

IPS

LABORATORY SEMESTER EXAM

Each team of students (normally 2 students working as partners) will be randomly assigned an unknown material or set of materials.

Three Liquids (Green, Blue, Yellow, Red, or Colorless)

TO THE STUDENT:

You are given three samples of liquids. Are any two of them – or all three of them - the same substance? Give as much evidence as you can to support your answer. Start with a plan. Write down a brief outline of the techniques that you think you will use. If you change the plan as you proceed, give the reasons for the changes. Your report of the experiment should include a clear and complete record of all procedures, results, and conclusions.

LIMITED QUANTITIES

THE VOLUME OF MATERIAL GIVEN TO YOU AT THE BEGINING OF THE EXAM IS THE ONLY AMOUNT YOU WILL RECIEVE. YOU MUST PLAN CAREFULLY AS TO MAKE SURE THAT YOU HAVE ENOUGH MATERIAL AVAILABLE THROUGHOUT YOUR EXPERIMENTATION TO PERFORM THE NECESSARY TESTS. **IF MORE MATERIAL MUST BE GIVEN TO YOU BY THE TEACHER FOR ANY REASON, YOUR GRADE ON THIS REPORT WILL BE REDUCED BY 25%.**

The following is a suggested format for outlining each test you perform while conducting your experiments. Having a standard “form” to “fill out” while you perform your tests usually proves to be a great help in keeping your work organized. And, more importantly, it makes it easier to compile your results into a logical and properly arranged report.

LABORATORY TEST _____

1. Investigation performed
2. Reason for choosing investigation
3. Results
4. Statement of conclusion

IPS Laboratory Exam **Safety Rules**

1. **WEAR GOGGLES** in the lab area **AT ALL TIMES**. Be aware that everyone is doing something different at all times.
2. Check flammability with small quantities of any substances before placing them over a flame.
3. Everything must be put away before you leave each period.
4. When the lab exam is finished, you must clean everything in your drawer and have it checked out with Mr. Scott. ***If you have any dirty glassware or items not put away properly, your lab exam grade will be reduced at least one letter grade for both lab partners.***

Characteristic Properties of Substances

Extensive Properties

- depend on the amount of the substance
- not good for distinguishing between kinds of substances.
- mass, volume, dimension, etc...

Intensive Properties

Depend on the kind of material the substance is composed of.

- Density
- Odor
- Freezing and Melting point (temperature at which this occurs)
- Boiling Point
- Solubility

| | |
|---------------------------|---------------------------------------|
| <u>Solids into:</u> | <u>If a liquid,</u> does it dissolve: |
| Water | salt |
| Alcohol | sugar |
| Acid | citric acid |
| Various organic solvents | naphthalene |
| (not. used in this class) | |
- Chemical Reactivity (color change, gas produced, heat evolved, etc...)
 - With water?
 - With acid?
- Flammability Testing
 - Does it burn?
 - Does it support combustion? (if a gas)
 - Does it not support combustion? (if a gas)
- Crystal Shape

Separation of Substances

Pure substances (Compounds)

- Only separated by chemical reactions. Some methods are:
 - Heating
 - Electrolysis
 - Reacting with acid

Mixtures

- Separated by physical means such as:
 - Fractional distillation
 - Decanting (liquid from an insoluble solid)
 - Filtering (better method than above)
 - Fractional Crystallization (separating soluble solids)
 - Evaporation by heating (liquid solvent from solid solute)
 - Evaporation by standing (liquid solvent from solid solute)
 - Paper Chromatography

Recognizing Specific Elements

- Flame testing and/or spectral analysis to identify specific elements: Na, K, Cu, Sr, Ca, Li, etc...
- Matching behavior and properties with known substances