

Project: Removal

M7-4 PHYSICS

Testable Question/Purpose

Question: Are permanent markers REALLY permanent?

Purpose: My purpose of this project was to see if there is a decent solution for removing Sharpie stains from a t-shirt.

Abstract

My motivation for doing this project is the fact that permanent markers are really useful, but can be a pain if they get on your clothes. This experiment will provide me, and my fellow students, a possible solution to what to use if we stain our clothes with a Sharpie. My hypothesis was: If a Sharpie is used on a white shirt, and we use hydrogen peroxide, lemonade, washing machine detergent, and vinegar, plus water as a control, then the hydrogen peroxide will remove the Sharpie quicker, because hydrogen peroxide is able to remove substances from earbuds without damaging them, so they could work just as well on a Sharpie. For my experiment, I will be dipping strips of plain-white t-shirts with Sharpie marker on them into a cup of each liquid. They will stay there for 30 minutes, then be removed and have their results recorded. After the experiment, I created a Pie Chart for each of the liquids. I found that hydrogen peroxide actually did the worst, which completely throws my hypothesis out the window. The liquid with the most change turned out to be the Washing Machine Detergent. This experiment has now provided me with a great answer to my experimental question, and will most likely need to use this in the future, considering I am very clumsy with art.

Hypothesis

If a Sharpie is used on a white shirt, and we use hydrogen peroxide, lemonade, washing machine detergent, and vinegar, plus water as a control, then the hydrogen peroxide will remove the Sharpie quicker, because hydrogen peroxide is able to remove substances from earbuds without damaging them, so they could work just as well on a Sharpie.

Materials

For my project, I required-

- ▶ Sharpie Permanent Marker
- ▶ Plain White t-shirts (5 XXL size should do)
- ▶ Publix-brand Lemonade (2 1-gallon bottles)
- ▶ Tap water (2 gallons minimum)
- ▶ All Stainlifters Detergent (2 46.5 fl. Oz. bottles)
- ▶ Publix-brand Plastic Cups (50 counts, 18 Oz)
- ▶ 1-5 Pencils (#2 Pencils, bought from Publix)
- ▶ Publix-brand Hydrogen Peroxide (32 fl. Oz.)
- ▶ Publix-brand Distill White Vinegar (128 fl. Oz/1 gallon)
- ▶ Scissors
- ▶ Clear Packing Tape
- ▶ Disposable Gloves
- ▶ Goggles (Optional)

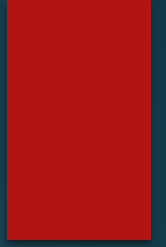
Procedures

1. Cut t-shirts into 5x1/2 in. strips.
2. Draw a 5-inch line with the Sharpie directly down the center of the strip, long ways.
3. Label each cup by the liquid (Lemonade 1, Vinegar 2, etc.)
4. Measure one cup of each liquid, and pour into separate cups.
5. Place a pencil on top of each cup, and make sure it stays close to the middle.
6. Suspend t-shirt piece with Sharpie mark on it into each liquid.
7. Tape one end of the t-shirt over the pencil, and tape it there, so that half of the Sharpie line is in the liquid, and the other half is suspended between the pencil and liquid (DO NOT PUT THE WHOLE STRIP INTO THE LIQUID).
8. After 30 minutes, remove the strips from each liquid.
9. Record and take pictures of your results.
10. Repeat as many times as needed.

Variables

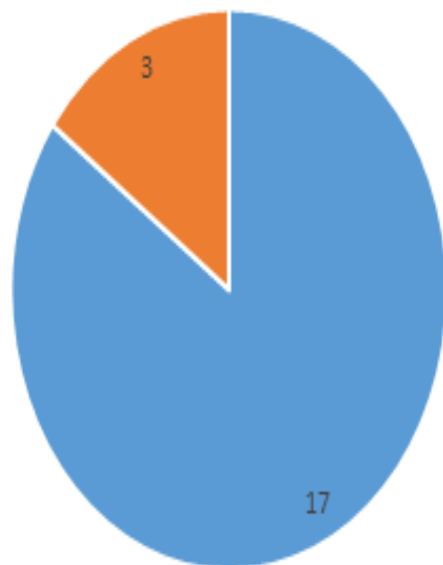
- ▶ Independent Variable- Type of liquids used on the Sharpie on the shirt.
- ▶ Dependent Variable- The visibility of the Sharpie after soaking in liquid after certain time increments.
- ▶ Controls- Amount of each liquid, type of Sharpie, water, type of shirt, time increments for each trial.

Pictures



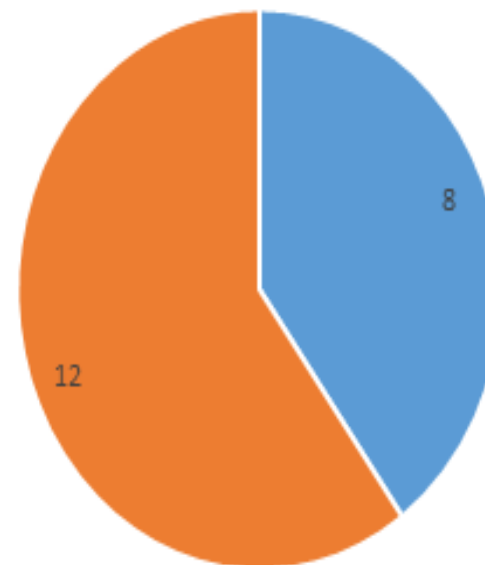
Results (Graph) Part 1

Detergent Data



■ # Changed ■ # Not C ■ ■

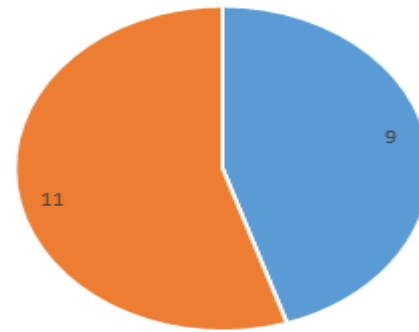
Hydrogen Peroxide Data



■ # Changed ■ # Not C ■ ■

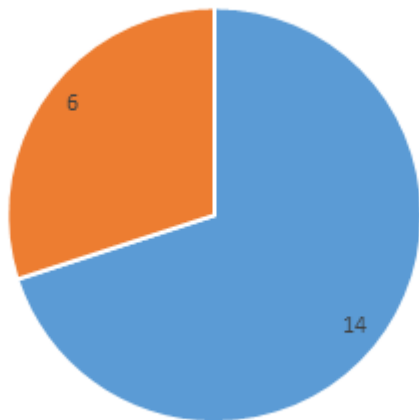
Results (Graph) Part 2

Water (Control) Data



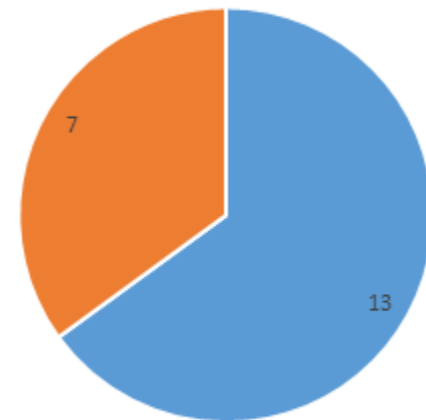
Changed # No C

Vinegar Data



Changed # Not C

Lemonade Data



Changed # No C

Conclusion

After the experiment and analyzing my results, I found that the Detergent had the most effect on the marker. My hypothesis was not supported because according to the data, only 8 had change for Hydrogen Peroxide, whereas Detergent had 17 change.

Bibliography

- ▶ <http://mwvsciencefair.wikispaces.com/Permanent+or+Not%3F>
- ▶ <https://prezi.com/xpvm-vwevnti/my-science-project-are-permanent-markers-really-permanent/>
- ▶ <https://prezi.com/4x11iqixjouu/how-permanent-are-permanent-markers/>
- ▶ <https://student.societyforscience.org/rules-all-projects>
- ▶ www.brighthubeducation.com/middle-school-science-lessons/15358-how-permanent-are-permanent-markers-experiment/
- ▶ http://www.ehow.com/info_8404337_permanent-markers.html
- ▶ <https://www.sharpie.com/en-US/about-us>
- ▶ <http://www.spectatornews.com/showcase/2007/10/15/history-of-sharpies/>
- ▶ <https://owl.english.purdue.edu/owl/resource/747/08/>
- ▶ <http://www.sharpie.com/en-US/sharpie-faqs>
- ▶ <https://www.atsdr.cdc.gov/MMG/MMG.asp?id=304&tid=55>