

Lab 1: Making Measurements

BE HERE – BE READY – BE RESPECTFUL – BE SAFE

Name: _____ Date: _____

Week: _____ Pts. Earned: _____

Guideline to follow when completing a formal lab report:

1. Define the Question
2. Gather information and resource
3. Form the hypothesis
4. Plan the experiment
5. Perform the experiment and collect data
6. Analyze data
7. Interpret and draw conclusions that help refine the hypothesis
8. Communicate results

*** Students will be in groups that will rotate between stations set up in the classroom. ***

*** Stations for each measurement will be determined prior to starting the lab. ***

Lab Question: In all aspects, how do measurements impact our daily lives?

Information / Resource: In this laboratory exercise, you will use a thermometer to measure temperature, a meterstick to measure length, a balance to measure mass, and a graduated cylinder to measure volume. You will then determine volume by liquid displacement.

Hypothesis: Form a hypothesis based upon the question (Measurements impact our lives by...)
– write the hypothesis you design below:

Measurements impact our lives by _____

Plan: The following are the steps to follow during the lab experience:

Temperature Station – At the front of the room, go to the thermometer and read the temperature. On the board, record your reading and time at which you read the temperature. After everyone has completed this station, you will make a graph of the temperature readings made overall by the class. When each group is done with all stations, record the temperatures in Table E under Data.

Length Station – Measure the length, width, and height of a block (or box) in centimeters. Record the measurements in Table A under Data. Using the equation below, calculate the volume of the block (or box) in cubic centimeters (cm³) and write the volume in the table. Perform three times and then average all three trials.

$$\text{Volume} = \text{length (cm)} \times \text{width (cm)} \times \text{height (cm)}$$

$$V = l \times w \times h$$

$$V = \text{_____ cm}^3$$

Mass Station – Place a small beaker (provided) on the balance and measure the beaker's mass – record the value in Table B under Data. Measure to the nearest 0.01 g using the triple beam. Then place the given material (rock) inside the beaker. Measure the beaker's and rock's mass together and record in Table B. Then subtract the total measure from the measure for the beaker to determine the mass of the rock. Perform three times and then average all three trials.

Volume Station – Fill three small beakers (provided) with tap water (from sinks). Then pour each beaker (at a time) into a graduated cylinder. The top of the column of water in the graduated cylinder will have a downward curve. This curve is called a meniscus. Take your reading at the bottom of the meniscus. Record the volume of the graduated cylinder for each beaker (one at a time) and record their volumes in Table C under Data. Find the average volume of the three beakers.

Volume by Liquid Displacement Station – Pour a small amount of tap water (from sinks) into the graduated cylinder using a small beaker to transfer the water. Record the volume as precisely as you can in Table D under Data. Then gently drop a small item/object (will be provided) into the graduated cylinder. Be careful not to splash any water out of the graduated cylinder. Measure the volume of the water and the small item/object. Record the volume in Table D. Determine the volume of the small item/object by subtracting the volume of the water from the total volume measured. Average the results after taking the measurements from the three beakers.

Data: Record all data taken during the lab below in the tables provided:

Table A	Length (cm)	Width (cm)	Height (cm)	Volume (cm ³)
Trial 1				
Trial 2				
Trial 3				
Average				

Table B	Mass of beaker (g)	Mass of beaker and rock (g)	Mass of rock (g)
Trial 1			
Trial 2			
Trial 3			
Average			

Table C	Volume (mL)
Beaker 1	
Beaker 2	
Beaker 3	
Average	

Table D	Total Volume (mL)	Volume of water only (mL)	Volume of small item/object (mL)
Trial 1			
Trial 2			
Trial 3			
Average			

Table E	Time	Temperature
Group 1		
Group 2		
Group 3		
Group 4		
Group 5		
Group 6		
Group 7		
Group 8		

Analyze Data: Analyze the temperature station. After completing ALL stations, then record the temperatures taken by each group on the board. Afterwards, take and graph the measurements from the temperature station by creating a line graph on a piece of graph paper (provided). Make the y-axis (dependent variable) or vertical measure be temperature and the x-axis (independent variable) or horizontal measure be time (the time of when the temperature was taken). Make sure to connect the measurements when completed.

1) Did the temperature change during the class period? Why would or would not this be?

Analyze the data above from ALL stations. Did you make any mistakes? Any errors? If so, write them here or work them out below.

Interpret & Conclude: Interpret and conclude what you have done – did everything work well? Did something not work well? If so, could you have done something different? How could the measurements have been done differently during the lab? Conclude the results – reference the results versus the averages and see how accurate you were. Conclude and interpret any of the above questions below:

Communicate Results: Communicate the results by telling the audience the overall lab experience – did you answer the lab question? If so, how accurate and precise was your hypothesis to the lab conducted? How were errors managed in the lab? If errors occurred, what were they? Explain the results analytically (give some examples) from the measurements above and how they relate back to the question of the lab. Communicate the results below:
