What roofing material can melt ice fastest with the power of the sun?

Questions/Purpose/Community problem being solved

What roofing materials can melt ice the fastest ?

What materials can melt faster in the winter?

A better roofing material like steel or aluminum would be easier for home owners get snow off the roof.

A good roofing material that can melt snow in a snowy environment. These kinds of roofs can prevent roofing leaks and mold build up unlike roofs now made of slate or clay that have gaps between them letting weather leak through.

Background Research

Snow mainly melts from heat energy. It can also be caused by the sun and the warm air. It dissolves the ice crystals into liquid. Metal is a perfect thermal conductor it transfers heat quicker than plastic. While plastic is a poor conductor. Ice on plastic melts slower than on metal even though it is the same temperature.

Websites used for background research

- Thermal conductivity: metal v. plastic https://spark.iop.org/thermal-conductivity-metal-v-plastic
- Our vision is to improve lives through STEM education https://www.stem.org.uk/

Brainstorm Ideas to make the experiment happen

We wanted to do something that has to do with metals melting ice. But we decided that it would be better to do something that has to do with roofs. So we decided to get roofing materials instead of metal and we are going to use ice to represent snow. Also instead of the sun we are going to use a heated lamp.

Any changes made from the first idea?

- The materials we were going to use silver, copper, tin, and plastic. But we used steel, roofing tile, aluminum, and plastic.
- We were going to use the sun to heat the metals up but instead we are going to use a heated lamp.

Procedure (Step by Step)

1. First you need to get all the materials which are aluminum, steal, plastic, and roofing tile also you need ice and a heated lamp.

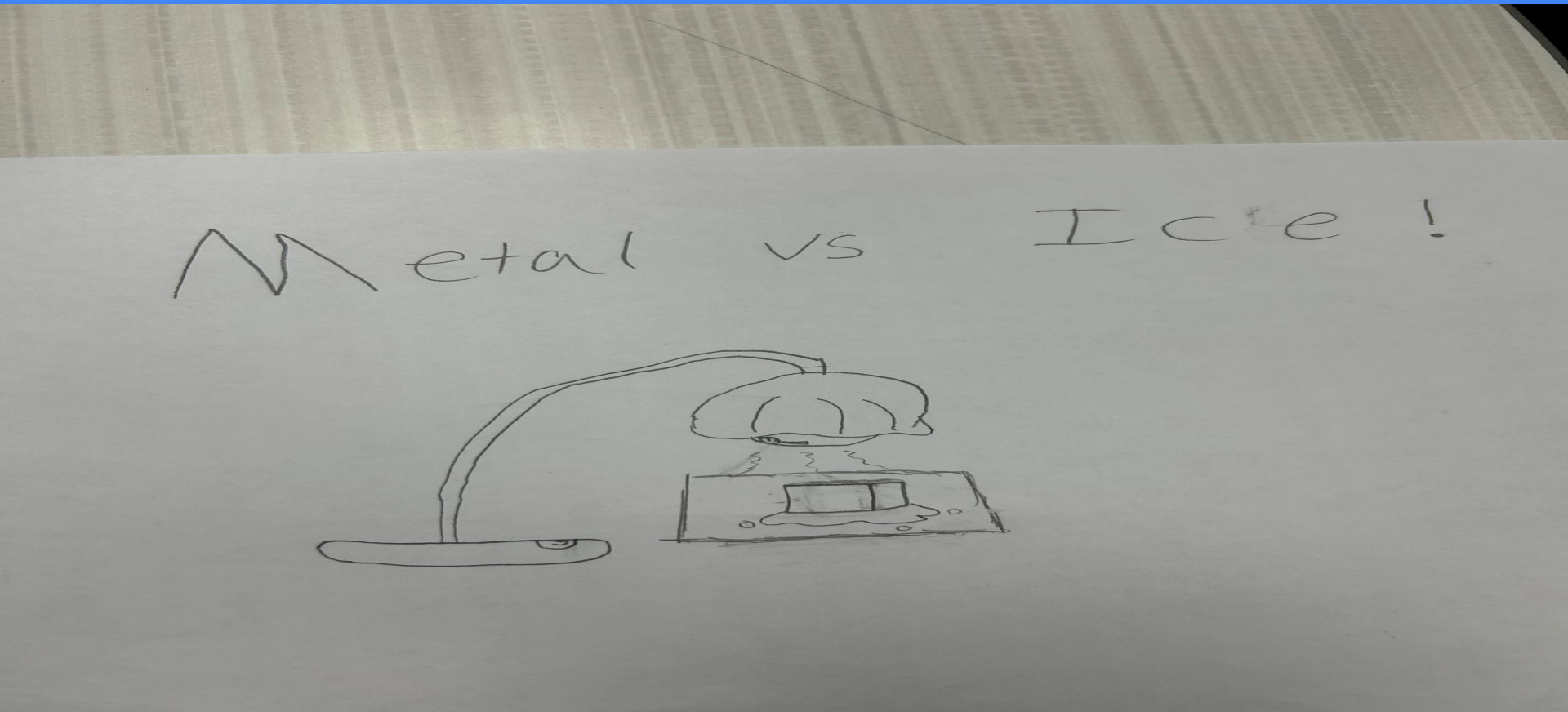
2. We are going to put one material at a time under the heated lamp on a higher surface like 4 composition books.

3. Then measure the temperature with a thermometer of the heated lamp.

4. When your done setting up you add the ice to the metals and let the metals melt the ice and get your data.

5. When the ice is melting we will measure the data by timing how long it takes takes to melt on each material.

Draw out your final idea



Materials used to create your project

1.ice

2.heated lamp

3.roofing tile

4.steel

5. plastic

6. aluminum

Data collection how will you collect it?

We are going to collect data by timing how long each metal takes to melt the ice. Also we are going to find the temperature of the heat lamp with thermometer.

Data

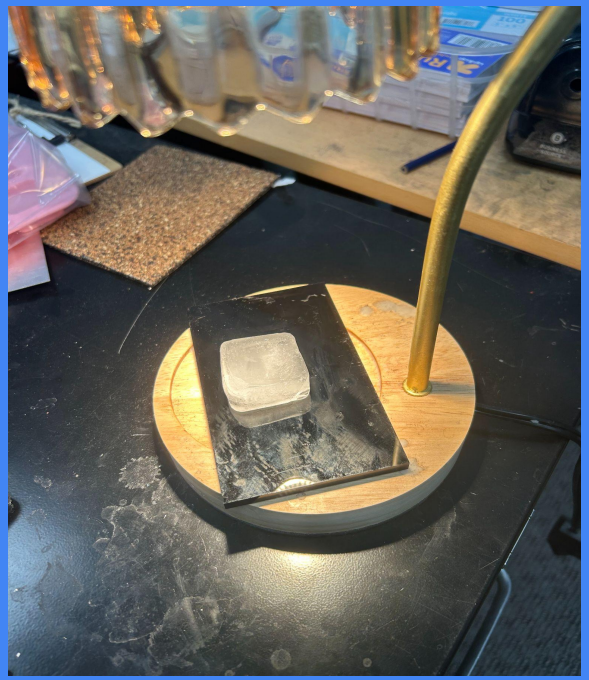
For plastic it took 26.36 minutes to melt was half way It took 26.36 melt the ice the heated lamp was at 98.4 degrees.

For roofing tile it took 26.28 minutes to melt and half way it took 13.10 minutes and the heated lamp was at 98.4 degrees.

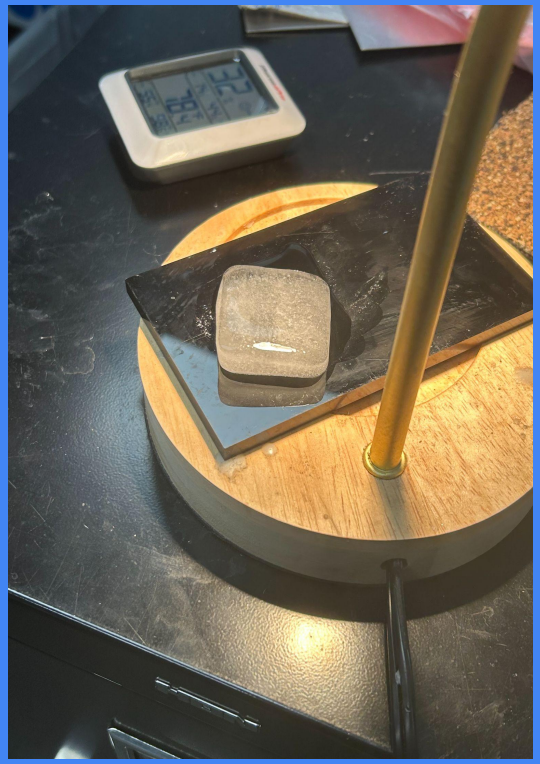
For aluminum it took 13.22 minutes to melt and half way it took 6.30 minutes and the heated lamp was at 98.4 degrees.

For stainless steel it took 21.41 minutes to melt and half way it took 11.36 minutes and the heated lamp was at 98.4 degrees.

The beginning of the ice on plastic.



Halfway melted on plastic.

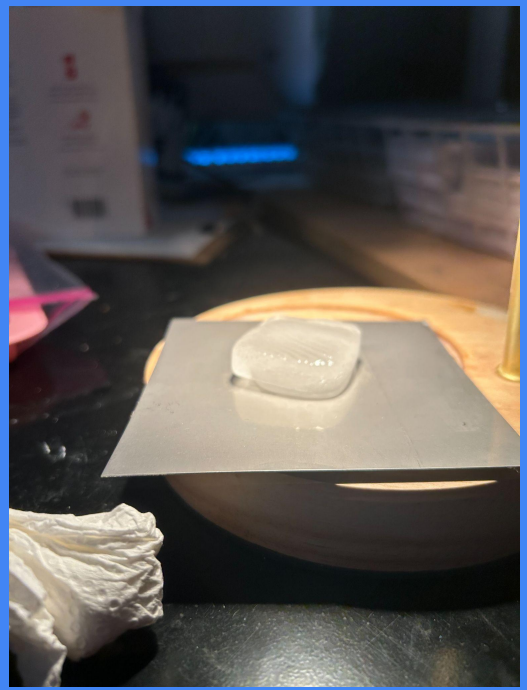


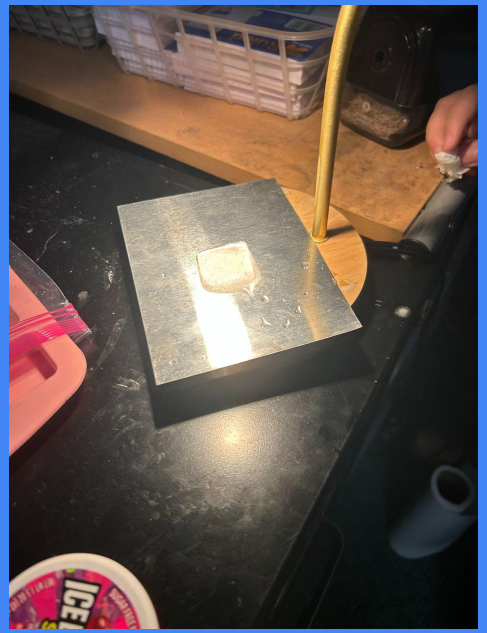
When the ice melted on plastic.

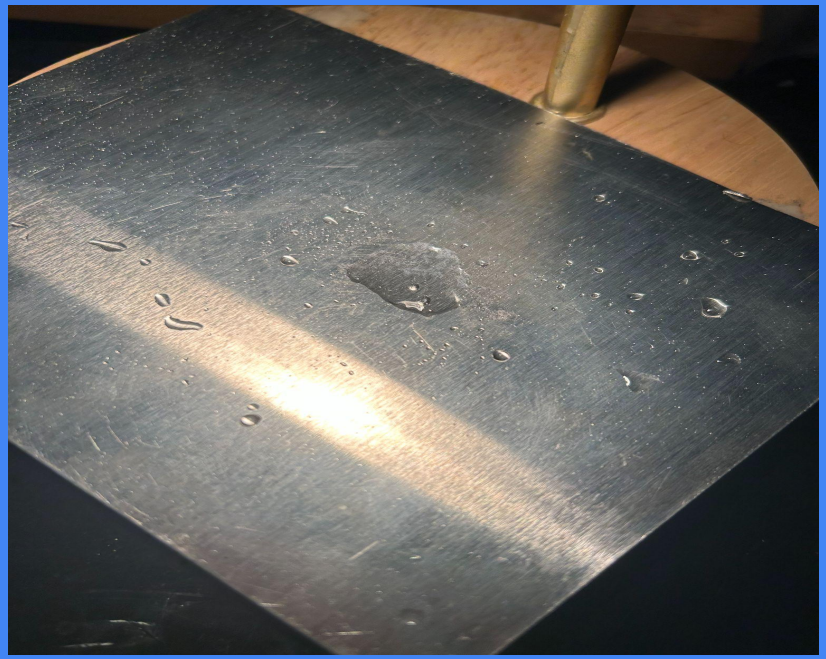
Half way melted on .

The beginning of the ice on aluminum.

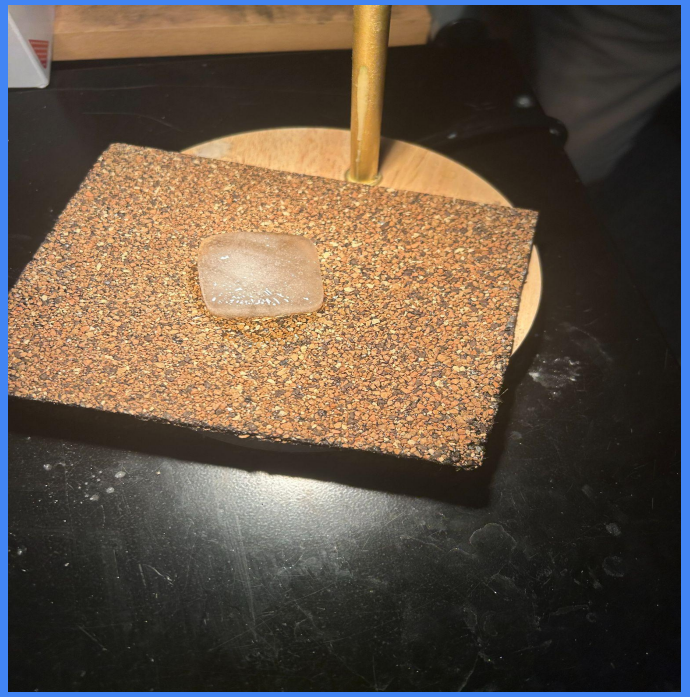
When the ice melted on aluminum.







This is half melted on roofing tile.



This is the beginning of the ice on stainless steel.

Data explained

We took data by timing how long it takes to melt the ice on each material. We also tested how hot the heated lamp was.

Was your project successful?

Yes our project was really successful it went exactly the way we wanted it to go. We got all the right materials it melted and went the way we planned.

How can you improve your project? How will the improvements help?

We would like to use smaller ice cubes next time, because it would show better data. Also we would like to have thicker materials because the materials we used were very thin. It would also help the data be more accurate because the real roofs are thick and really heavy.

Conclusion of your project

The purpose was to test each material and which one melts fastest. The project went really good the way we wanted it to go. When we tested the data it went good all the times were reasonable. The project was successful because it went really good and we tested the data correctly.