Solar Oven

Question & Purpose

My question:How long it takes to melt food items such as medium sized marshmallow, chocolate, and ice.

My purpose: Is to melt or cook items using something other than a conventional oven. Ovens and stoves use a lot of electricity or gas. I chose this project because I wanted to see if a renewable resource like the sun could be used to heat or cook food items.

Research

I researched how other people made their solar oven in the past and the results they got. They all did it differently with some using glass and foil and others using foil and plastic wrap.

Solar ovens cook food by converting sunlight into heat through a process of concentration, absorption, and insulation, creating a greenhouse effect. Reflective panels (like aluminum foil) concentrate sunlight onto a dark-colored spot inside an insulated, sealed chamber. This traps the heat inside, similar to a car with its windows rolled up on a sunny day.

Hypothesis

I predict that the sun can produce enough heat to reflect the energy off of the tin foil to melt an assortment of food items.

I based my hypothesis off of what I have seen objects do in direct sunlight.

Variables

My Independent Variables are, the angle of the sun and the time of day.

My Dependent Variable is, the food items melting.

Materials

- Pizza Box
- Black Paper
- Aluminum Foil
- Plates
- Glass Bowls
- Tape

Procedure

Step 1. Gather all materials needed.

Step 2. Make your solar oven.

Step 3. Get the food that you are testing.

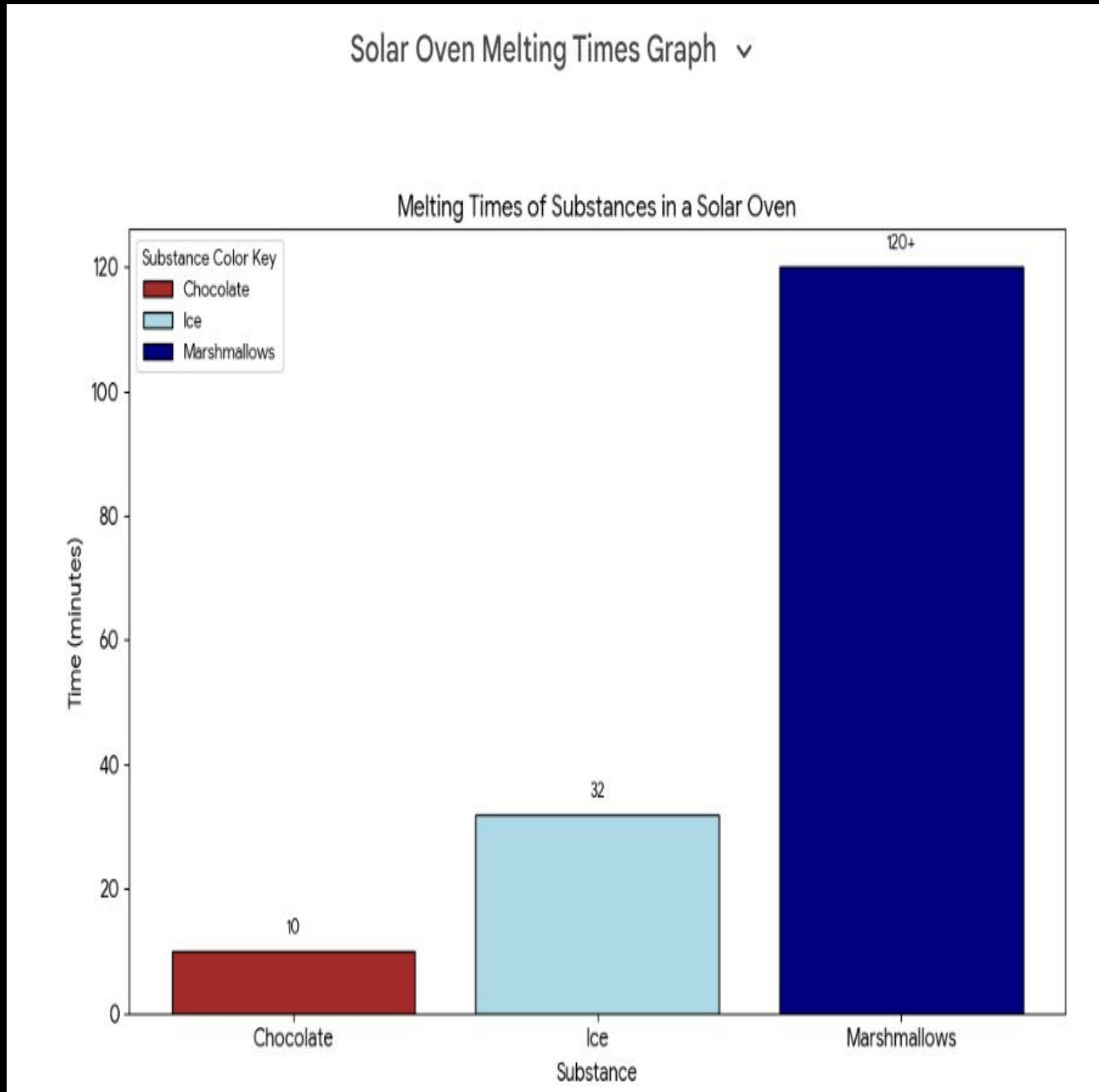
Step 4. Find the right angle of sunlight.

Step 5. Let each food item melt over time.

Step 6. Record the data and results.

Results

The chocolate and ice both melted. But the marshmallows just got more and more squishy. They were all in 70-73 heat. The chocolate melted in 10 minutes and the ice melted in close to 33 minutes. However, the marshmallow didn't melt in 2 hours plus.



Ice

32:30.29

70°

Completely melted in 32 mins.

After 5 min in the solar oven.

71°

Chocolate

10:17.73

After 5 mins in the solar oven.

The chocolate

Fully melted in 10 mins.

Marshmallow

73°

Before cooking in the solar oven.

After 2 hours of baking.

I put the marshmallow in the sun for two hours but realized it just got more and more squishy as time went on.

Conducting the experiment/Data

In my test I learned that you don’t always need an oven to make things or a stove top. You just need patience, sun, heat, something reflective, and something to cook or melt.

Conclusion

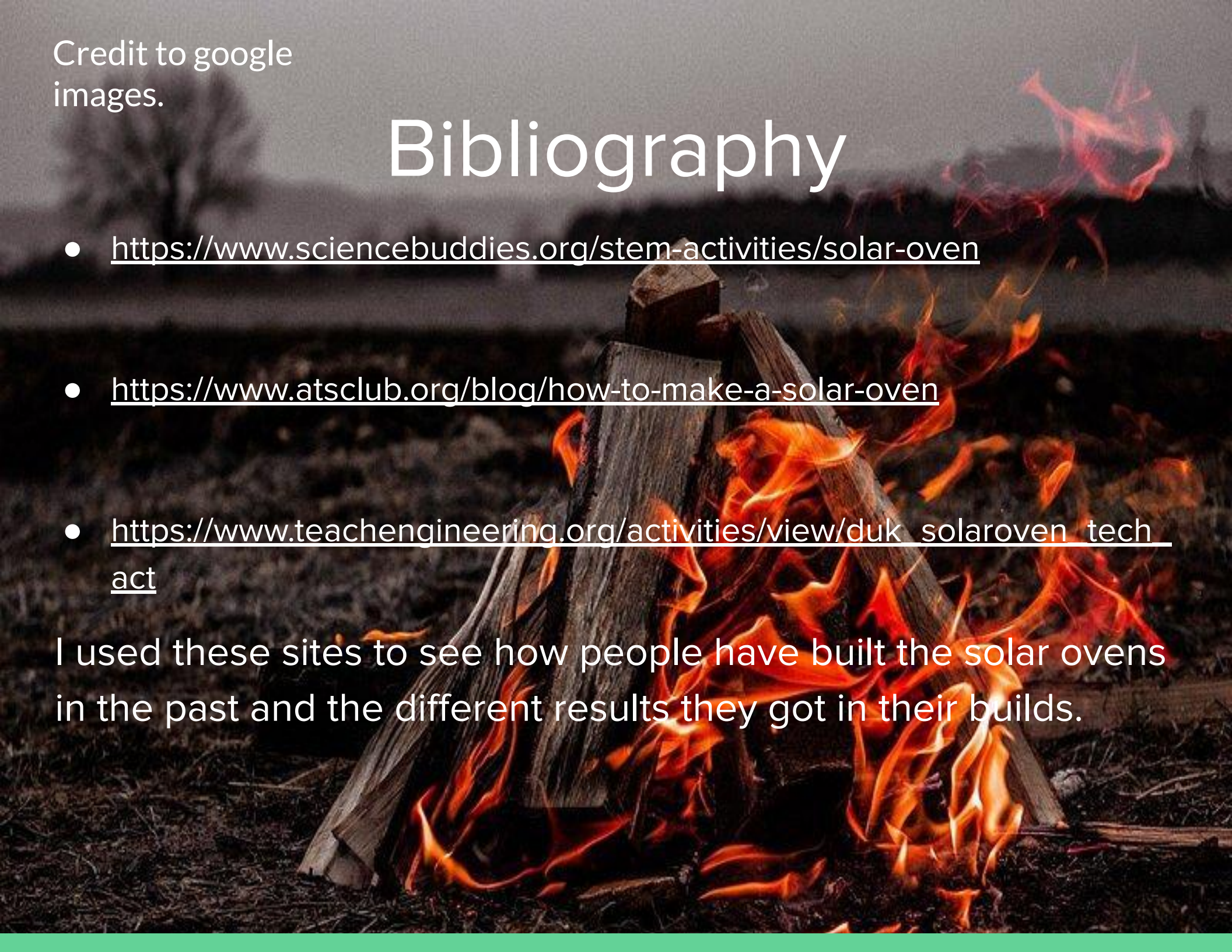
My hypothesis was proved to be correct. I predicted that with the sun and the foil, that enough heat would generate to melt the items and it did. Two items completely melted and one heated up to the point of getting soft and squishy.

This happened with the sun's heat and reflected energy off the foil.

Factors that may have caused this outcome are the foil to spread the light more and the heat it produced then causing the items to melt.

I could further test this project by going further in what it can melt and seeing what it can cook in the summer when it is higher than 90 degrees.

Real world uses for the Solar Oven would be if you are without power or can’t have a campfire you can melt the chocolate or make your marshmallows squishy for s’mores. Even heat up your breakfast or a snack.



Credit to google images.

Bibliography

- https://www.sciencebuddies.org/stem-activities/solar-oven
- https://www.atsclub.org/blog/how-to-make-a-solar-oven
- https://www.teachengineering.org/activities/view/duk_solaroven_tech_act

I used these sites to see how people have built the solar ovens in the past and the different results they got in their builds.