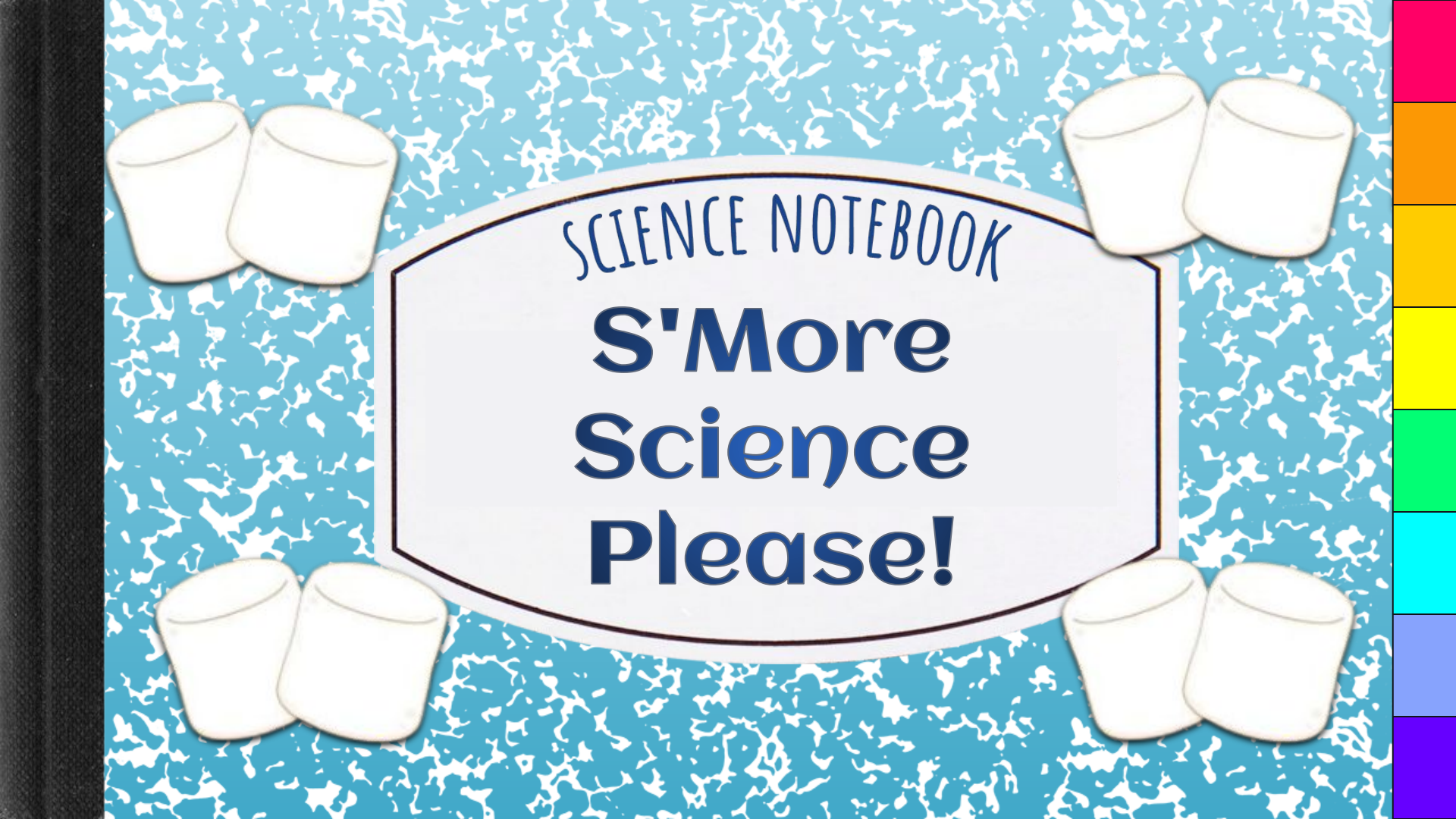
SCIENCE NOTEBOOK
S'More Science Please!

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ABSTRACT

I was very excited to try some sweet science and possibly reduce risk of fire! The purpose of this science experiment was to learn how to melt marshmallows without starting a fire during campouts, because I live in a dry area and want to prevent forest fires. I learned that a stone solar oven melts a marshmallow the most thoroughly because the average temp for the stone oven was 85.4 degrees fahrenheit and the average temp for the tinfoil one was 82.5. I feel like I did not meet my objective because the marshmallow did not really seem thoroughly melted on the outside. So, if I were to do this again, I would plan to revise my design get the marshmallows more melted.

QUESTION

Does a stone solar oven or a tin foil solar oven melt a marshmallow the most thoroughly?

I want to know how to melt a marshmallow without starting a fire, because I live in a dry area and want to prevent a forest fire.

RESEARCH

A stone solar oven, built with proper insulation and a dark interior (like black paper), will likely melt a marshmallow faster than a simple tinfoil (or box-style with minimal insulation) oven because stones retain heat better and create a more stable, hotter environment, trapping energy efficiently, while tinfoil mainly reflects, needing a good insulated box to truly perform like a 'real' oven. The key is insulation, so a stone oven with insulation beats a poorly built tin foil oven, but a well-insulated tinfoil box with dark surfaces will also be effective, with the stone offering superior heat retention.

- Source: Learning Mole

95 degrees fahrenheit is considered a melted marshmallow.

- Source: Chemical and Engineering News

HYPOTHESIS

If I use a stone solar oven and a tin foil solar oven I think the tin foil solar oven will melt a marshmallow the most thoroughly.

MATERIALS

- One Jumbo bag of Jet Puffed Marshmallows
- 3 clean stones
- 30 inches of Reynolds wrap tin-foil
- 6 small size pizza boxes
- One roll scotch tape
- 1 Thermapen thermometer
- 6 wooden sticks

PROCEDURES

HOW TO BUILD TIN FOIL SOLAR OVEN

1. Open the pizza box
2. Tape tin foil on the top and the bottom of the pizza box
3. Take a wooden stick and prop the pizza box open
4. Place the marshmallow in the center of the box
5. Place the box in the sun for 6 hours
6. After 6 hours, record temperature of marshmallow and observations of marshmallow

Building a tinfoil solar oven

PROCEDURES

HOW TO BUILD STONE SOLAR OVEN

1. Open the pizza box
2. Put clean stones on the bottom of the pizza box
3. Take a wooden stick and prop the pizza box open
4. Place the marshmallow in the center of the box
5. Place the box in the sun for 6 hours
6. After 6 hours, record temperature of marshmallow and observations of marshmallow

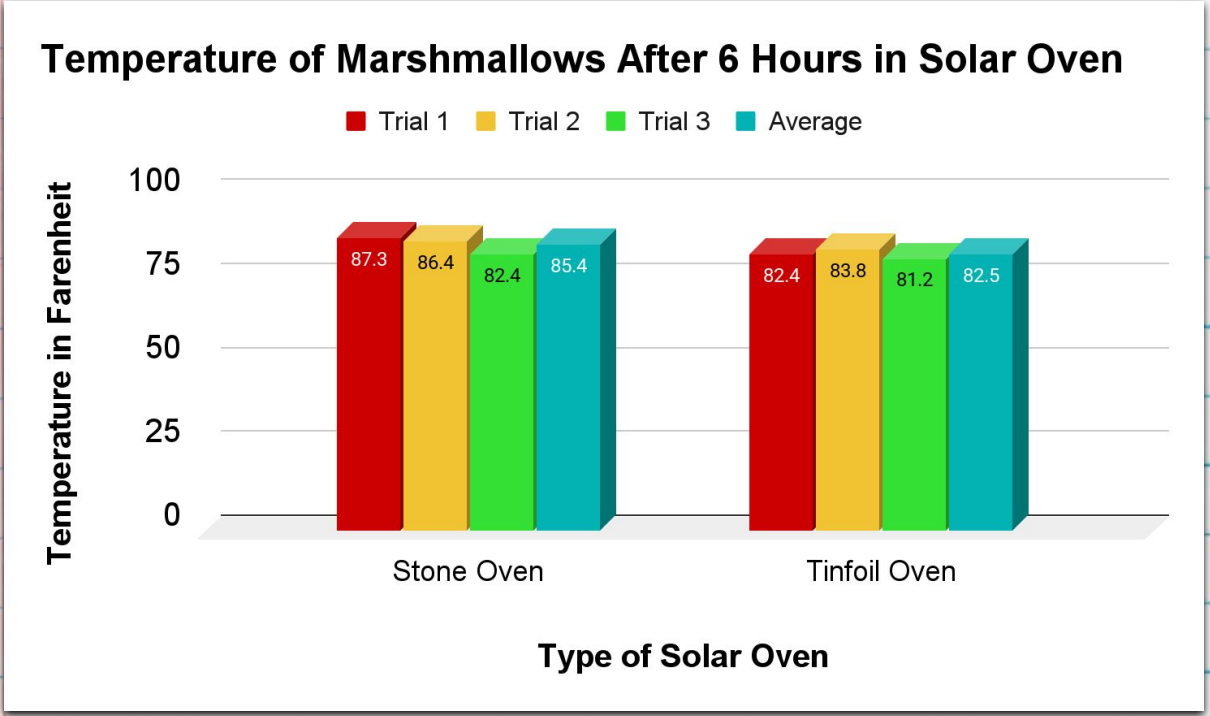
Placing marshmallow in solar ovens

Taking temperature after 6 hours

DATA & RESULTS

	Trial 1 Marshallow Temp in Fahrenheit	Trial 2 Marshallow Temp in Fahrenheit	Trial 3 Marshallow Temp in Fahrenheit	Average Marshallow Temp in Fahrenheit
Stone oven	87.3	86.4	82.4	85.4
Tinfoil oven	82.4	83.8	81.2	82.5

Data Analysis Graph



The Stone Oven warmed the marshmallow the most, beating out the Tinfoil oven by about 3 degrees Farenheit on average.

Pictures of Marshmallows after 6 hours

CONCLUSION

I loved doing this experiment, even though my results were not what I expected. My results contradicted my hypothesis because I thought that the tinfoil solar oven would heat the marshmallow the most thoroughly. However, the stone solar oven did that instead. The average temp for the stone was 85.4 degrees Fahrenheit and the tin foil average was 82.5 degrees Fahrenheit. I noticed that neither the stone nor tin foil oven looked like it melted the marshmallow all the way. Next time I will put tinfoil on the top of the tin foil solar oven because then the tin foil will reflect the suns rays and heat the marshmallow more.

Acknowledgments

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I thank my dad for helping me build the ovens
And I thank my mom for helping me with my experiment