

## Chemistry Objectives - Laboratory

### Safety, Technique, Equipment, Lab Notebook, and Computer-based labs

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**Goal: 1. Be able to work safely in the laboratory.**

**2. Demonstrate proficiency with basic lab techniques and equipment**

**3. Understand the hazards associated with various chemicals and use this knowledge to prevent injuries or accidents.**

**4. Collect, record and analyze data.**

**5. Use a computer to set up and run an experiment, including the collection and analysis of data.**

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#### I. Laboratory Safety

- A. Explain and follow all safety rules (see Chemistry Safety Rules pages 1-2 Lab Section of notebook; pages 826-829 in textbook)
- B. Know how to safely exit the laboratory and how to call for help.
- C. Demonstrate and explain use of safety equipment in the lab
- D. List 5 categories of harmful chemicals and describe the harmful effects of each.
- E. List and explain 4 routes of entry into the body for chemicals. Describe prevention for each route of entry
- F. List and explain 3 ways a chemical can harm your body
- G. Explain the difference between *local* and *systemic* toxicity
- H. Explain the difference between *acute* and *chronic* toxicity
- I. List parameters (individual differences) which affect toxicity
- J. List and describe ways to measure toxicity (LD50, TLV)
- K. Explain how to read a MSDS and know what information you can obtain from it
- L. Describe first aid for minor cuts and burns

#### II. Laboratory Techniques

- A. Be able to demonstrate proper lab techniques for:
  1. using safety equipment - goggles, apron, fire extinguisher, fire blanket, hood
  2. measuring mass on a balance
  3. measuring length with a ruler
  4. measuring volume with graduated cylinders, burettes, pipettes
  5. pouring liquids
  6. transferring solids
  7. filtering
  8. lighting the Bunsen burner
  9. washing glassware

#### III. Laboratory Equipment

- A. Be able to identify all commonly used equipment by name and by sight. Spelling counts.

#### **IV. Writing the Laboratory Notebook and Formal Report**

- A. Preparation of notebook - to be checked off by instructor on lab day
  - 1. protocols for keeping a notebook
  - 2. general format
  - 3. chemical information table
  - 4. abstract/hypothesis
  - 5. introduction
  - 6. safety, source
  - 7. materials list and procedure
  - 8. preparing a data table - what do you need to know?
- B. Recording of data
  - 1. Correct protocols and standard
  - 2. Quantitative and qualitative
- C. Analyzing data
  - 1. Data tables and how to record data in them
  - 2. Calculations tables and what goes in them
- D. Writing calculations
  - 1. Showing your work in 3 steps, and examples of them
- E. The formal lab report

#### **V. How to Do a Lab - Putting it all together and getting to work**

- A. Collecting your thoughts
- B. Getting to work

#### **VI. Computer Use in the Lab**

- A. Computer basic skills -
  - 1. using applications and group expectations
  - 2. file management and saving your work
- B. using the computer to collect, record, and analyze data
- C. Using Graphical Analysis for data collected by other means
- D. Using Science Workshop and other data collection software with probes