Science 10 H

Group Member Names:

**Science is Magic – The Production**

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**AUDIENCE:**

Who is the target audience for this project?

The target audience for this project is directed for kids from the age of 11-13. This means that our trick is directed at middle school kids. This is a good magic trick for our audience because kids being in middle school are often amazed by fire and that is exactly what our trick includes. Being in middle school, they will already have the knowledge that when paper is lit on fire, that it will burn, so by having a middle school intended audience for this project is perfect.

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| Communication | The presentation is imaginative and effective in conveying scientific ideas to the audience. | Presentation techniques used are effective in conveying main ideas. Presentation tries to be imaginative but is ineffective. | Presentation techniques used are effective in conveying main ideas, but a bit unimaginative. | The presentation fails to capture the interest of the audience. | The presentation fails to capture the interest of the audience and/or is confusing in what is to be communicated. |  |

**CHEMICAL REACTION:**

**VIDEO SCRIPT:**

**Introduction:**

\*Before watching the video\*

Hey, check out this super cool magic trick!

Wow this is crazy! I wonder how they do it
Let’s watch a little bit more of the video to figure out how they do it.

Let’s go try it

(tries and completely fails)

\*Watching the “video”

Hey guys, today we are going to be doing some magic.

First off, we have 2 pieces of paper towel, as you can see.

\*lights one fire\*

There Is nothing wrong with this paper towel it lights on fire and burns perfectly like an ordinary paper towel.

Now, with a little bit of magic and a snap of the finger, I am going to make this paper towel, fire-proof!

\*lights the special paper towel on fire\*

WOW this paper towel is on fire but its not burning, how is that possible?

Magic!

\*flash back to reality, ripple effect\*

Is it possible for magic to make a paper towel not burn? It is possible but not from magic, it is science that allows this to happen.

Let’s bust this myth of magic \*\*intro plays\*\*

**Doing experiment:**

\*mythbusters\*

So, there is obviously, some pre-planning to do before they lit that paper towel on fire.

Did you figure it out?

Yes, I think I did, it’s a lot simpler than it appears. Let me explain.

**Explaining scientifically:**

This amazing trick may seem like magic, but you can even do it at home!!! (With adult supervision)

All you need to make the solution is some rubbing alcohol and some water.

First off, another name for the rubbing alcohol is isopropyl alcohol. This is the same chemicals you use when you need to treat a wound when you fall. The chemical compound for this is C3H8O. It has a boiling point of 82.5o Celsius, which is lower than the boiling point of water which is 100 oC

Rubbing alcohol, or isopropyl alcohol, is approximately 70% alcohol and 30% water.

The only other thing that we need for this solution is in fact water.

The chemical compound for water is H2O and has a boiling point of 100o Celsius.

For this trick, we need to aim for a solution that is 50% water and 50% alcohol.

To make this solution we must do some simple math.

(Show math equation)

For this experiment, we are going to make 100ml of the solution of 50% alcohol and 50% water.

We are going to have 2 variables, x and y, the x represents how many ml of alcohol we need, and y will represent how many ml of water we need.

So, we know that we need 100ml of the solution so, x + y = 100ml.

Once you use this equation shown, x will equal 71

This means 71ml of the isopropyl alcohol is being used

Then that also means that we need 29ml of water to dilute it back to 50% alcohol and 50% water

X is equal to the amount of ml of alcohol that is needed and Y is equal to the amount of water that is needed to dilute the solution to 50/50

Using this equation, we can figure out that to make 50% alcohol and 50% water. If we want a solution that is 100ml, we must use 71ml of the rubbing alcohol and therefore 29ml of water to make the 50/50 solution.

Now that we know how to make this solution, we must know what they both do to prevent the paper towel from going into flames.

First off, the water in the solution acts like a cooling factor and it keeps the temperature under the ignition temperature of paper which is 233o Celsius.

So basically, in the mixture, the water molecules will soak into the paper towel to cool it which leaves the alcohol on the surface because it has a lower density then water.

Then because the alcohol burns at a lower temperature than water, the alcohol will burn until there is no more fuel and the paper towel will not catch fire

You can find this method in many different places where it is the alcohol burning, such as a fancy restaurant where they will seem to light the food on fire.

The chemical reaction for our magic trick is also a combustion reaction which would be the equation showed above 2C3H8O + 9 O2 🡪 6CO2 + 8H2O

The reason there is no water (H2­O) in the reactants is because water only acts as a dilatant and does not influence the chemical reaction.

**Conclusion:**

If you are to try this at home, always make sure to have an adult with you and have fun wowing your friends with your scientific magic. Use this trick to burn a paper towel but leave it untouched to amaze your friends but just remember, its not magic cause magic isn’t real, it is science behind burning money.

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| Video | Students display a high level of subject knowledge from research and the process of completing the experiment. Students can extrapolate from the experiment. Students speak clearly. | Students display a moderate level of subject knowledge from research and the process of completing the experiment. Students speak clearly | Students display a fair level of subject knowledge from research and the process of completing the experiment. Students speak clearly. | Students display a low level of subject knowledge from research and the process of completing the experiment. Students speak unclearly | Students display a poor level of subject knowledge from research and the process of completing the experiment. Students speak unclearly. |  |

**Lab Report**

**PURPOSE:**

**The purpose of our experiment is to put a paper towel on fire and for it not to burn at all and the flame will eventually go out.**

**OBSERVATIONS: HOW DOES THIS EXPERIMENT ‘LOOK’ LIKE MAGIC?**

**This experiment will look like “Magic” because the expected result from this experiment will be that the paper towel will catch on fire and burn but, it will be completely normal, and the flame will burn out. We will make this look like magic because we will have a normal paper towel without the solution on it get lit on fire first as like a control group to make the audience seem like any paper towel will burn like so. Then we will take a paper towel that has been soaked with the solution out and say the magic words and light it on fire and it will look completely untouched.**

**MATERIAL LIST:**

Chemicals

|  |  |
| --- | --- |
| Chemical Name & Formula | Amount: grams/milliliters  |
| Rubbing Alcohol (C3H8O) | 71 ml |
| Water (H2O) | 29ml  |
| Salt (NaCl)  | A pinch  |
|  |  |
|  |  |

Other supplies

|  |  |
| --- | --- |
| Paper towel |  |
| Tongs |  |
| Lighter |  |
| Safety Goggles  |  |
| Small bowl for mixture  |  |
| Measuring Spoons/Cups  |  |

**PROCEDURE: (add any changes that were necessary/made)**

1. Start the experiment by gathering all of supplies needed, indicated in the list above.
2. Make 100ml of a solution of 50% alcohol mixture and water. To make this solution, carefully add 71ml of Rubbing Alcohol to a bowl that is big enough to submerge the bill and dilute the alcohol with 29ml of water.
3. Add a pinch of salt to the mixture
4. Let the bill soak in the mixture until it has thoroughly been soaked through, this should only take around 10 seconds
5. With tongs, remove the bill from the mixture and let the excess liquid drip back into the mixture.
6. Hold the bill away from you and carefully light the bill on fire with the lighter
7. Wait until the bill has finished burning, you will be then left with a slightly damp bill.
8. Dispose of the mixture down a sink in well ventilated area, run lots of water into the bowl to clean it but then run lots of water down the sink to ensure that the alcohol does not remain in the pipes.
9. Wash your hands

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**CONCLUSION:**

After conducting this experiment, we found that paper towels are the best thing to use to set on fire. We tried with Canadian tire money, regular money and different kinds of paper towels, but they just burned right away, or the flame wouldn’t last for more than 5 seconds. This is because on the money, there is a wax coating which won’t allow the water to soak in to prevent the bill from burning which therefor the bill will burn, or it will only last for a few seconds because the water wouldn’t be fully soaked in. We also attempted with a different kind of paper towel that worked but not as well because the density and texture of different kinds of paper towels may vary and the paper towels that are at the school do not work as well for this experiment. With our chemical reaction, we got to have firsthand experience with what a combustion reaction is and how it takes place. Overall, we are vey happy with our experiment and we believe it looks a lot like magic.

SCIENTIFIC EXPLANATION:

To conduct this experiment, the solution you need to make consists of isopropyl alcohol and water. Isopropyl alcohol is also known as rubbing alcohol. The chemical compound for this is C3H8O. It has a boiling point of 82.5o Celsius.

Rubbing alcohol, or isopropyl alcohol, is approximately 70% alcohol and 30% water.

The only other thing that we need for this experiment is in fact water.

The chemical compound for water is in fact H2O and has a boiling point of 100o Celsius.

For this magic trick, it is a good idea to aim for a solution that is 50% water and 50% alcohol.

To make this solution we must do some simple math.

(Show math equation)

Using this equation, we can figure out that to make 50% alcohol and 50% water. If we want a solution that is 100ml, we must use 71ml of the rubbing alcohol and therefore 29ml of water to make the 50/50 solution.

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So basically, in the mixture, the water molecules will soak into the paper towel to cool it which leaves the alcohol on the surface. Then because the alcohol burns at a lower temperature than water, the alcohol will burn until it goes out and the temperature isn’t high enough to burn the water which would burn the paper towel.

You can find this method in many different places where it is the alcohol burning, such as a fancy restaurant where they will seem to light the food on fire.

The chemical reaction for our magic trick is also a combustion reaction which would be combustion reaction is 2C3H8O + 9 O2 🡪 6CO2 + 8H2O

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| Level of Difficulty/ Creativity | Problem is conceptually intricate/requires extra effort and involves a creative approach. | Problem requires extra effort and involves a creative approach. | Problem requires effort and involves a less than-creative approach. | Problem requires little effort and involves a less-than-creative approach. | Problem requires little effort and does not involve a creative approach. |  |

Using the Core Competencies Break Down Chart (Core Competencies Break down  ([Web view](https://sd43bcca-my.sharepoint.com/personal/bmireau_sd43_bc_ca/_layouts/OneNote.aspx?id=%2Fpersonal%2Fbmireau_sd43_bc_ca%2FDocuments%2FClass%20Notebooks%2FSc%2010%20Honors%20%28Sem%202%202020%29&wd=target%28_Content%20Library%2FClass%20Info.one%7C3780EBFD-4A17-47FC-99A6-7E4F881A20F3%2FCore%20Competencies%20Break%20down%7CF5271C34-0F81-4D8C-8B7A-1AC671192FE9%2F%29))) write a Core Competency Reflection addressing 3 different statements.

* Done –
* Tag Blog Post Sc10H2020ScienceisMAGIC
* Add appropriate Core Competency tags.
* Categorize for Science 10