

Metric Mastery Practice

Part 1: Estimation

You will be asked to estimate length, mass and volume.

You will need to estimate length of 10 different objects. After you have estimated each of the lengths you will need to use a ruler to check your work. For this exercise we will consider the length to be the longest side of the object. Each item will tell the units you should estimate in. **You may not touch the objects when making your estimations!**

Item	Length Estimate	Length Actual
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

You will also need to estimate the mass and volume of 10 different objects. We will estimate volume in cm^3 and mass in grams. You will not be asked to use any other units for estimation. After finishing your estimates you will need to use a triple beam balance to check your masses and a ruler to check your volumes. You may touch these objects to help you make your estimations!

Item	Mass Estimate	Mass Actual
1.		
2.		
3.		

Item	Mass Estimate	Mass Actual
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Item	Volume Estimate	Volume Actual
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Next you need to see how 9 of your estimations would have scored in the actual competition. Choose three of your answers from each type of measurement and determine the % error in your estimate. You will receive 2 points for being within 10% of the correct answer, 1 point for being within 20% and 0 points for more than 20%.

$$\frac{\text{estimate}}{\text{actual}} = \frac{x}{100}$$

Item	Property Measured	% Error	Points Earned

Feel free to check and score more of your work now that you know how.

Which types of measurements were you best at? Worst at?

Your teacher will have some additional objects out in the room for further practice. Please continue to practice in your weakest areas.

Part 2: Measurement

You practiced measuring length, mass and volume of regular shapes earlier so we will not practice those properties today. You will be expected to both estimate and measure those quantities on competition day. Today we will focus on other properties you will have to measure and calculate.

Volume of an Irregular Object: Use a graduated cylinder and an overflow can to find the volume of the three objects at this station.

Item	Volume (include units)

Liquid Volume: Use a graduated cylinder to determine volume (in ml) of each of the containers at this station.

Item	Volume (include units)

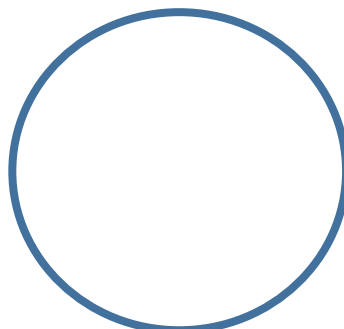
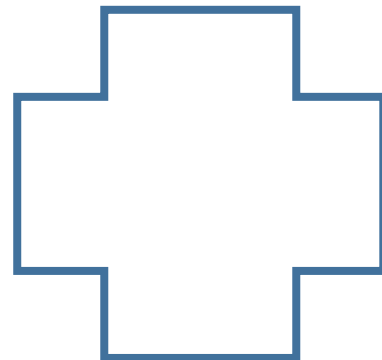
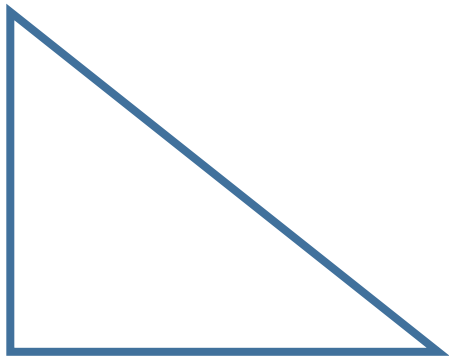
Force: Use a spring scale to determine the mass of each item in grams.

Item	Mass (include units)

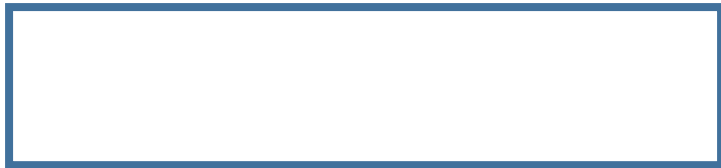
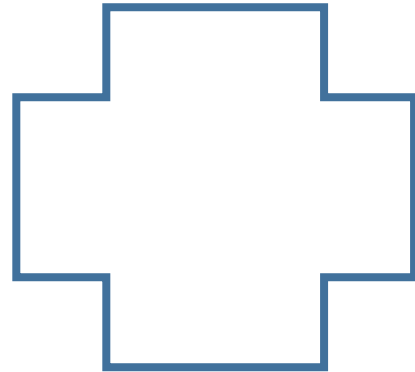
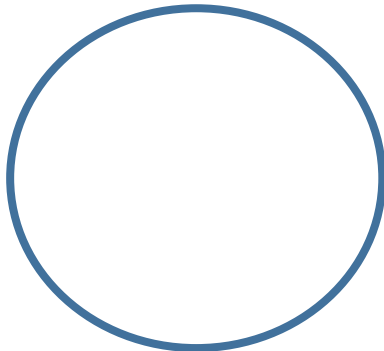
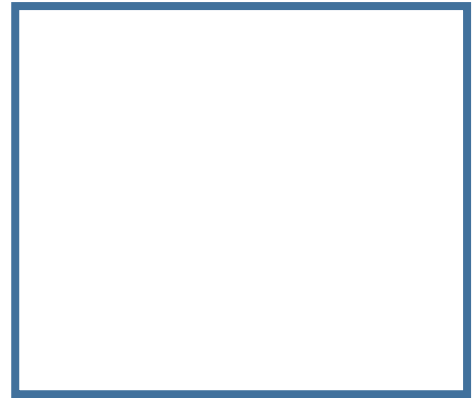
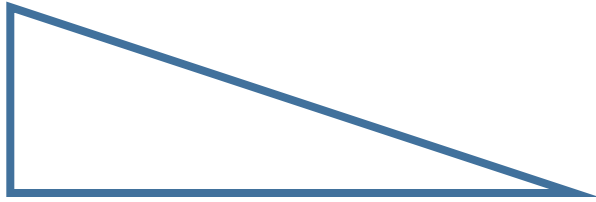
Temperature: Use a thermometer to determine the temperature of each item in the table.

Item	Temperature
Air in classroom	
Tap Water	
Tap Water + Ice Melt (one spoonful)	

Perimeter: Measure the perimeter of each of the shapes below. Write your answer in the center of the shape.



Area: Find the area of each shape in the space below. Write your answer inside the shape.



Density: Answer the following questions about density.

1. An irregularly shaped stone was lowered into a graduated cylinder holding a volume of water equal to 2 ml. The height of the water rose to 7 ml. If the mass of the stone was 25 g, what was its density?

Answer _____

2. A 10.0 cm^3 sample of copper has a mass of 89.6 g. What is the density of copper?

Answer _____

3. Silver has a density of 10.5 g/cm^3 and gold has a density of 19.3 g/cm^3 . Which would have the greater mass, 5 cm^3 of silver or 5 cm^3 of gold?

Answer _____

4. Five mL of ethanol has a mass of 3.9 g, and 5.0 mL of benzene has a mass of 44 g. Which liquid is denser?

Answer _____

5. A sample of iron has the same dimensions of $2 \text{ cm} \times 3 \text{ cm} \times 2 \text{ cm}$. If the mass of this rectangular-shaped object is 94 g, what is the density of iron?

Answer _____

Angles: Measure each of the angles shown below.

- a)
- b)
- c)
- d)
- e)
- f)
- g)
- h)

