

<http://ir.chem.cmu.edu/>



THE IRYDIUM PROJECT

A User's Guide for
The Chemical Laboratory Simulation

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NOTE: The instructions were written for a PC, but Mac/Unix users may still use them as a basic reference. If you have questions, please email help@ir.chem.cmu.edu.

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InYodium Chemistry Lab

File Edit Tools View Help

Stockroom Explorer...

Stockroom Explorer

Yodium Solutions

- dAMP
- dCMP
- dUMP
- dTMP
- H₂O (l)
- Unknown

Solution Description

A soluble form of ydenite.

Workbench 1

Retrieve
Click to retrieve a solution from the stockroom.

Store

New Glassware

Source

Recipient

Empty Flask
AC Mixture

Remove

Tab

Workbench 2

Workbench 3

Enter the amount (mL): 12.2

Transfer Bar (Precise)

Pair

Solution Info...

Name: ...

Volume: ...

Concentration Graph

Concentration Viewer

| Species | Molarity |
|-----------------|----------|
| H ⁺ | 9.764e-8 |
| OH ⁻ | 9.764e-8 |
| C | 8.680e-2 |
| AC | 2.247e-3 |

PH Meter

6 8 10 12

0 2 4 6 8 10 12 14

c: dAMP

ACCESSING THE CHEMICAL LAB

NOTE: If you have any problems locating the lab, please email help@ir.chem.cmu.edu

▶ 1. Launch a web browser application.

If the application does not open a new browser window by default, you must open a new window manually.

▶ 2. Load the IrYdium website:


<http://ir.chem.cmu.edu/irProject/applets/virtualLab/>

You may receive a new URL from your professor.

▶ 3. Single click the “Run the applet” link located on the bottom of the window.

The server will auto-detect information about the computer you are working from and download the appropriate files for your machine. You will merely identify yourself as a novice user and click “Continue” through several pages.

RETRIEVING A SOLUTION

 **HINT:** You may want to use stock solutions anytime you begin a new experiment.

- ▶ 1. In the “Stockroom Explorer” window, locate the directory called “IrYdium Solutions.”

In this directory, you will see a list of many solutions. If you do not see the list, single click on the small key icon to the left of the directory name, “IrYdium Solutions,” and the solution list will be displayed.


- ▶ 2. Single click the solution you wish to add to your workbench.

Once you select a solution, a description of the solution will appear in the bottom window of the Stockroom Explorer (i.e., 10M HCL is described as a “Strong Hydrochloric Acid”).

- ▶ 3. Single click the “Add Solution” button on the action bar, located on the left-hand side of the active workbench.

An Erlenmeyer flask will appear on your workbench, labeled with the name of the solution.

REMOVING A FLASK

 NOTE: You must have at least one flask on your active workbench.

- ▶ 1. Single click the flask you want to remove.

The outline of the flask will change from black to a light blue and the name of the flask will become highlighted.

- ▶ 2. Single click the “Remove” icon on the action bar, located on the left-hand side of the active workbench.

The flask will disappear.

OBTAINING GLASSWARE

HINT: You may want to use new glassware to mix your solutions.

1. Single click the “Add Glassware” icon in the action bar, located on the left-hand side of the active workbench.

The icon is the third one in the list. When your pointer sits on top of the icon, a pop-up menu appears with the message, “Click to select new glassware from the drop-down menu.”

2. Drag the pointer down to the type of glassware you want and single click.

The list will disappear, and the glassware will appear on the active workbench.

RELABELING A FLASK

NOTE: You must have at least one flask on your active workbench.

- ▶ 1. With the right mouse button, single click the flask you want to rename.

The outline of the flask will change from black to a light blue, the name of the flask will become highlighted, and a pop-up menu will appear.

- ▶ 2. Drag the pointer down to the option, “Relabel,” and single click with the left mouse button.

A “Relabel Solution” dialog box will appear.

- ▶ 3. Type the new label for your solution and single click “Ok.”

The dialog box will disappear and the flask will bear the new label.

SELECTING A TRANSFER MODE

NOTE: You should use realistic transfer mode to simulate the precision possible in an actual lab.

- ▶ 1. Single click the “Tools” menu, located above the Stockroom Explorer window.

The “Tools” menu contents will be displayed.

- ▶ 2. Drag the pointer down to the option, “Transfer Bar.”

A submenu will appear, listing two options (precise transfer or realistic transfer).

- ▶ 3. Drag the pointer over to the desired option, either “Precise Transfer” or “Realistic Transfer,” and single click the highlighted option.

The dialog box will disappear and the transfer bar located below the active workbench will reflect the selected option.

POURING A SOLUTION (PRECISE TRANSFER)

NOTE: You must have at least one solution and one flask on your active workbench.

1. Single click the solution you want to pour.

The outline of the flask will change from black to a light blue and the name of the flask will become highlighted. This flask is known as the “source flask” for the transfer.

2. Single click and drag the source flask on top of the flask in which you want to pour the solution -- release the mouse button when the recipient flask outline changes from black to light blue.

The source flask will become tilted above the “recipient flask” (the one receiving the liquid) and the outline of the recipient flask will return to black.

3. In the Transfer Bar field located beneath the active workbench, type the amount of source solution (in mL) you want to pour into the recipient flask and hit return.

In the Solution Information window, the volume of the recipient solution will increase to reflect its new volume. If you single click on the source flask, you can see an equivalent decrease in the volume of the source solution. All changes in the concentration and/or pH are updated instantly.

POURING A SOLUTION (REALISTIC TRANSFER)

NOTE: You must have at least one solution and one flask on your active workbench.

1. Single click the flask of the solution you want to pour.

The outline of the flask will change from black to a light blue and the name of the flask will become highlighted. This flask is known as the “source flask” for the transfer.

2. Single click and drag the source flask on top of the flask in which you want to pour the solution -- release the mouse button when the recipient flask outline changes from black to light blue.

The source flask will become tilted above the “recipient flask” (the one receiving the liquid) and the outline of the recipient flask will return to black.

3. Click and hold on the “Pour” button located beneath the active workbench for as long as you wish to pour source solution into the recipient flask.

As you hold the Pour button, the amount of solution actually poured is shown to the left of the Pour button. Please note, however, that this ‘counter’ resets itself each time you click on the pour button. You will need to refer to the Solution Information window to determine the amount of solution in the recipient flask or click on the source flask and refer to the Solution Information window to determine the amount of solution in the source flask. All changes in the concentration and/or pH are updated instantly.

TRANSFERRING WITH PIPETTE (PRECISE TRANSFER)

NOTE: You must have at least one solution, one flask, and one pipette on your active workbench.

- ▶ 1. Single click and drag the source flask from which you want to withdraw the solution on top of the pipette to fill the pipette -- release the mouse button when the pipette outline changes from black to light blue.

The detail view of the pipette will appear.

- ▶ 2. In the Transfer Bar field located beneath the active workbench, type the amount of source solution (in mL) you want to withdraw with the pipette and hit return.

In the Solution Information window, the volume of the pipette will increase to reflect its new volume. If you single click on the source flask, you can see an equivalent decrease in the volume of the source solution. All changes in the concentration and/or pH are updated instantly.

- ▶ 3. Single click and drag the pipette on top of the recipient flask to which you want to add the solution -- release the mouse button when the recipient flask outline changes from black to light blue.

The detail view will still appear.

- ▶ 4. In the Transfer Bar field located beneath the active workbench, type the total volume of the pipette to transfer its contents to the recipient flask and hit return.

In the Solution Information window, the volume of the pipette will decrease to reflect its new volume. If you single click on the recipient flask, you can see an equivalent increase in the volume of the recipient solution. All changes in the concentration and/or pH are updated instantly.

TRANSFERRING WITH PIPETTE (REALISTIC TRANSFER)

NOTE: You must have at least one solution, one flask, and one pipette on your active workbench.

- ▶ 1. Single click and drag the source flask from which you want to withdraw the solution on top of the pipette to fill the pipette -- release the mouse button when the pipette outline changes from black to light blue.

The detail view of the pipette will appear.

- ▶ 2. Click the “Pour” button located beneath the active workbench for as many times as you need to withdraw the appropriate amount of source solution from the flask into the pipette.

In the Solution Information window, the volume of the pipette will increase to reflect its new volume. If you single click on the source flask, you can see an equivalent decrease in the volume of the source solution. All changes in the concentration and/or pH are updated instantly.

- ▶ 3. Single click and drag the pipette on top of the recipient flask to which you want to add the solution -- release the mouse button when the recipient flask outline changes from black to light blue.

The detail view will still appear.

- ▶ 4. Click and hold the “Pour” button located beneath the active workbench until all of the solution in the pipette has been added to the recipient flask.

In the Solution Information window, the volume of the pipette will decrease to reflect its new volume. If you single click on the recipient flask, you can see an equivalent increase in the volume of the recipient solution. All changes in the concentration and/or pH are updated instantly.

HEATING A SOLUTION

NOTE: You must have at least one solution and the bunsen burner on your active workbench

- ▶ 1. Single click and drag the flask you want to heat on top of the bunsen burner.

The flask will become centered above the flame, and the temperature will begin to rise on the thermometer, located to the right side of the active workbench (above the pH meter).

- ▶ 2. Single click on the Bunsen Burner, and single click the up or down arrow to increase or decrease the flame.

As you click the up arrow, the flame will increase, and as you click the down arrow, the flame will decrease.

STORING A SOLUTION

NOTE: You must have logged into a user account and have a solution on your active workbench.

1. Single click the folder in your account folder where you want to store your solution.

The folders within your account are denoted by the “open door” icon, a rectangle with two shades of purple. If you attempt to store a solution in something other than a folder, you will get a “Store Error” message.


2. Single click the solution you wish to store in your account.


The outline of the flask will change from black to a light blue and the name of the flask will become highlighted.

3. Single click the “Store Solution” button on the action bar, located on the left-hand side of the active workbench.

The solution will not disappear from your workbench, but you will have a copy of the solution in your account.

SELECTING A WORKBENCH

 **HINT:** Select a new workbench if your current one is crowded or you are doing multiple experiments.

-  1. Under the active workbench, single click on a tab (i.e., Workbench 2 or Workbench 3, etc).

The new workbench will appear, and the tab you selected will become a lighter shade of gray than the other tab options.

ADDING A WORKBENCH

HINT: Create a new workbench if your current ones are crowded and you need clean workspace.

1. In the File menu, select “New Workbench.”

Another tab, entitled “Workbench 4,” will be added to the bottom of your workbench area. You will have to single click on the tab to make the new workbench the active workbench.

Development Team

David Yaron, PhD.

Rea Freeland, PhD.

Donovan Lange

D. Jeff Milton

Mike Karabinos

Jon Sung

Aaron Rockoff

Jean Vettel

Email any questions/comments to:
help@ir.chem.cmu.edu