

## **Metric Measurement Boot Camp Lab – Part One**

**Purpose:** Accurately take linear measurements and volume readings of selected objects and liquids through the use of metric measurement tools and math calculations.

**Method:** Use the provided metric rulers, graduated cylinders, and beakers to measure the length or volume of the selected object at each of the lab stations around the room. It is important to follow the correct rules for reading a metric ruler and a graduated cylinder when collecting your data for this lab. Each partner must independently measure each object. You can compare values later.

### **Practice Measurement:**

Review your measurements from this practice diagram with your partner to check for accuracy.

### **Data: Part One - Linear Measurements In Our Classroom**

<b>Object</b>	<b>(cm)</b>	<b>(m)</b>
Length of your table top		
Length of a floor tile		
Width of a floor tile		
Area of a floor tile		
Height of the white board		
Length of your foot		
Height of your partner		
Length of your textbook		
Height of your textbook		
Width of your textbook		
Volume of your textbook		

### **Part Two – Liquid Volume Measurements**

<b>Liquid Sample</b>	<b>(ml)</b>	<b>(L)</b>
Graduated Cylinder #1		
Graduated Cylinder #2		
Graduated Cylinder #3		
Graduated Cylinder #4		
Graduated Cylinder #5		
Beaker #1		
Beaker #2		
Beaker #3		
Beaker #4		
Beaker #5		

### **Part Three – Volume By Water Displacement**

<b>Solid Sample</b>	<b>Starting Volume (ml)</b>	<b>Final Volume (ml)</b>	<b>Volume of Solid (cm<sup>3</sup>)</b>
A rubber stopper			
5 pennies			
A rock			
A marble			

### **Questions:**

- 1.) Which part of the lab did you get the greatest difference in measurements? Describe the source of error.
- 2.) What is the most important rule when measuring with a metric ruler? Did you follow this rule in lab?
- 3.) Were you able to get a more accurate volume measurement with a graduated cylinder or a beaker? Why?
- 4.) What is the point called where you measure the exact volume of a liquid?
- 5.) When is it necessary to use water displacement to measure the volume of an object?
- 6.) How can measure the volume of a solid with a metric ruler?
- 7.) Why is the volume of a liquid measured in milliliters and the volume of a solid measured in centimeters cubed?

8.) What lesson did you learn by completing this measurement lab?

## **Metric Measurement Boot Camp Lab - Part Two**

**Purpose:** Accurately measure the mass of selected objects and record the temperatures of liquids through the use of metric measurement tools and math calculations.

**Method:** Use the provided triple beam balances and electronic balances to measure the mass of the selected solid or liquid at each of the lab stations around the room. It is important to follow the correct rules for reading a triple beam balance when collecting your data for this lab. You will also use the thermometers to measure the temperature of each provided liquid in degrees Celsius. Each partner must independently measure each object. You can compare values later.

### **Rules for massing with a triple beam balance:**

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### **Data:** **Part One – Mass Measurements**

TBB-Triple Beam  
Balance  
EB-Electronic Balance

Massing Tool/Object	My Mass (g)	My Partner's Mass (g)	Average Mass (g)
TBB- 250 ml beaker (empty)			
TBB- two large rubber stoppers			
TBB- an alcohol burner			
TBB- a large paper clip			
TBB- a plastic funnel			
*TBB- 100 ml of water (show work)			
*TBB- 250 ml of water (show work)			
EB- 250 ml beaker (empty)			
EB- large rubber stoppers			
EB- a large paper clip			
EB- a plastic funnel			
*EB- 25 ml of water (show work)			
*EB- 50 ml of water (show work)			

### **Part Two – Temperature Measurements**

Sample	My Temp. Reading (°C)	My Partner's Temp.(°C)	Average Temp. (°C)
Beaker #1			
Beaker #2			
Beaker #3			
Beaker #4			
Beaker #5			
Beaker #6			
The classroom			
Outside air			

### **Questions:**

- 1.) Which part of the lab did you get the greatest difference in measurements? Describe the source of error.
- 2.) List 3 important rules when massing objects with a triple beam balance? Did you follow these rules in lab?
- 3.) Were you able to get a more accurate volume measurement with the TBB or the EB? Why?
- 4.) Describe the method you used to calculate the mass of the water.
- 5.) Did you and your partner find the same temperatures for the liquids? Explain why or why not.

