Name: Date: Period:

Comparing Fuel Values - Lab Data Sheet

Hypothesis

Make a hypothesis about which type(s) of fuel will have the highest fuel value.

Data

Table 1. Data recorded during the Fuel Comparison Lab

Fuel type	Initial mass of fuel (g)	Final mass of fuel (g)	Initial temperature of water (°C)	Final temperature of water (°C)
Kerosene (lamp oil)				
Ethanol				
Isopropanol				
Paraffin (candle wax)				
Methanol				

Table 2. Quantities calculated from Table 1 Data

Fuel type	Mass of fuel burned (g)	Change in temperature (°C)	Total energy liberated (J)	Energy per gram of fuel (J/g)	Energy per milliliter of fuel (J/mL)
Kerosene (lamp oil)					
Ethanol					
Isopropanol					
Paraffin (candle wax)					
Methanol					

Name: Date: Period:

Data Analysis:

1. From the data collected for each type of fuel in Table 1, calculate the **mass of fuel burned** and the **temperature change of the water**. Show your work below. Record your answers in Table 2.

2. For each type of fuel, use the following formula to calculate the **total amount of energy liberated** in joules (J). Show your work below. Record your answers in Table 2.

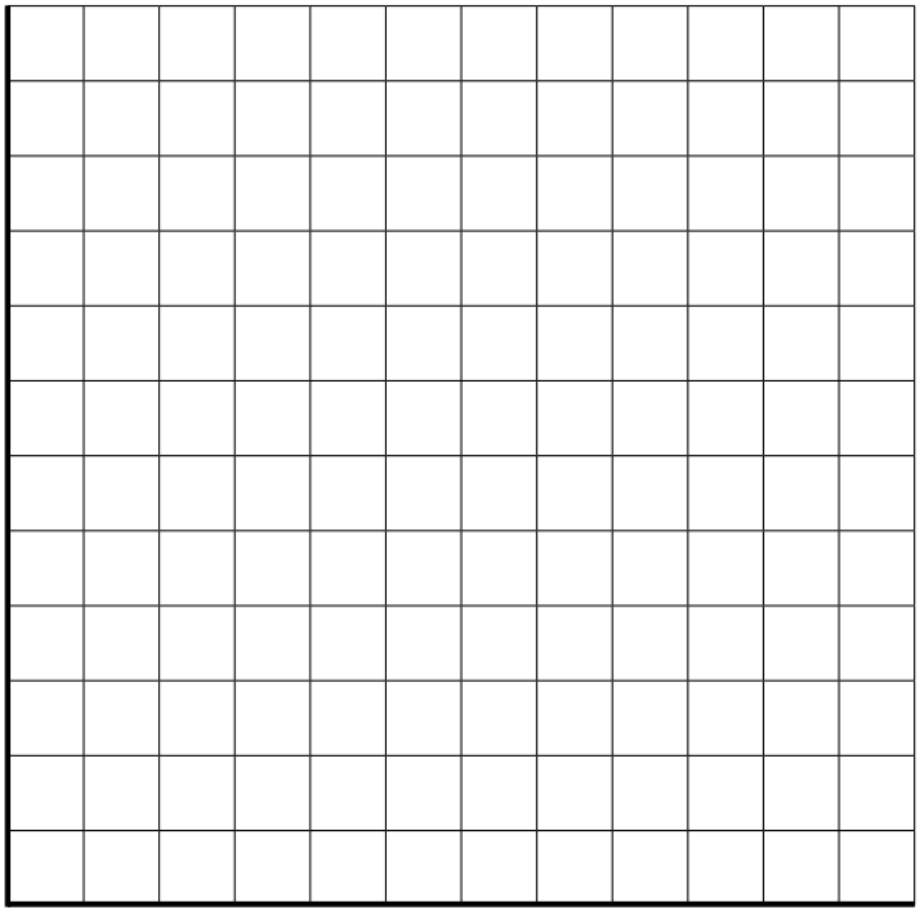
   Energy liberated = [4.184 joules/(gram x °C)] x Mass of water x Temp change of water

3. For each type of fuel, calculate the amount of **energy liberated per gram of fuel** that was burned. Show your work below. Record your answers in Table 2.

Name: Date: Period:

Data Analysis (continued):

4. Make a bar graph comparing the amount of energy per gram for each type of fuel.



5. What type of fuel provides the most energy per gram? The least?

6. For each type of fuel, use the fuel densities below to calculate the **amount of energy liberated per milliliter of fuel** that was burned. Show your work below. Record your answers in Table 2.

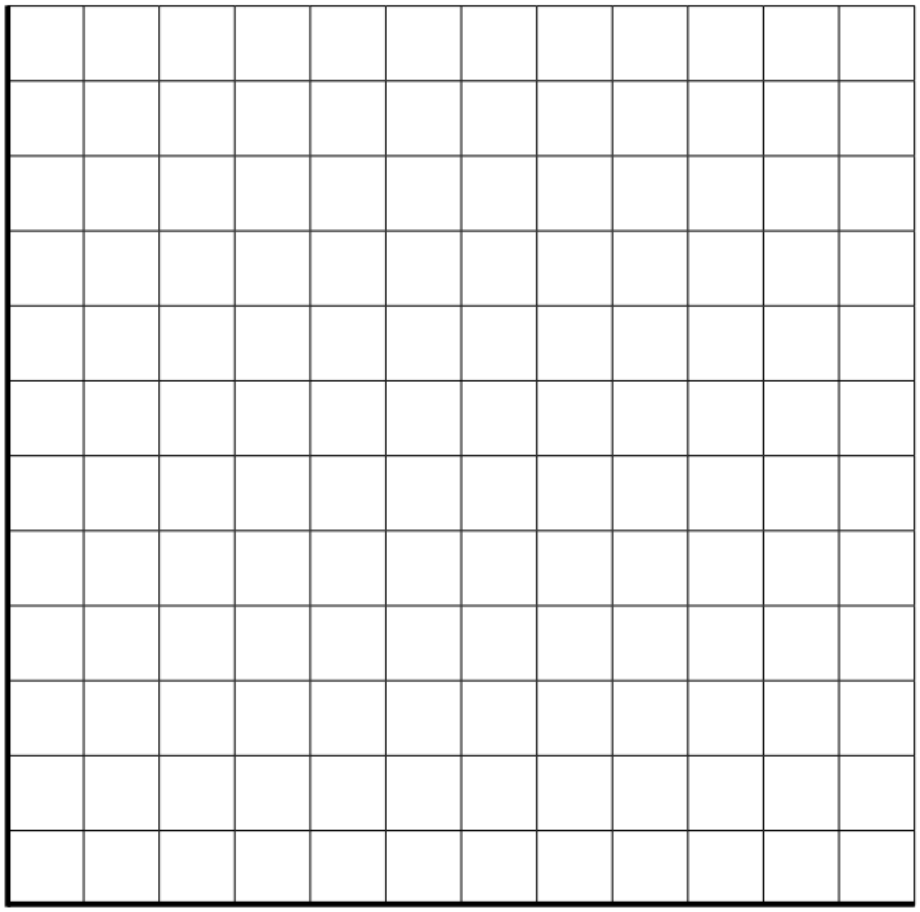
Fuel densities:

Kerosene: 0.81 g/mL	Isopropanol: 0.79 g/mL	Methanol: 0.791 g/mL
Ethanol: 0.789 g/mL	Paraffin: 0.88 g/mL	

Name: Date: Period:

Data Analysis (continued):

7. Make a bar graph comparing the amount of energy per milliliter for each type of fuel.



8. What type of fuel contained the most energy per milliliter? The least?

9. Describe any differences you noticed in the amount of particulates (i.e. soot) produced by the different fuels. Why might some fuels produce a large amount of particulates and others don't? Discuss why this might be a concern when using these fuels.

Name: Date: Period:

Data Analysis (continued):

10. Which of the fuels that were tested are fossil fuels? Discuss why this should be a consideration when choosing sources of fuel.

11. Choose one of the fuels tested in this investigation and make an argument for why it is the “most promising” fuel of the future to power transportation vehicles. Include both positive and negative aspects of the fuel you choose.

Conclusion:

Use the CER format (Claim, Evidence, Reasoning) to summarize your experiment: ***Determine and compare the fuel values of different types of fuel.***

Claim: (Which fuel provided the most energy?)

Evidence: (Include any data, graphs, and descriptions of both data and graphs that support how you know that your claim is accurate.)

Reasoning: (Explain how you are able to make a connection between your Claim and the Evidence you have provided. Explain why your results make sense. Provide background information and define the terms that you use and the concepts that you need to know in order to understand and explain your findings.)