Variables

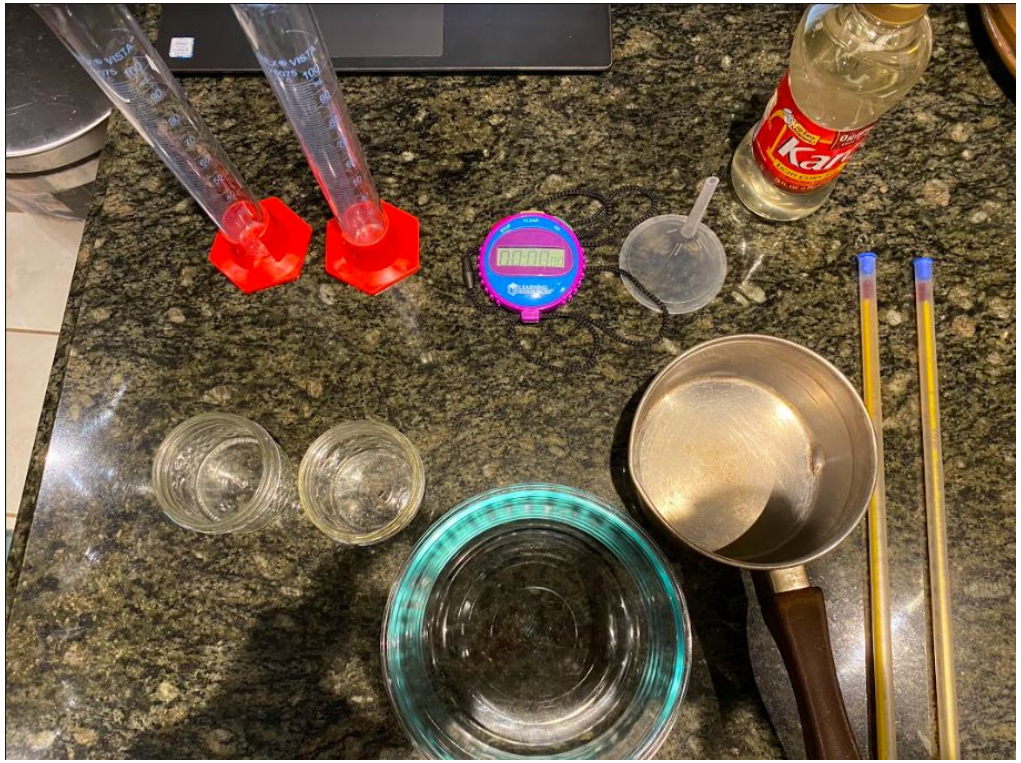
- **Independent variable:** My independent variable is the temperature of the corn syrup. I changed the independent variable by increasing the temperature to 140℉. I also decreased the temperature to 45℉.
- **Dependent variable:** My dependent variable is the viscosity of the corn syrup after the temperature changes.
- **How I Collected My Data:** I measured the dependent variable by timing the amount of time it takes for the corn syrup to pass through a funnel after each temperature change. I repeated my measurements 10 times to be more reliable.

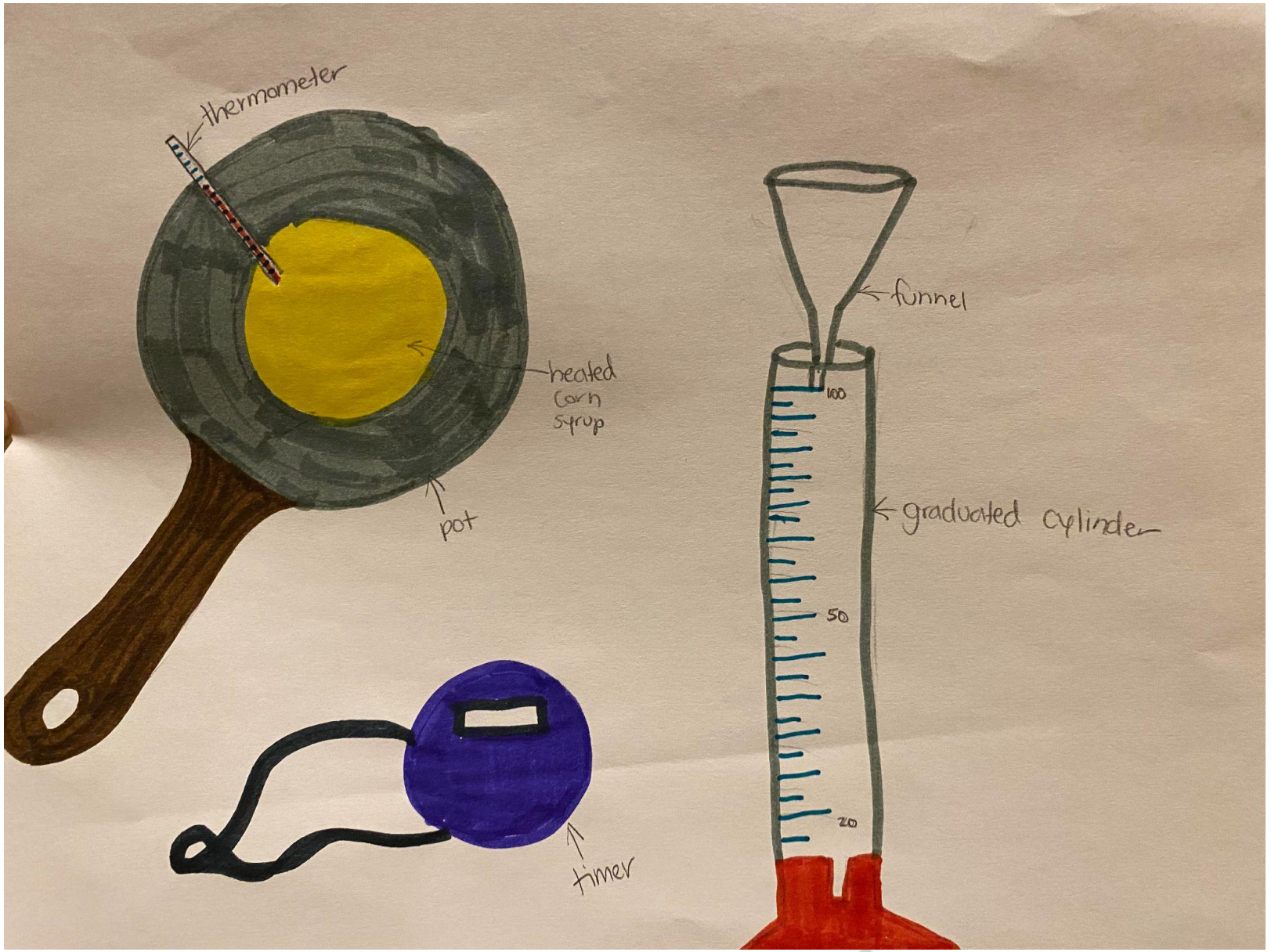
Controlled Variables

Controlled Variables	Why It Needs to be Controlled
The amount of liquid being tested	It will take longer for more liquid to pass through the funnel, when compared to less liquid
The funnel being used	More liquid will be able to pass through the funnel, if the size of the funnel changes
The temperature the corn syrup is being heated to	The viscosity of the liquid will change at different temperatures
The temperature the corn syrup is being cooled to	The viscosity of the liquid will change at different temperatures
The ‘Room Temperature’ temperature	The viscosity of the liquid will change at different temperatures
The amount of time the corn syrup is left out after heating and before timing	Different amounts of time between heating and measuring will affect viscosity
The amount of time the corn syrup is left out after cooling and before timing	Different amounts of time between cooling and measuring will affect viscosity
The thermometer being used	The thermometer might be read differently, depending on thermometer

Materials

- *One bottle of Karo brand light corn syrup*
- *One pot*
- *Two thermometers*
- *A freezer*
- *Small containers (I used Mason Jars)*
- *Four funnels*
- *Four Graduated cylinders*
- *A big bowl*
- *Four Timers*
- *Heat Source*





Labeled Diagram

Photos!

Room Temperature Corn Syrup Going Through the Funnel

Cold Corn Syrup Going Through the Funnel

Room Temperature Corn Syrup Going Through the Funnel

Data Table

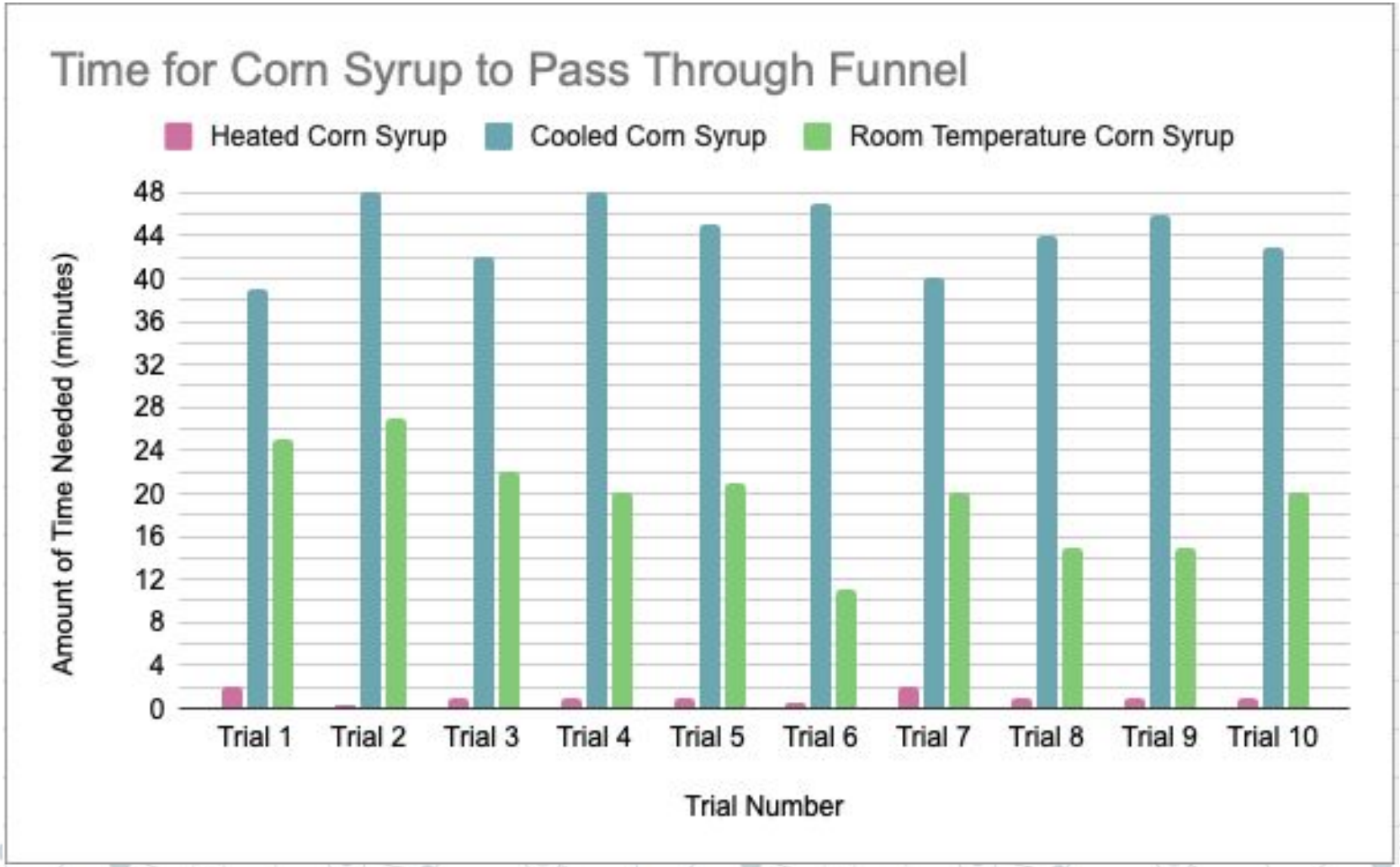
Table

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
Temp.	140	140	139	139	140	139	140	140	139	140
Time	1:49	00:35	1:22	1:57	1:35	1:25	00:55	1:38	1:29	1:15
Temp.	45	45	45	45	45	45	45	45	45	45
Time	39:00	48:05	42:25	48:42	45:52	47:24	40:54	44:43	46:08	43:13
Temp.	70	70	70	70	70	70	70	70	70	70
Time	25:34	27:54	22:38	20:35	21:45	11:24	20:00	15:24	15:35	20:00

Key:
Heated
Cooled
Room Temperature

Observations:
In Trial 1, the corn syrup boiled at 65 degrees and developed a film on top.
It heats up very quickly.
After 15 minutes, the cold corn syrup increased in temperature by 15 degrees.
Trial 6 melted the spatula I was using to stir, so I redid it.

Graph


Time for Corn Syrup to Pass Through Funnel
Heated Corn Syrup
Cooled Corn Syrup
Room Temperature Corn Syrup
Amount of Time Needed (minutes)
48
44
40
36
32
28
24
20
16
12
8
4
0
Trial 1
Trial 2
Trial 3
Trial 4
Trial 5
Trial 6
Trial 7
Trial 8
Trial 9
Trial 10
Trial Number

Analysis

- My data shows that when corn syrup is cooled, its viscosity increases and when corn syrup is heated, its viscosity decreases. My data suggests that viscosity is directly related to temperature of certain liquids. This might be because molecules move slower when the liquid is colder.

Summary

- I conclude that this experiment has helped me solve my original problem. This is because I was able to get the data I wanted to find about viscosity and temperature, from this experiment.

- I predicted that when the corn syrup is cooled, the viscosity would increase. My data supports my prediction. I think this is because I had previous knowledge about molecules and how they act in different temperatures. The viscosity was higher in colder temperatures and lower in higher temperatures because of the movement of the molecules.

Future Work

- The method I followed did allow me to answer the research question. I think this is because I was able to collect the data I needed to answer the research question. Some strengths in the method were the data it allowed me to collect and the simplicity of the experiment. One weakness in the method was the amount of time it took. Something I found difficult in carrying out the method was making sure I checked and stopped the timer at the right time, because otherwise my experiment wouldn't have been valid. If I wanted to test the same problem again, I would use the same method. This is because I was able to get the data I needed and it was simple and easy to follow.

- I could improve the method by decreasing the amount of trials or measuring the viscosity in a different way. I would make these improvements because it would save time and it would still be simple. This investigation has made me think of a new question, which is how would adding water affect the viscosity of a liquid. I could test this the same way but adding water to the liquid in the beginning. I would like to find out more about what affects viscosity because I know that water reacts differently when cooled.