Physical Science Heat energy Date Period
KJHS Name

OBJECTIVES: complete a temp/time graph for four different insulators on your chromebook.

- **THERMAL ENERGY**: same as heat energy
- **LATENT HEAT:** Heat stored in molecules motion - Seen when changing phases.
- **TEMPERATURE**-- The measure of the average kinetic energy in molecules.
- Ex. Cup of coffee has a high temperature, but low amount of latent heat.
- EX: Bathtub has a lower temperature, but high amount of heat.
- **1) Fahrenheit Scale**: Used in the United States. **2) Celsius Scale**: Used in most other countries
- **3) Kelvin Scale**: Based off of absolute zero. (Where all molecular motion stops = **ABSOLUTE ZERO)**
- Heat is measured in several different units.
- **CALORIE**: amount of heat needed to raise 1 gram of water 1 degrees Celsius.

INDEPENDENT VARIABLE (1): _____

DEPENDENT VARIABLE (2): _____

HYPOTHESIS: If we change the _____, then I think the _____ will hold heat energy most efficiently.

CONTROL: _____

CONSTANTS: _____

MATERIALS: Bunsen burner goggles (2) 250 ml beakers, tongs, ring stands, metal cup Styrofoam cup paper cup thermometer

PROCEDURE: you may use a **device** as a timer to keep track of 20 minutes.

1. Fill 250 ml beaker with **200 ml of water**
2. Put a thermometer in each container (glass, Styrofoam, paper and metal)
3. As water boils, carefully use tongs to pour water 50 mL into the metal cup. TAKE TEMPERATUR E IMMEDIATELY! (There are lines in the cup in the general area of 50 mL) Put beaker of boiling water back onto ring stand (bring to boil again) and then pour 50 mL into the metal cup. TAKE TEMPERATUR E IMMEDIATELY! Return beaker to ring stand – repeat procedure for paper cup and glass (50 mL each) TAKE TEMPERATUR E IMMEDIATELY! ***Basically, stagger your start time by 30 seconds for each container.
   When all water is poured, TURN OFF GAS Put empty beaker and tongs on counter.**
4. The immediate temperature when the water in poured in each cup will be _____.
5. Record temperature for each container every 2 minutes for 20 minutes. (4 containers, take temperature every 30 seconds = 2 minutes)
6. DATA TABLE: see below

Time	Metal	Styrofoam	Paper	Glass
0:00	100 ° C	100 ° C	100 ° C	100 ° C
2:00				
4:00				
6:00				
8:00				
10:00				
12:00				
14:00				
16:00				
18:00				
20:00				

7. **After 20 minutes of data is recorded, clean up: empty cups and set up lab station for next class (leave it as you found it).**

GRAPH: FOLLOW THESE DIRECTIONS CAREFULLY AND STEP BY STEP
Put away all lab materials before anyone in your lab group takes out a chromebook
You must have a chromebook – if you do not, you need to finish this on your own tonight.
CREATE→ SPREADSHEET→
A COLUMN: time, 0,2,4,6,8,10,… minutes count by 2
B COLUMN: metal, 100, and the rest of the data
C COLUMN: Styrofoam, 100, and the rest of the data
D COLUMN: Paper Cup, 100, rest of the data
E COLUMN: Glass, 100, and the rest of the data

INSERT → CHART → click "**use row 1 as headers**" → click on "**use column A as lables**" → click "**more charts**" →click "**line graoh**" and choose the first choice (just lines)
Then go to "Customize" tab:
title chart (Heat energy Lab), choose a dark color if you like.
Click "AXIS"→ "Horizontal" and Label horizontal axis: "time (minutes)"
Click "AXIS" again and select "left vertical axis title" and title is "temperature Celsius"

1. **Does your hypothesis match** your results? Explain your results _____
   _____
   _____
   _____
2. **You must share you graph with me to get FULL credit for this lab – no shared document, no credit!** itoal@petk12.org ******time stamp - you must share it by midnight tonight ☺**

FEEDBACK: Please state your argument about using a chromebook to graph your data in science. (at least 25 words)
_____
_____
_____
_____
_____