Mars Thermos: Experiment and Record   NAME_____

Today you will conduct an experiment to demonstrate the movement of atoms and molecules through temperature measurements and engineer a design that can slow down that movement. Take a few minutes and find the definitions of these words and phrases:
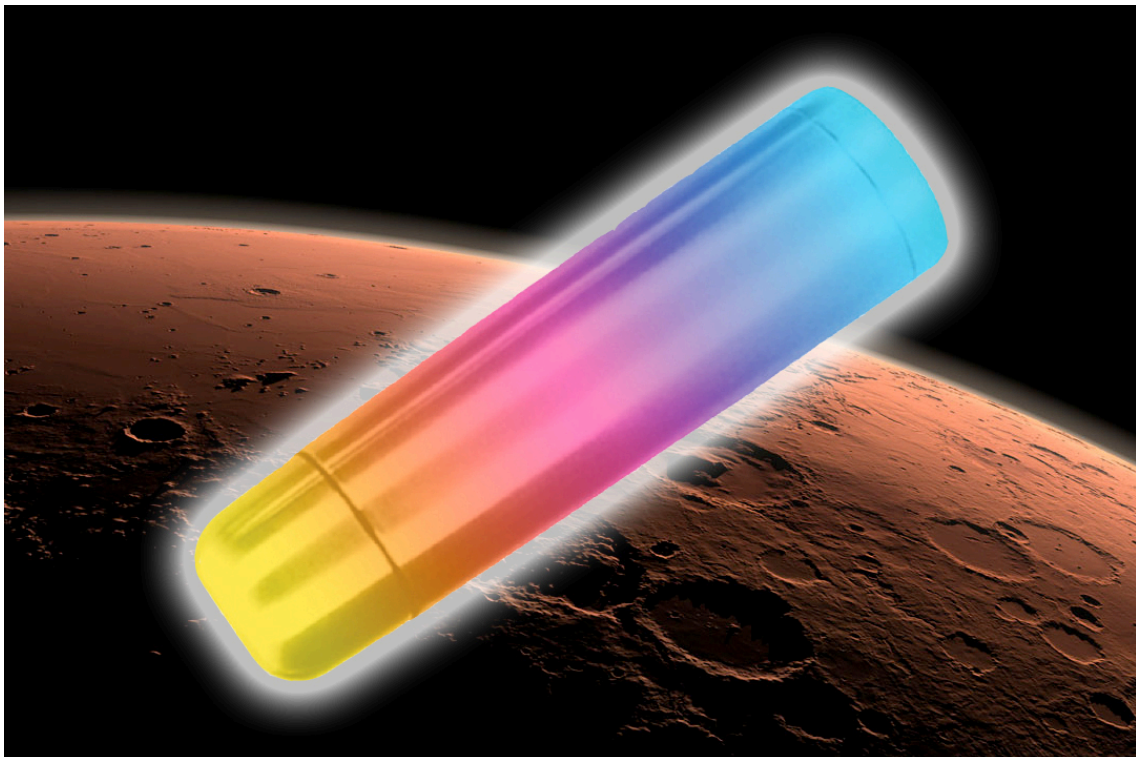
HEAT_____

TEMPERATURE_____

EQUILIBRIUM_____

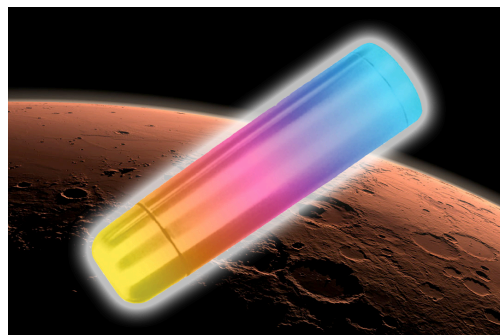THERMAL ENERGY TRANSFER_____

_____

Before you begin setting up the experiment, can you predict how the temperature will change in each cup? Using the vocabulary from above, write a hypothesis for what you think will happen in the experiment.

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_____

_____

_____

1. Record the temperature of the room: _____°F.

2. Decide how much water you should use in your cup. Our group has decided to use _____ml of water because _____

3. Decide how often you will record the temperature for each cup of water.

4. Using a graduated cylinder, measure ice water (with no ice) and pour it into one small cup. Repeat for hot water (from the tap or from your teacher).

5. Perform the control experiment (no insulation). Record your data in the "Control" column in the table below.

6. Collect necessary materials and create a Mars Thermos for each cup and perform the experiment, noting the data in the data table below. Your goal is to limit the temperature change of the water to no more than 5°F in 10 minutes. Note the materials you are using for each cup here:

   _____

   _____

   _____

7. Improve your design by trying another combination of materials and repeat the experiment. Record your results using the table for Trial 2. Note changes here:

   _____

   _____

8. If time allows, repeat the experiment a third time with a different amount of water. Does the amount of water affect the temperature loss? _____

9. What can you conclude from your experiment?_____

   _____

   _____

Mars Thermos Data Table

Time Min:sec	Cold Water Cup (°F)			Hot Water Cup (°F)		
	Control	Trial 1	Trial 2	Control	Trial 1	Trial 2
0:00						

Graph the results from your experiment, using the data from either Trial 1 or Trial 2. Time is the **independent variable** in this experiment. You, as the experimenter, decide when to take temperature readings. The independent variable is plotted on the x-axis. The temperature of water is the **dependent variable** in this experiment. The temperature of water depends on the time it was measured. The dependent variable is plotted on the y-axis. Label the y-axis below and plot your data using dots. Connect your dots to make a line. Draw two lines in two different colors to distinguish the data from each cup.

Mars Thermos Graph

Temperature (°F)

y

0

x

Time (sec)