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. The possible materials include; a pure solid substance, three liquids of similar appearance, or a sludge (a mixture of several substances). The task for each situation is briefly outlined below.

Composition of a Solid

TO THE STUDENT:
The material you have been given is a pure substance. Find out as much as you can about its composition. giving quantitative answers where possible. Record the experiments you try, your reasons for choosing them, and the results you find. 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.

Three Liquids (Blue, Yellow, or Clear)

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. Write down a brief outline of the techniques that you plan to 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.

Sludge

TO THE STUDENT:
The "sludge" you have been given is a mixture of substances. Find out as much as you can about each of the substances in the mixture. Write down a brief outline of the techniques that you plan to 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. Your summary statement should include a listing of the number of solids and liquids in the original mixture and provide as detailed a description of each as possible. Do not try to identify, just give a description.

LIMITED QUANTIITES

THE AMOUNT 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, A GRADE REDUCTION WILL RESULT.

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. Everything must be put away before you leave each period.

3. 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.
    - Odor
    - Freezing and Melting point (temperature at which this occurs)
    - Boiling Point
    - Solubility Solids into:
        - Water
        - Alcohol
        - Acid
        - Various organic solvents (not. used in this class)

      If a liquid, does it dissolve:
        - salt
        - sugar
        - citric acid
        - naphthalene
    - Chemical Reactivity (color change, gas produced, heat evolved, etc...)
        - With water?
        - With acid?
    - Flammability
        - Does it burn?
        - Does it support combustion? (if a gas)
        - Does it not support combustion? (if a gas)
    - Limewater test (if a gas — to distinguish between carbon dioxide and other gases)

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 (liquid solvent from solid solute)
    - Paper Chromatography

Recognizing Specific Elements

- Flame testing and/or spectral analysis
- Matching behavior and properties with known substances