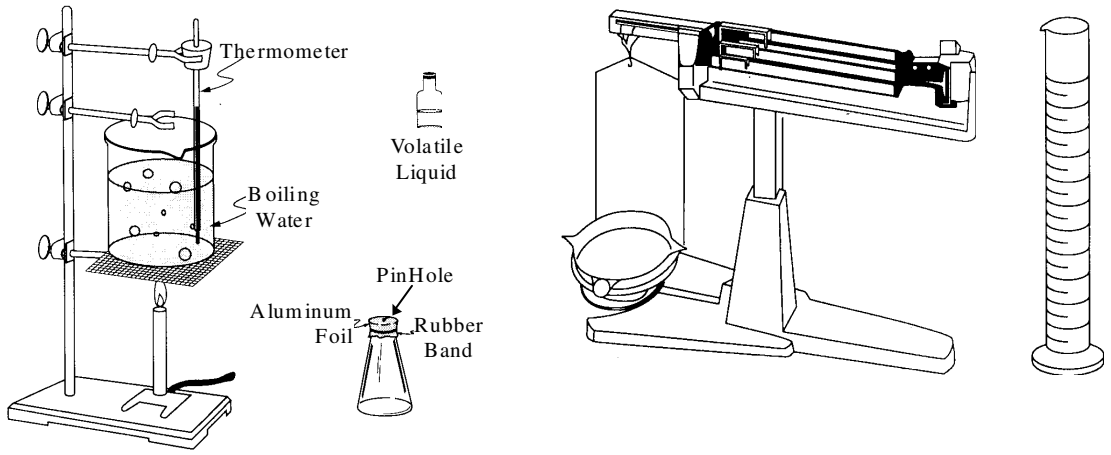
AP Exam Review- Lab Procedures Name: _____ Period: ____

(1) Four bottles, each containing about 5 grams of finely powdered white substance, are found in a laboratory. Near the bottles are four labels specifying high purity and indicating that the substances are glucose ($C_6H_{12}O_6$), sodium chloride (NaCl), aluminum oxide (Al_2O_3), and zinc sulfate ($ZnSO_4$).

Assume that these labels belong to the bottles and that each bottle contains a single substance. Describe the tests that you could conduct to determine which label belongs to which bottle. Give the results you would expect for each test.

(2)



An experiment is to be performed to determine the molecular mass of a volatile liquid by the vapor density method. The equipment shown above is to be used for the experiment. A barometer is also available.

(a) What data are needed to calculate the molecular mass of the liquid?

(b) What procedures are needed to obtain these data?

(c) List the calculations necessary to determine the molecular mass.

(d) If the volatile liquid contains non-volatile impurities, how would the calculated value of the molecular mass be affected? Explain your reasoning.

(3) An experiment is performed to determine the empirical formula of a copper iodide formed by direct combination of elements. A clean strip of copper metal is weighed accurately. It is suspended in a test tube containing iodine vapor generated by heating solid iodine. A white compound forms on the strip of copper, coating it uniformly. The strip with the adhering compound is weighed. Finally, the compound is washed completely from the surface of the metal and the clean strip is dried and reweighed.

DATA TABLE

Mass of clean copper strip	1.2789 grams
Mass of copper strip and compound	1.2874 grams
Mass of copper strip after washing	1.2748 grams

(a) State how you would use the data above to determine each of the following. (Calculations not required.)

(1) The number of moles of iodine that reacted

(2) The number of moles of copper that reacted

(b) Explain how you would determine the empirical formula for the copper iodide.

(c) Explain how each of the following would affect the empirical formula that could be calculated.

(1) Some unreacted iodine condensed on the strip.

(2) A small amount of the white compound flaked off before weighing.