Name _____ Date _____ Hour ___

Spengler--Eikmeier

Volume Lab

Purpose: You will be able to use a graduated cylinder and metric ruler to accurately measure the volume of liquids and solid objects. You will be able to calculate the volume of regular solid objects.

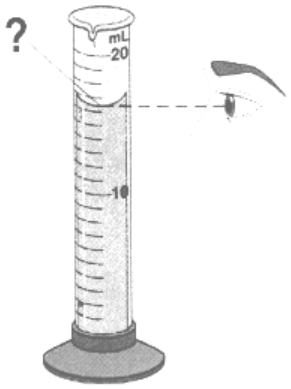
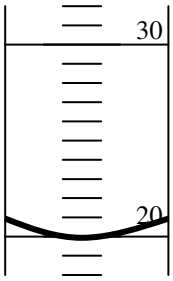


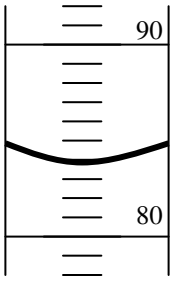
Diagram 1

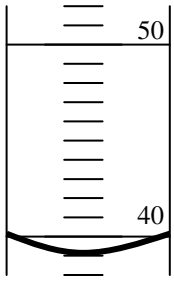
Materials: 100 ml graduated cylinder
10 ml graduated cylinder
Metric ruler
Miscellaneous objects from the lab cart as needed
100 ml beaker
600 ml beaker

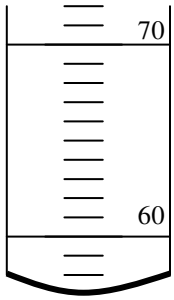
Procedure A: Measuring Liquids

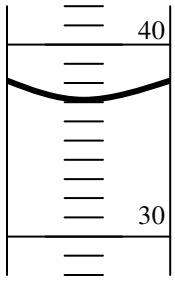
1. Notice the bent water surface in the diagrams below. It is called a **MENISCUS**. When reading liquid volume in a graduated cylinder, always measure from the **BOTTOM** of the Meniscus. See ***Diagram 1.***
2. Study the scale on the side of one of the 100 ml graduated cylinders shown below. What volume of water will fit between two of the small lines on the cylinder? _____ ml
3. Read and record the volumes in each 100 ml cylinder A-E.



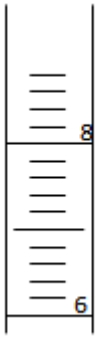






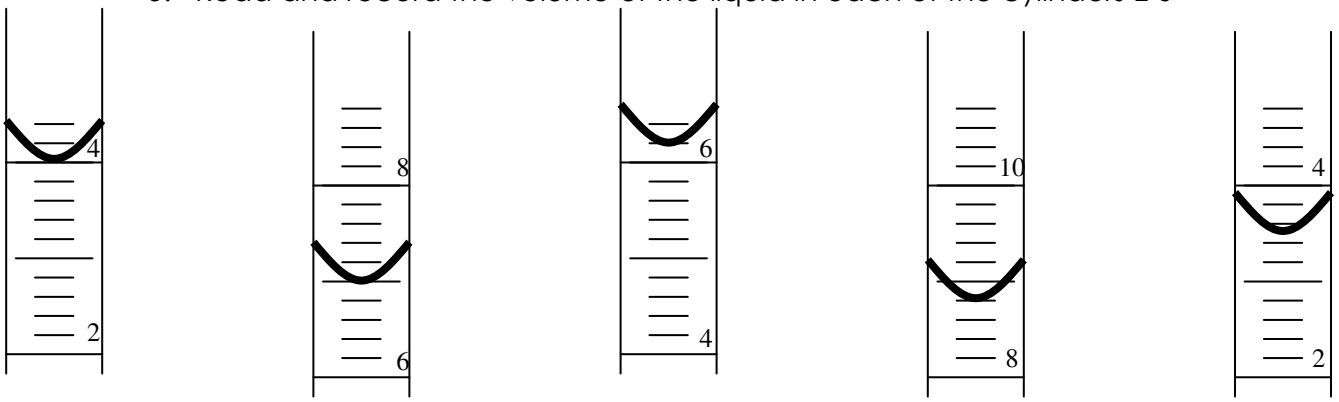


A. _____ ml B. _____ ml C. _____ ml D. _____ ml E. _____ ml



4. Examine the scale on the side of the 10 ml graduate shown to the left. What volume of water would fit between two consecutive lines on this cylinder? _____ ml

5. Read and record the volume of the liquid in each of the cylinders E-J



F. _____ ml G. _____ ml H. _____ ml I. _____ ml J. _____ ml

Checkpoint

6. Have your instructor check your answers for # 1-5.

7. Using a 600 ml beaker, fill it with water to the 100ml marking. Pour this water into your 100 ml graduated cylinder. Does the water come exactly to the 100 ml mark?

Which is better to measure accurately with, a graduated cylinder or a beaker?

8. Next, place 10ml of water into your 100ml graduate. Pour this water into your 10ml graduate. Does the water come exactly to the 10ml mark? _____ Which graduate is more accurate, the 10 ml graduate or the 100 ml graduate? _____
9. Get a test tube from the lab cart. Using the 10ml graduate, how much water does it hold? _____.
10. How many drips from a medicine dropper does it take to make 1 milliliter? Do three trials and calculate an average.

	Trial One	Trial Two	Trial Three	Average
# of Drips				

11. Fill your 100ml graduate to the 50 ml level. Drop a small rock from the lab cart into the cylinder. What is the volume of the rock?

ml

Diagram 2

Procedure B: Measuring Solids

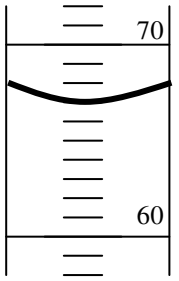
12. The cube in ***Diagram 2*** measures 1cm on each side. Remember, the formula for volume = Length x Width x Height or V = L x W x H. The volume of this cube, then is 1cm x 1cm x 1cm = 1 cm^3. A cm^3 is a "centimeter cubed" and can also be called a "cc". A centimeter cubed (cm^3) equals 1 ml

1 ml = 1 cc = 1 cm^3

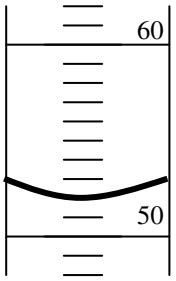
13. Using a metric ruler, determine the volumes of each object in the table below.

Object	Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)
Metal cube				
Aluminum bar				
Block "A"				
Block "B"				

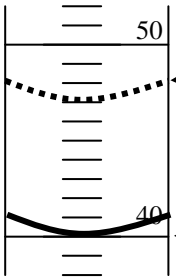
14. **<u>Practice</u>**. Determine the volume of the items shown below:

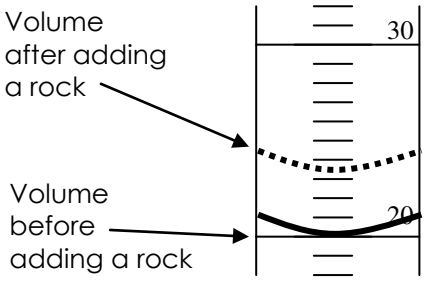


A. _____ ml



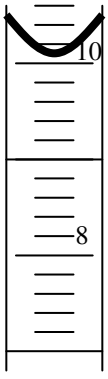
B. _____ ml



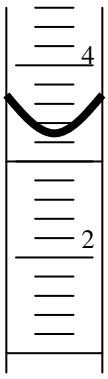


C. _____ ml
(Volume of just the rock)

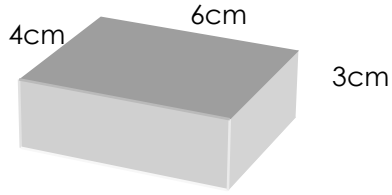
D. _____ ml
(Volume of just the rock)



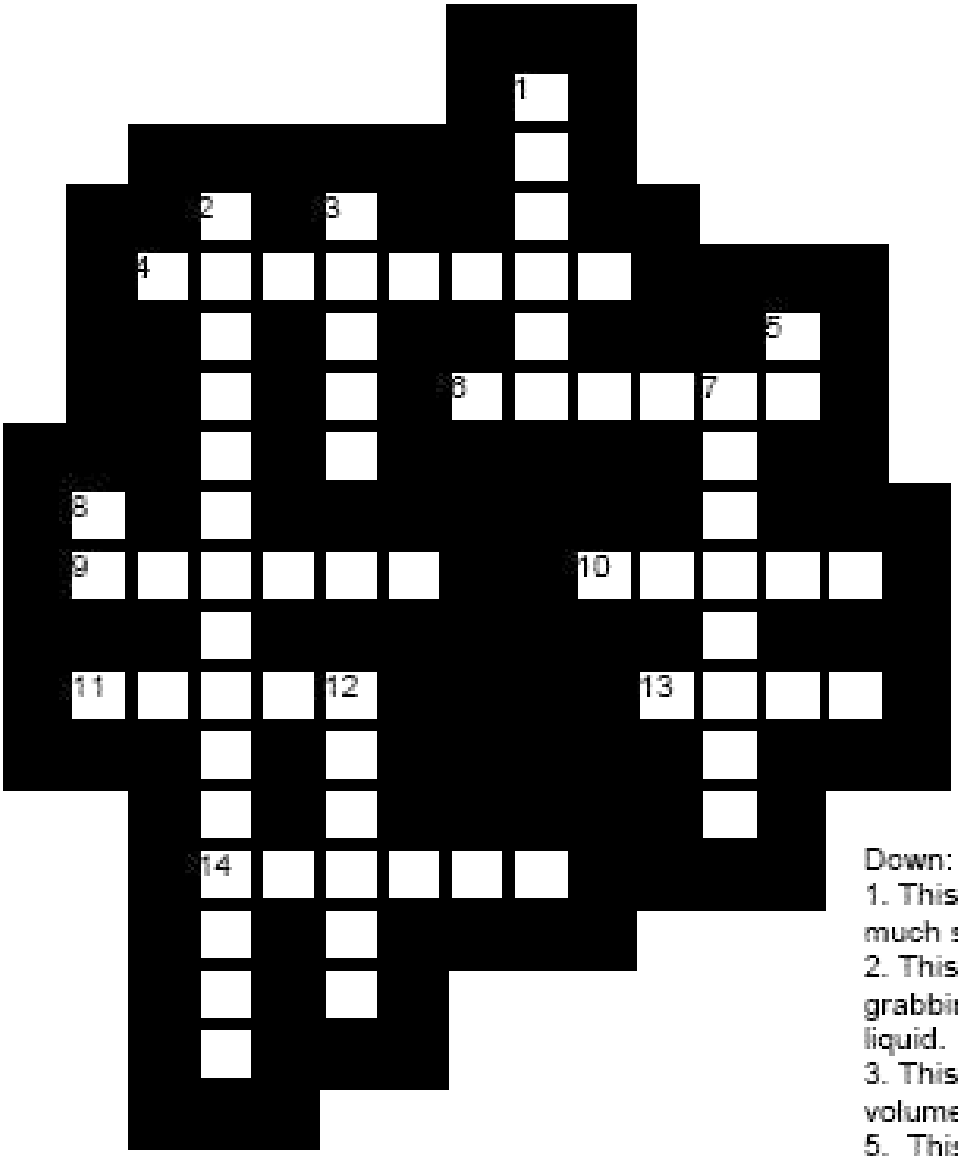
E. _____ ml



F. _____ ml



G. _____ ml



Across:

4. This is the bent water surface inside a 10ml graduated cylinder.
6. This system of measurement also known as SI uses ml and l to measure volume.
9. One dimension needed to measure the volume of a rectangular solid.
10. This is the volume occupied by water between two marks on a 100ml graduated cylinder.
11. One dimension needed to measure the volume of a rectangular solid.
13. One ml on a 10ml graduated cylinder is divided into _____ equal parts
14. a little swine

Down:

1. This is a measurement of how much space an object occupies.
2. This equipment is useful in grabbing very small volumes of liquid.
3. This is the basic metric (SI) unit of volume.
5. This is the "medical" way of referring to a ml.
7. This system uses tsp, TB, Fl. Oz., cups, pints, quarts, gallons, barrels, pecks, and bushels to measure volume.
8. A cube measuring 1 cm on each side occupies this volume.

12. One dimension needed to measure the volume of a rectangular solid.

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