



Determination of Density

Introduction

Density is mass per unit of volume and is characteristic of a substance regardless of sample size. You will be calculating the densities of three different unknown liquids in this exercise by pipetting a known volume of each liquid and then measuring its respective mass. Using data generated by the entire class, you will then graph volume on the abscissa (x-axis) and mass on the ordinate (y-axis) for each of the three liquids. The slope of each line produced on the graph will give you density in g/mL.

Procedure

1. Put on goggles. Find the mass of a clean dry beaker and record.
2. Using your assigned volumetric pipet and pipet filler, measure that volume of one of the unknown liquids. NEVER MOUTH PIPET! (*see illustration to the right*)
3. Deliver the liquid to the beaker and find the mass of the beaker and the liquid. Record.
4. Pour the liquid back into the dispensing container. Thoroughly wash and dry the beaker. Wash the pipet with distilled H₂O and carefully shake dry.
5. Repeat the procedure using the other unknown liquids.
6. Clean up as directed by your teacher and wash your hands.

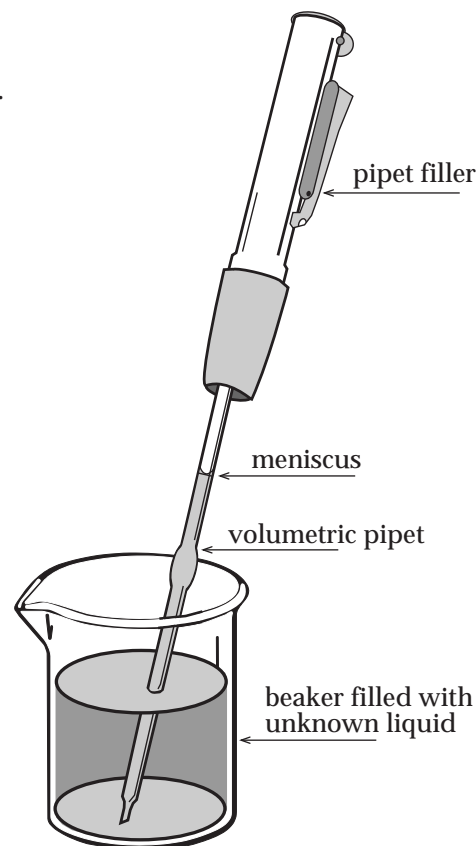
Materials

- small beaker (25 or 50 mL)
- centigram balance
- volumetric pipet
- goggles
- pipet filler
- graph paper
- liquid A
- liquid B
- liquid C

Data Table

Volumetric pipet size assigned to you: ml

| | Liquid A | Liquid B | Liquid C |
|-----------------------------|----------|----------|----------|
| Mass of small beaker | g | g | g |
| Mass of beaker and liquid | g | g | g |
| Mass of liquid (subtract) | g | g | g |
| Density (mass/pipet volume) | g/mL | g/mL | g/mL |





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Class Data

| | Partners' Initials | Volume | Mass A | Mass B | Mass C |
|----|-----------------------|--------|--------|--------|--------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |

Analysis and Conclusions

After you have collected data from each pair of students in your class, choose three colored pencils to represent each of the three liquids. Label the abscissa as "volume" and the ordinate as "mass" and write in numbers to represent the range for class data for both mass and volume. Plot points for the three liquids in the respective colors you have chosen and draw best fit lines. Calculate the slope (rise/run) for each line and you will have determined the density of each liquid.

Slope of liquid A line = _____

Slope of liquid B line = _____

Slope of liquid C line = _____