

## Sample Design Plan

**Question:** In which type of mug will my coffee cool the fastest – Styrofoam, Nissan Metal Mug, or Ceramic Mug?

**Independent Variable:** The type of mug

**Dependent Variable:** The rate at which my coffee cools

**Control:** \_\_\_\_\_

### Things I will keep constant in the experiment:

1. Same type of coffee.
2. Same volume of coffee
3. All cups need to have a cover or no cover. If they have no cover, the opening exposed to air needs to be the same size
4. Same temperature in the environment
5. Same humidity in the environment

### Describe your experiment in as much detail as possible.

I will make one pot of coffee using my coffee maker. I will use the same amount of coffee and water every time. Every time the pot finishes, the coffee is at the same temperature. I will pour 75mL of coffee into a ceramic mug, my nissan metal mug, and a styrofoam cup. All three cups have a 9cm opening at the top. Once I pour the coffee in to each mug, I will take the temperature of each mug. I will continue to take the temperature of each cup of coffee every minute for 20 minutes. I will repeat the experiment with 12 fresh pots of coffee.

**Possible unpreventable error:** Some heat of energy may be lost when the coffee is poured. It will be hard to regulate the temperature of the environment.

**A reasonable sample size:** A total of 12 cups of coffee

**Number of trials:** 12

### Data:

**Qualitative/What you will describe/draw/etc:** The steam rising off the mug and how the mug feels to a brief touch.

**Quantitative/What you will measure:** Time and temperature of each mug of coffee

**Quantitative/What you will graph:** Line graph of temperature vs time for each mug