

Metric Measurement Lab

Part A: Count your drops!

Take a guess - How many drops of water will it take to equal 1 milliliter? _____ drops

Follow the directions to find the number of drops in 1 milliliter of water, then answer the questions. You will need a small graduated cylinder (25 mL), a beaker of water, and an eyedropper for this section. Remember to read the **bottom of the meniscus** when you are reading the volume of a liquid in a graduated cylinder.



1. Fill a small graduated cylinder with 10 mL of water.
2. Count the number of drops it takes to raise the water to 11 mL. Record the number in the chart.
3. Leave the water in the graduated cylinder and count the number of drops it takes to raise the water to 12mL. Record the number in the chart.
4. Leave the water in the graduated cylinder and count the number of drops it takes to raise the water to 13mL. Record the number in the chart.
5. Calculate your average and round to the nearest tenth.

# of drops to 11 ml	# of drops to 12 ml	# of drops to 13 ml	Average

Based on your average, how close were you to your guess? _____

Based on your average, how many drops would it take to make 1 liter? _____

Part B: Water Displacement

Follow the directions to find the volume of three marbles using water displacement.

1. Add 20 ml of water to a 100 ml graduated cylinder. Record this amount in the chart.
2. Add three marbles to the cylinder and measure the volume. Record this amount in the chart.
3. Find the difference between the two measurements and record in the chart. The difference between the two measurements will be the volume of the three marbles.

Volume of Water Before adding Marbles (mL)	Volume of Water After Adding Marbles (mL)	Difference in Volume (mL)	Volume of 3 Marbles

Part C: Mass Mania

The gram is the standard unit of mass in the metric or SI system. The basic instrument used to measure mass is the mass balance. Some mass measurements can be made using an electronic balance.

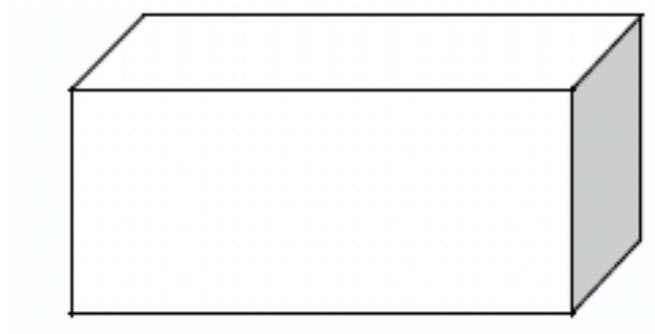
1. Turn on your electronic balance.
2. Press the zero button to reset the scale to zero.
3. Place your metric ruler on the scale and record the ruler's mass.
4. Remove the ruler from the scale.
5. After resetting the balance to zero, measure and record the mass of the empty 25-mL graduated cylinder.
6. Using the weight boat, measure the mass of the 3 marbles. Ensure that the mass of the boat is not included.
7. Reset the balance to ZERO when all items have been massed.



Mass of Metric Ruler (g)	Mass of Empty 25-mL graduated cylinder (g)	Mass of 3 Marbles (g)

Part D: Volume by Formula

Use the formula to find the volume of the box. Measure to the nearest centimeter before calculating your answer. If necessary, Round your answer to Two Decimal places.



Volume = length x width x height

_____ x _____ x _____ = _____ cm³

Part E: Color Challenge

1. Obtain the following items from your teacher:

- 3 beakers with colored water- 25 mL of each color (red, blue, and yellow)
- 1 graduated cylinder (25 mL - 50 mL)
- 1 eyedropper
- 6 test tubes labeled A, B, C, D, E, and F

2. Perform each step outlined below using **accurate** measurements.

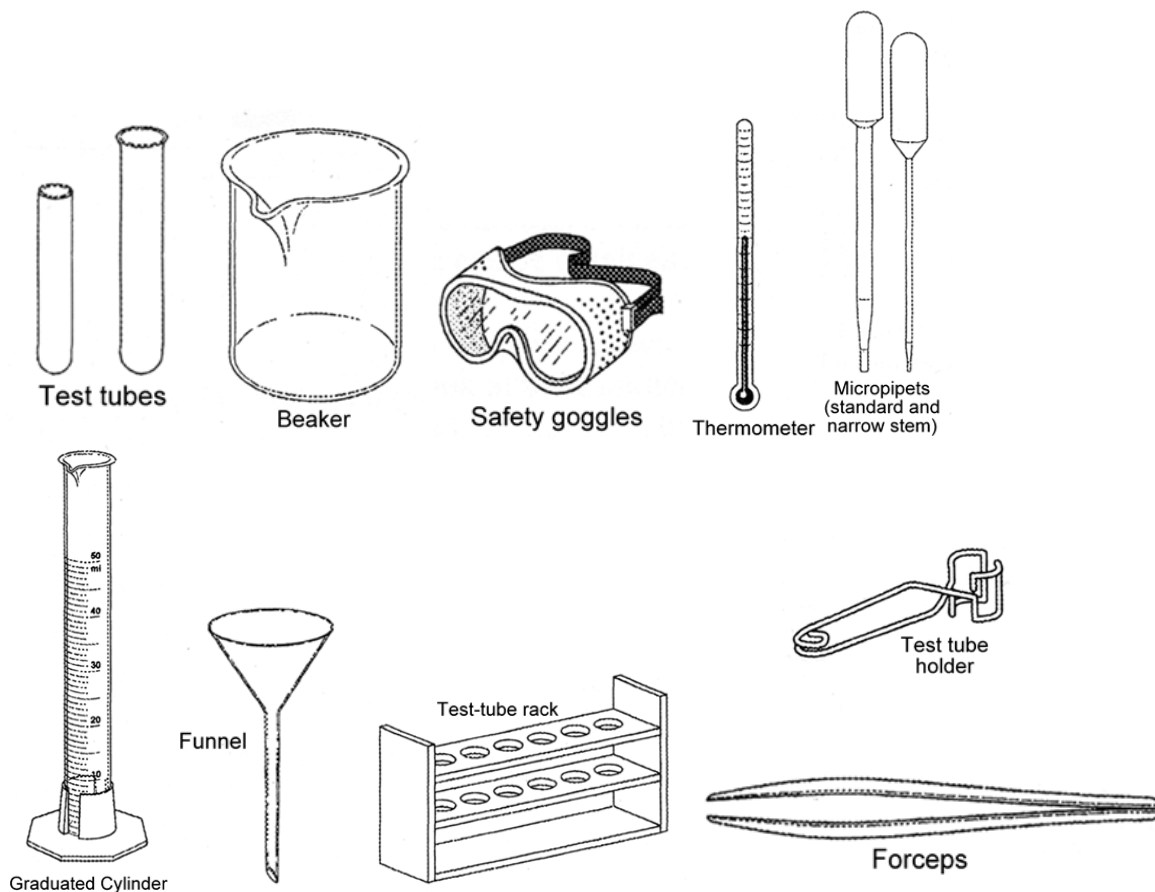
- Measure 17 mL of RED water from the beaker and pour into test tube A.
- Measure 21 mL of YELLOW water from the beaker and pour into test tube C
- Measure 22 mL of BLUE water from the beaker and pour into test tube E.
- Measure 5 mL of water from test tube A and pour it into test tube B.
- Measure 6 mL of water from test tube C and pour it into test tube D.
- Measure 8 mL of water from test tube E and pour it into test tube F.
- Measure 5 mL of water from test tube C and pour it into test tube B.
- Measure 2 mL of water from test tube A and pour it into test tube F.
- Measure 4 mL of water from test tube E and pour it into test tube D.

3. Complete the chart.

Test Tube	Color	Final Volume (mL)
A		
B		
C		
D		
E		
F		

LAB EQUIPMENT

For each type of equipment below, match the picture to its function.



- _____ Test Tubes
- _____ Beaker
- _____ Safety goggles
- _____ Thermometer
- _____ Micropipets
- _____ Graduated cylinder
- _____ Funnel
- _____ Test tube rack
- _____ Test tube holder
- _____ Forceps

- A. Used to hold and heat liquids.
- B. Used to target liquids into a container so they will not be lost or spilled.
- C. Used for moving small amounts of liquid from place to place.
- D. Used to hold test tubes when they are hot and untouchable.
- E. Used to hold test tubes while reactions happen in them or while they are not needed.
- F. Used to take temperatures of solids, liquids, or gases.
- G. Used to measure small amounts of liquids.
- H. Used to protect your eyes during laboratory experiments.
- I. Used to pick up small amounts of substances or used to examine specimens during dissections.
- J. Used to perform experiments in; usually filled with liquids