

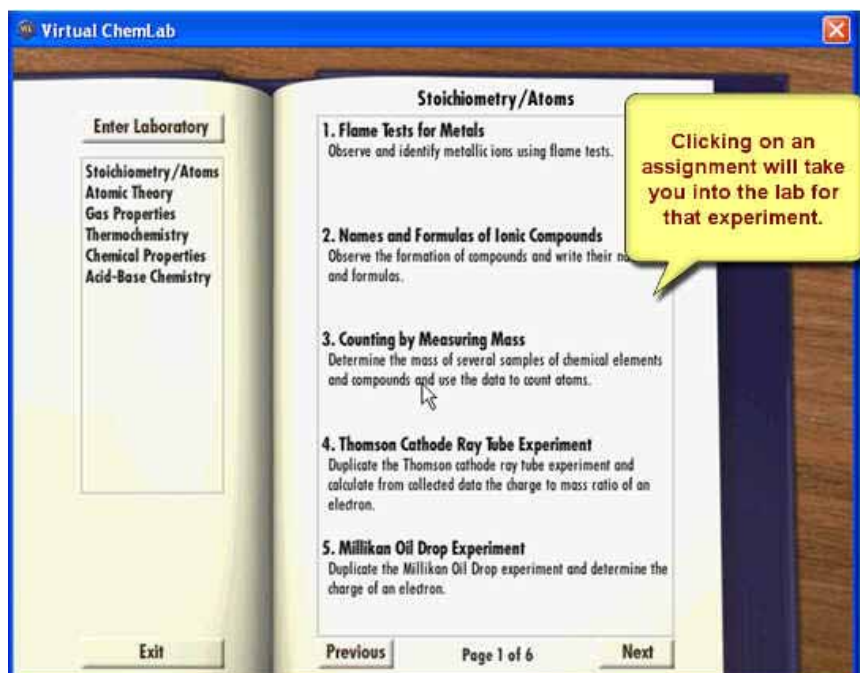


# Virtual ChemLab

## Getting Started

### Tutorial Guide

1. **Introduction** Virtual ChemLab is software which enables students to connect theory to practice by conducting experiments in a simulated lab environment. Dr. Brian Woodfield, Associate Professor of Chemistry at Brigham Young University, is the creator of Virtual ChemLab.
2. **Hallway** After you start Virtual ChemLab, you'll be brought to the hallway where you'll see three doors: the Organic Chemistry Laboratory, the Stockroom, and the General Chemistry Laboratory. Only the General Chemistry Laboratory will be available to enter in this high school version. You'll also see an electronic workbook which can be opened by clicking on it.
3. **Workbook** Each of these assignments corresponds to assignments in the Lab Record Sheets book. Clicking on the assignments will take you to the appropriate lab bench with the experiment set up and ready to go.



4. **Entering the Lab** From the electronic workbook, you may enter the laboratory by clicking on the **Enter Laboratory** button. (You may also enter the laboratory from the Hallway by clicking on the General Laboratory door.) There are 5 lab benches which represent the 5 Virtual ChemLab simulations: Inorganic Qualitative Analysis, Calorimetry, Titrations, Gases, and Quantum Mechanics. Simulations may be entered by clicking on a lab bench.



5. **The Lab Bench** All of the lab bench simulations have the following items in common:
  - **TV** Pull down the TV to display tutorial information and a Help menu
  - **Lab Book** See the User's Guide for more details. (*A PDF was installed with the software.*)
  - **Stockroom** Contains the materials for use at that particular lab bench
  - **Exit** Click the Exit sign above the door to return to a wide view of the general laboratory
6. **The Stockroom** Click the Stockroom window to enter. Clicking on the Stockroom bell will open a Help file which contains information about how to use the Stockroom.

*[In the Inorganic Simulation]* Drag test tubes to the test tube holder. Click on the cations to add them to the test tube. As you do, you will notice that a picture of your test tube contents appears on the left side of the screen. Clicking the *Done* button will transfer that test tube out to the lab bench so that when you exit the stockroom, your test tubes will be waiting for you.

To create an Unknown, click the *Unknowns* sign and select your desired randomization options. Click the bottles of cations that you would like to have placed in the test tube. When you click the green *Save* arrow, Virtual ChemLab will select random amounts of the cations and place them into your test tube. The test tube will now appear in the as a Practice Unknown in the test tube rack. Drag the test tube to the test tube holder and click the *Done* button to transfer it out to the lab bench. At this point you may continue to fill test tubes with cations or you may return to the lab bench by clicking the green *Return to Lab* arrow.

7. **Inorganic Lab Bench Procedures** Pull down the TV. As you mouse over the different test tubes, their contents will appear on the TV monitor. Notice that a picture of the test tube contents also appears. You may label the test tubes by clicking on the test tube label and typing into the label field.

Dragging a test tube to the test tube holder will activate the bottles of reagents. Click the reagents to add them in any order or combination to the test tube.

Laboratory manipulations are represented beneath the lab bench. Click on the lab manipulations to affect the contents of the test tube.

### Did You Know?

**Detailed user's guides were installed along with your Virtual ChemLab software. You will find these inside the VCL folder on your computer!**