Heating Different Liquids

3rd Grade

Testable Question:

Which liquid heats the fastest? I tested water, oil, apple juice, milk, and coffee.

Prediction:

I expected that oil would heat the fastest because I often see my mom putting oil on the pan and it started bubbling almost immediately.

Procedure:

1. I put about 600 ml of the test liquid in a measuring cup.
2. I use a thermometer to measure the temperature, I want it to be 21C. If it is too warm, I put it in the refrigerator to cool down. If it is too cold, I put it in the microwave to warm it up.
3. I measure out on a scale exactly 500 ml into a pot, and if it is too much, I scoop some out with a spoon.
4. I count down and when I reach zero my dad puts the pot on the stove and at the same time I start my stopwatch.
5. Every minute I look at the thermometer and write down what it says.
6. Once the liquid starts boiling I record the time and temperature.
7. If the liquid reaches the temperature 110C and it is still not boiling, I still record the time and the temperature and stop because my thermometer only measures to 110C.

Background:

I chose this project because I like using thermometers and I like cooking.

In my research I found out that oil heats the fastest and has the highest boiling temperature and that water, milk, coffee, and apple juice all boil at around the same time and temperature.

This project is important because almost every time people cook they heat a liquid.

Constant Conditions:

Independent Variable: The one thing I changed was the liquid to be heated. I did water, oil, apple juice, milk, and coffee.

Dependent Variable: I’m measuring temperature as time passes.

Constant Conditions: I’m keeping the amount and the starting temperature the same. Also the pot, the settings of the stove, and the position of the pot were the same.

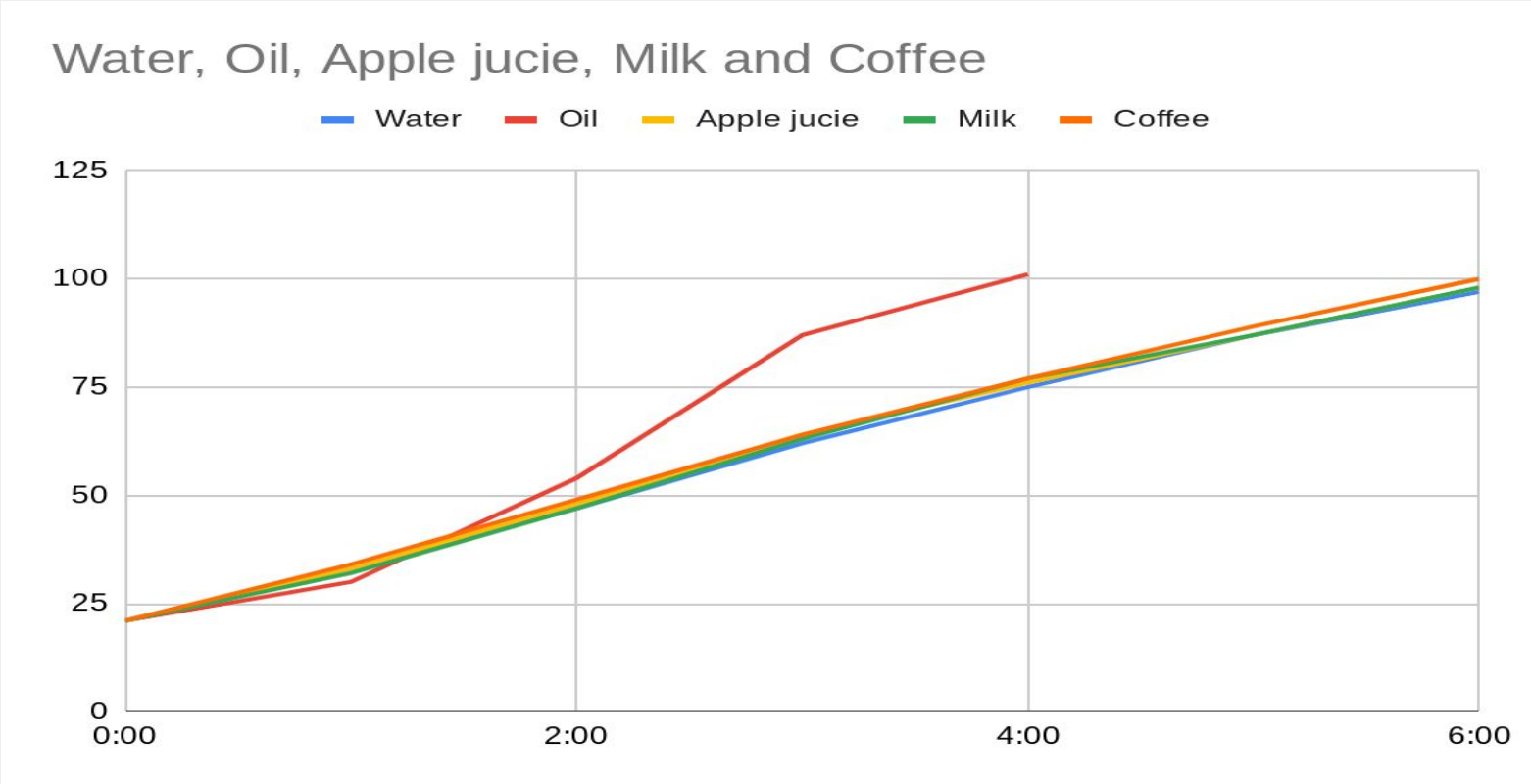
Data and Trials:

This table shows the data of all the tests.

	Water	Oil	Apple juice	Milk	Coffee
0:00	21	21	21	21	21
1:00	33	30	33	32	34
2:00	47	54	48	47	49
3:00	62	87	64	63	64
4:00	75	101	76	77	77
5:00	87		87	87	89
6:00	97		98	98	100

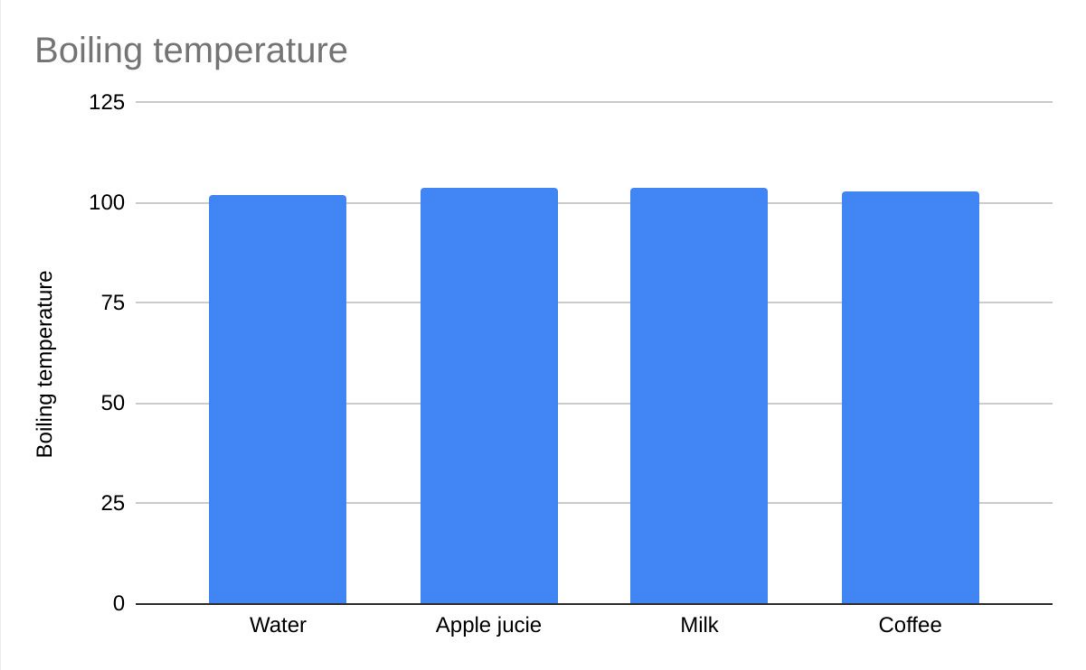
Data and Trials:

This graph shows the data of all the tests. It shows that water, apple juice, milk, and coffee all heat at almost the same speed, and that oil heats faster than the others.



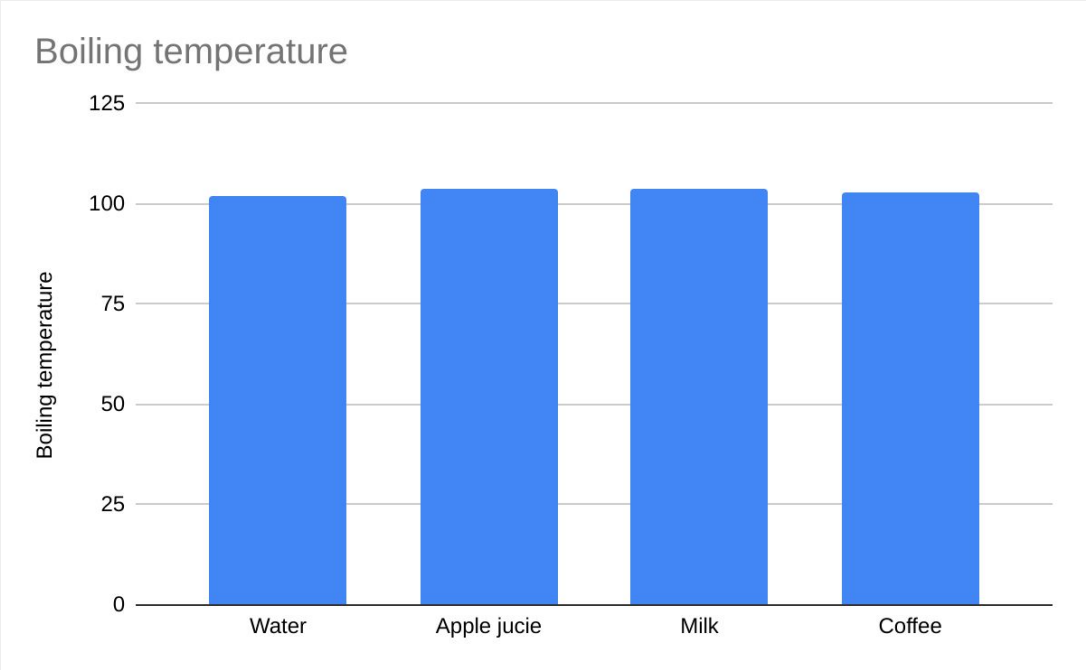
Data and Trials:

This graph shows the temperature at when the liquids boil, but not for oil because our thermometer only measures up to 110C and our oil does not yet boil at 110C. In Wikipedia I saw that oil boils at 230C. This graph shows that water, apple juice, milk, and coffee all boil at around the same temperature.



Data and Trials:

This graph shows the time the liquids take to boil in seconds. It shows that water, apple juice, mlik, and coffee boil at around the same time.



Conclusion and Reflection:

I found out that water, apple juice, mlik, and coffee have a lot of things that are very alike: They heat at almost the same speed and boil at the almost the same temperature. I think this is because they are all mostly water. Apple juice contains water and sugar, coffee is almost only water and milk contains water a bit of fat and sugar.

I was surprised that oil didn’t boil at 103C like the others did.

If I did this project again I would try heating Coca Cola or Gatorade. Also if we had put it in a bigger pot.