

Erasing the marks: Effective strategies for graffiti removal

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Our research question: How can spray paint be removed efficiently without affecting the environment in a negative way?

Digital Portfolio



Abstract:

Graffiti has been known to be troublesome to remove, especially by property owners and city officials. With factors like age, brands of paint, and type of surface leading to differences in effectiveness of solutions, our goal is to find the most eco-friendly, effective solutions that work on many surfaces. Currently, we are testing the age, brands/colors, and the surfaces of paints and seeing how effectively they can be removed with acetone, orange oil, and paint thinner on wood and concrete. We originally planned to test out WD-40, but due to 3rd party interference with our experiment, the size of our experiment had to be reduced.

Conclusion:

Drawing a conclusion from the data we have collected, acetone seems to be the most effective solution tested, with it being most effective on concrete, which proved our initial hypothesis wrong. We found that orange oil worked the least, which was expected as we did not expect the more eco-friendly solutions to work, at least not as well. However, when testing the 1 month old data, we found that the orange oil worked remarkably well for chrome paint on wood. This proved our initial hypothesis wrong, as we expected orange oil to not be nearly as effective as acetone for all cases.

Replicable Methods:

Solutions:

- Acetone
- Orange oil
- Paint thinner

PPE:

- Disposable Masks
- Safety Glasses

Old clothes were used as rags to remove graffiti.

1. Ensure all PPE is put on properly before starting. Wear old clothes that the researchers will not mind spraying (on accident).
2. Spray the spray paints on the surfaces stated above. Ensure that dates are marked for each time period that will be tested (1 week, 1 month, 2 months)
3. Make sure that spray paints do not bleed into other paints. Spray small splotches in an array.
4. When it is time to remove, rub the splotches vigorously with the solutions that are being tested for 5 minutes.
5. Note findings and take pictures, as there is no quantitative data to collect.



Surfaces:

- Wood (plywood)
- Cinder blocks (concrete)

Spray paints:

- Behr Black
- Rustoleum Black
- Cranberry
- Chrome

Background/Lit Review:

Graffiti and spray paints have notoriously been known to be extremely difficult to remove. So, this piqued the interest of our group, (Jae Ren Yee and Griffin Johnson) and led us to try to find solutions to this problem. This led us to develop our research question: How can we find an efficient, eco-friendly and effective way to remove graffiti/spray paint? We will be using various materials such as acetone and orange oil to test the effectiveness of paint removal, and we will record the age and effectiveness of these materials with pictures, charts and data tables. More specifically, writing down physical changes, taking videos and pictures, and keeping track of time are all methods we plan on using. Comparisons will mainly be drawn between all substances used to remove graffiti, to analyze and draw conclusions.

As there are many factors that play a role in the effectiveness of graffiti removal, one source we referenced was "The City of Stevens Point's guide to graffiti removal", as they mention the problem of wood absorbing spray paints. Another source that brought another issue to our attention was by the article "Air and biological monitoring of solvent exposure during graffiti removal". It went over general concerns of safety that people handling substances related to graffiti, and the effects of the fumes.

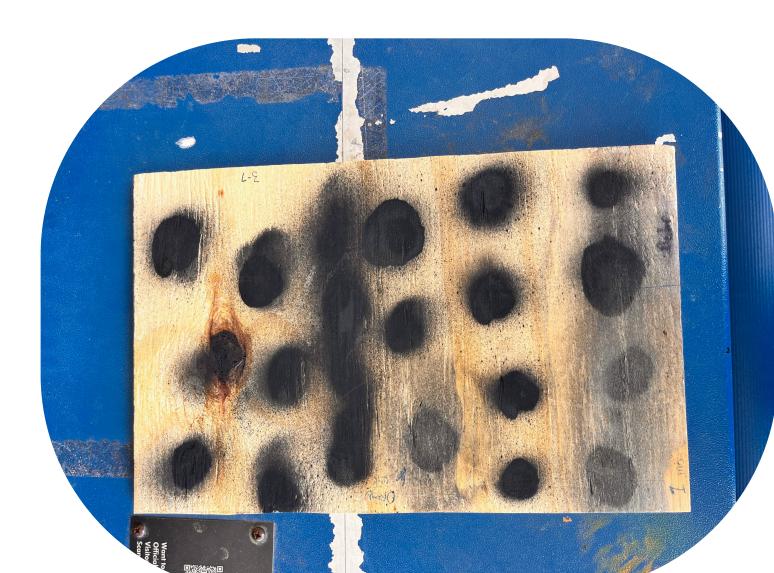
The scientific article, "Formulation of Environmentally Safe Graffiti Remover Containing Esterified Plant Oils and Sugar Surfactant", primarily talks about various techniques that can be used for graffiti removal. The authors cover specific, eco-friendly ways that graffiti can be removed, with testing to back this up. However, they do argue that oils can be used to remove graffiti, even though people typically look for stronger solutions such as acetone. This is a useful source, as it gives us information of what solutions to test. Additionally, compared to other sources, it gives us little-known solutions of graffiti that we can test out, and they specifically mention the benefits of these eco-friendly solutions as well. This source will undoubtedly be helpful, as we will not have to use as many dangerous chemicals, meaning that we can test the safer chemicals mentioned in this source instead. It could also allow us to consider the eco-friendly factor in our research and our solution. This led us to go along the more eco-friendly route, resulting in us testing orange oil instead of other traditional methods.

We kept all of these in mind when preparing our research, and developing our research.

To see our full, detailed report, please navigate to our digital portfolio.

Hypothesis:

We believe that acetone will prove to be the most effective solution for spray paint removal, and that wood will be the easiest surface to remove graffiti from.



Effectiveness of graffiti removal for 1 week old graffiti

1-Month Old results

WOOD	Effective	Somewhat Effective	Not effective
Cranberry	A O		
Rustoleum Black	A	O	
Behr Black	A	O	
Chrome	O	A	

A = acetone

O = Orange oil

Note: as of 3-31-25, only 1 round of testing has been completed.

1 Week Old results

WOOD	Effective	Somewhat Effective	Not effective
Cranberry	A	O	
Rustoleum Black	A O		
Behr Black	A	O	

CONCRETE	Effective	Somewhat Effective	Not effective
Cranberry	A	O	
Rustoleum Black	A	O	
Behr Black	A	O	

Citations:



Potential Next Steps:

Our next steps would definitely be to increase the size of the experiment and to find a better place to store our spray painted concrete, as interference from others have prevented us from conducting parts of our experiment..

Data Collected