brown. Overall, fruit browning is caused by over-ripening, exposing it to oxygen, or damaging it.

Source 1 Bibliography

If the source is a book, Title of the book:		
Author's Name:		
Date Published:		
Place Published:	Publisher:	Date Published:
Edition: (if applicable)		
Page Number(s):		

Background Research Source 2

If this source is a: _____ Magazine _____ Newspaper
_____yes _____ Other

Title of the publication:

Title of Article:

What bread grows mold really fast

Author's Name:

Google

Date Published:

none

Edition:

Number(s):

(if applicable)

Volume Number:

Page

(periodicals or encyclopedias)

This source is a: Yes : Website _____ Other.

The URL is

<https://www.ifst.org/lovefoodlovescience/resources/fruit-and-vegetables-enzymic-browning>

Last Date of Access: 11/13/2025

Title of Article: Fruit and Vegetables: Enzymic Browning

Author's Name: The Institute of Food Science and Technology

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Date of Article: May 11, 2017

Science Fair Hypothesis

Hypothesis: Use your background research to help you create a HYPOTHESIS that predicts the outcome of your experiment

What is your Hypothesis? The effect of different types of liquids like apple juice, lemon, white vinegar, and the control, water on the amount of brown on the apple is the lemon juice will do the best, the vinegar the second, the apple juice the third, water the fourth, and control the last. Since lemon juice has the most acidity, I infer that it will protect my apples from that brown color the most.

Tip: Make your Hypothesis after the background research

Materials

Make a list of all the Materials you used for this experiment

1. Two apples,
2. Cutting board,
3. Five Plates,
4. Masking tape,
5. Permanent marker,
6. Knife,
7. Fork,
8. Spoon,
9. Lemon juice,
10. White vinegar,
11. Apple juice,
12. Water,
13. Notebook,
14. Timer,
15. Pencil,
16. Camera

.

Procedure

What are the steps you followed during this experiment?

Write all of them down. Make sure they are exactly what you followed while doing the experiment.

step 1:

First, make some space for your project, and place all your materials there to prepare for your experiment.

step 2:

Secondly, organize all your stuff, and get your notebook, juice, and apples ready,

step 3:

Next, label all your plates with the masking tape with all the liquids: water, lemon juice, vinegar, and water.

step 4:

To start the experiment, cut the four apples into equal slices and place them on the labeled plates.

step 5:

Then pour an equal amount of liquid on each designated plate.

step 6:

Then, leave them for two hours, but check on them every thirty minutes.

Step 7:

Create a scale on the brownness of the apples, 5 being the brownest. And one having the least amount of brown.

Step 8:

Record your observations in your notebook and create a chart based on them.

step 9:

Keep your notebook for your final project for the recordings.

step 10:

lastly, present your project on your science fair board.

Use more paper if you need to.

Variables

What are the Variables of your experiment?

Dependent Variable? I am measuring how brown the apples are after the experiment, or the brownness of the apples.

Independent Variable? I am changing the types of liquids that I am putting on the apples. I am also changing the color of the apples.

Control Variable? The controls are water, the untouched apple, the time the apples are left out, the amount of liquid poured onto each plate, the type of apple, and the same number of apples on each plate.

Testing the Hypothesis - Experiment

EXPERIMENT Collect and record data. Take pictures. Write everything in your science fair notebook, even mistakes and problems! Conduct your experiment multiple times to see if anything changes.

Results

Put your data into graph form and study you graph to see what kinds of trends you notice.

First, I gathered all my materials in one area. Then I labeled each plate. Then, I cut the apple sand placed them on the plates. Each plate had three apple slices. I started a two hour timer and took pictures every thirty minutes. The first thirty minutes the lemon seemed to do the best, while the control was doing the worst. Then after another thirty minutes the lemon was doing amazing, while the white vinegar was looking pretty brown. The next thirty minutes the lemon juice was still the best, and the vinegar was doing not so well. Lastly the results were lemon juice 1st, apple juice 2nd, water 3rd, and white vinegar and the control were tied for last.

Conclusion

Based on your results, what was the outcome?

Does your data show that your hypothesis was correct?

What kinds of problems did you have?

What would you do differently next time?

The outcome was, lemon did the best, apple juice did the second best, water the third, and white vinegar and control were tied for last. My data does not show my hypothesis was correct, since i put white vinegar second, even it was tied for last. On problem I had is making sure every liquid got the right amount poured on, since that could've changed the results. I would be more organized next time, so my results could be more accurate.



Rough Draft Report

The hypothesis of my experiment is that lemon juice will prevent apple slices from turning brown the most, white vinegar will be the next most effective, followed by apple juice, and then water as the least effective. This is because I think the higher acidity in lemon juice will protect the apples from browning the best.

My materials are two apples, a cutting board, five plates, masking tape, a permanent marker, a knife, a fork, a spoon, lemon juice, white vinegar, apple juice, water, a notebook, a timer, a pencil, and a camera.

Step 1: First, create some space for your project and place all your materials there to prepare for the experiment. Step 2: Next, organize all your belongings and prepare your notebook, juice, and apples. Step 3: Next, label all your plates with masking tape, indicating the liquids: water, lemon juice, vinegar, and water. Step 4: To start the experiment, cut the four apples into equal slices and place them on the labeled plates. Step 5: Then pour an equal amount of liquid on each designated plate. Step 6: Then, leave them for two hours, but check on them every thirty minutes. Step 7: Create a scale for the brownness of the apples, with 5 being the darkest. And one having the least amount of brown. Step 8: Record your observations in your notebook and create a chart based on them. Step 9: Keep your notebook for your final project, where you will record the recordings. Step 10: Lastly, present your project on your science fair board. Use more paper if needed.

First, I gathered all my materials in one area. Then I labeled each plate. Then, I cut the apple sand placed them on the plates. Each plate had three apple slices. I started a two hour timer and took pictures every thirty minutes. The first thirty minutes the lemon seemed to do the best, while the control was doing the worst. Then after another thirty minutes the lemon was doing amazing, while the white vinegar was looking pretty brown. The next thirty minutes the lemon juice was still the best, and the vinegar was doing not so well. Lastly the results were lemon juice 1st, apple juice 2nd, water 3rd, and white vinegar and the control were tied for last.

Treatment	Apple Slice 1	Apple Slice 2	Apple Slice 3	Average for All Slices	
Control	4	3	2	3`	
Lemon	1	1	1	1	
Water	1	2	2	2.3	
Apple Juice	2	1	2	1.3	
White Vinegar	4	3	2	3	

The outcome was, lemon did the best,apple juice did the second best, water the third, and white vinegar and control were tied for last. My data does not show my hypothesis was correct, since i put white vinegar second, even it was tied for last. On problem I had is making sure every liquid got the right amount poured on, since that could've changed the results. I would be more organized next time, so my results could be more accurate.

Final Project - Display Board Report

Make a Trifold Poster Board

Have it include all the components you have included in this Binder so far.

Your Finished Poster Board should look something like this:

Science Fair Board Sample

Tell the reasons you are conducting this experiment. What do you want to learn?

What is your scientific question? (Ex. Why does, How does, Will this...)

What do you think will happen when you run the experiment? What do you predict?

Be sure to list everything you have used to help you complete the experiment.

The list should include everything another person would need to conduct your experiment if they wanted to do it on their own.

"Show" your experiment here. Use color.

How did you run your experiment? Tell it step by step. (First, Next, Then, After That, Finally)

Your title should capture interest in about 5 words or less, if possible.

Tell/Describe the exact outcome. Use data to support statements.

Summarize your results, tell if the results support or challenge your hypothesis, what was the relationship between the dependent and independent variables, judge your procedure, and suggest changes you would make next time.

Something that is changed by the scientist. (If you are measuring whether a class is noisier with or without a teacher, the teacher leaving the room is the variable that is being changed.) Independent variables are either/or, with/without, closed/opened, light/dark, etc.

This part of the experiment or "test" is not changed at all. (Same class, same students, same time of the day)

This is something that you notice after you make your change. (Measuring the noise in a room in decibels)

Purpose

I would like to learn more about whether a teacher is necessary to keep the noise level in a classroom down.

Question

Will the classroom noise level rise if there is no teacher?

Hypothesis

I predict the classroom will be louder without a teacher.

Materials

1. Classroom full of students
2. Teacher willing to leave
3. Paper
4. Pencil
5. Decibel meter

Title of Project

Procedure

1. _____
2. _____
3. _____
4. _____
5. _____

Photos

Graphs

Charts

Tables

Independent Variable (What I Change)

Controlled Variable (What I Keep the Same)

Dependent Variable (What I Observe)

Results

Conclusion

Report Log/Journal Photographs

