

Law of Cooling Worksheet

Definitions

- **Temperature** is how hot or cold something is.
- Energy transferred from one body to another due to a temperature difference is called **heat**.

Background

The transfer of heat from a body with high temperature to a body with lower temperature is what runs your car’s engine and keeps food cold in your refrigerator. Let’s investigate how heat moves in time.

Equipment

- BASIC Stamp 2 with temperature probe
- 100 ml beaker of room temperature water
- ice water bath
- hot water bath

Your prediction:

Procedure

Place temperature probe in beaker with room temperature water. Begin recording its temperature with the temperature probe. Record its temperature every 15 seconds for 5 minutes.

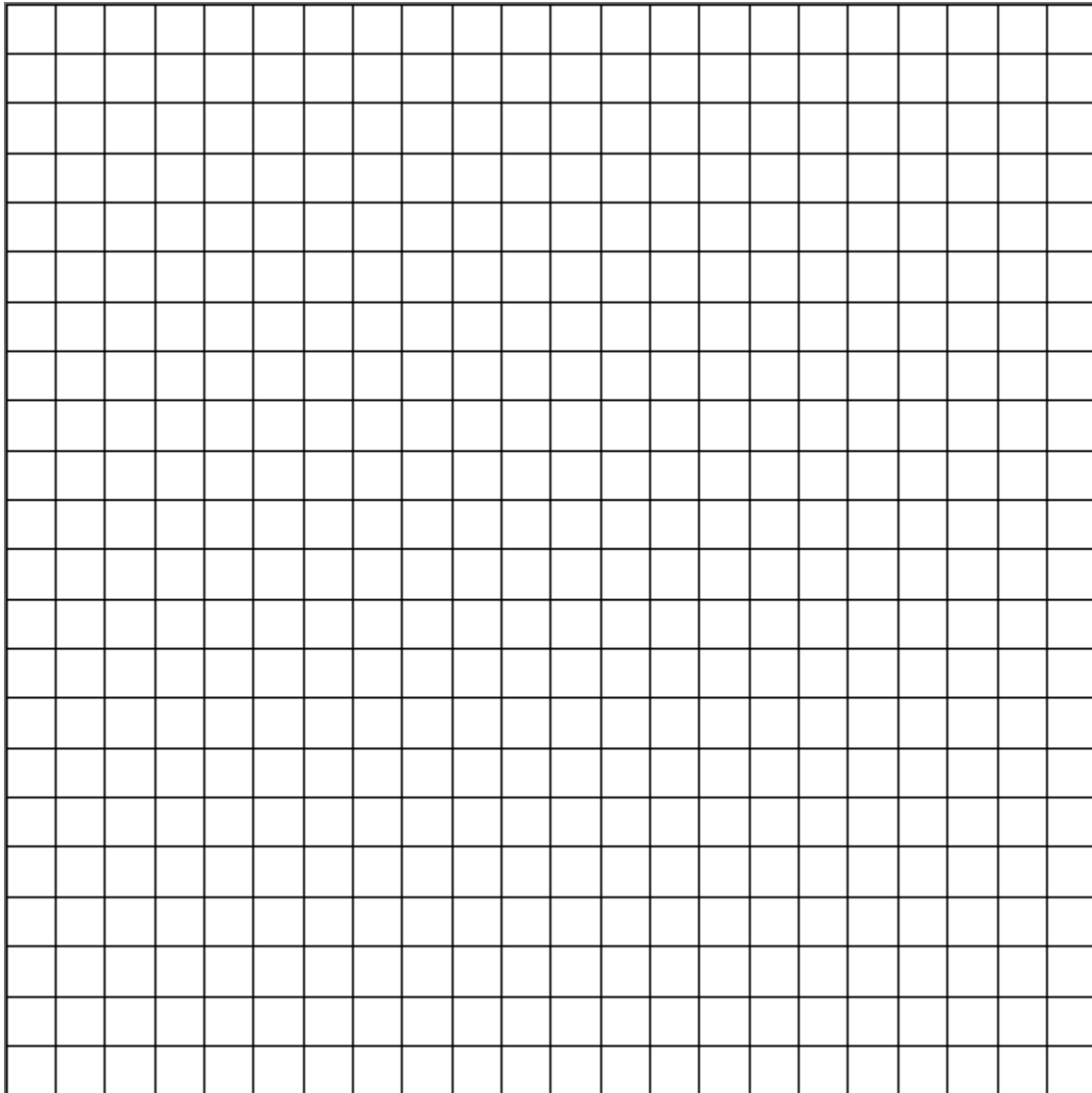
	Time (seconds)	Temperature (°C)		Time (seconds)	Temperature (°C)
Ice Water Bath					

	Time (seconds)	Temperature (°C)		Time (seconds)	Temperature (°C)
Hot Water Bath					

Name: _____ Date: _____

Analysis

Plot your results on the graph below.



Name: _____ Date: _____

Questions

1. What do you expect the temperature to be at 360 seconds? At 900 seconds?
2. Will the water in the beaker ever be 0° Celsius? Why?
3. You are an industrial engineer designing a factory to make cookies. You need to design a process to add melted butter to eggs, but you do not want the hot butter to cook the eggs. Butter starts to melt and eggs start to cook around at ~95 °Fahrenheit, so if you add a lot of melted butter to the eggs, their temperature rises and they will cook before they make it to the cookie dough! As an engineer, apply what you learned to come up with a solution for your client.

Describe a general idea for how to add a gallon of butter to a gallon of eggs without the eggs getting too hot. What kind of sensors would you need in the system to make sure the eggs did not cook from the butter? (Write approximately one paragraph.)

4. Describe two other possible situations in which engineers might apply their understanding of heat transfer.