

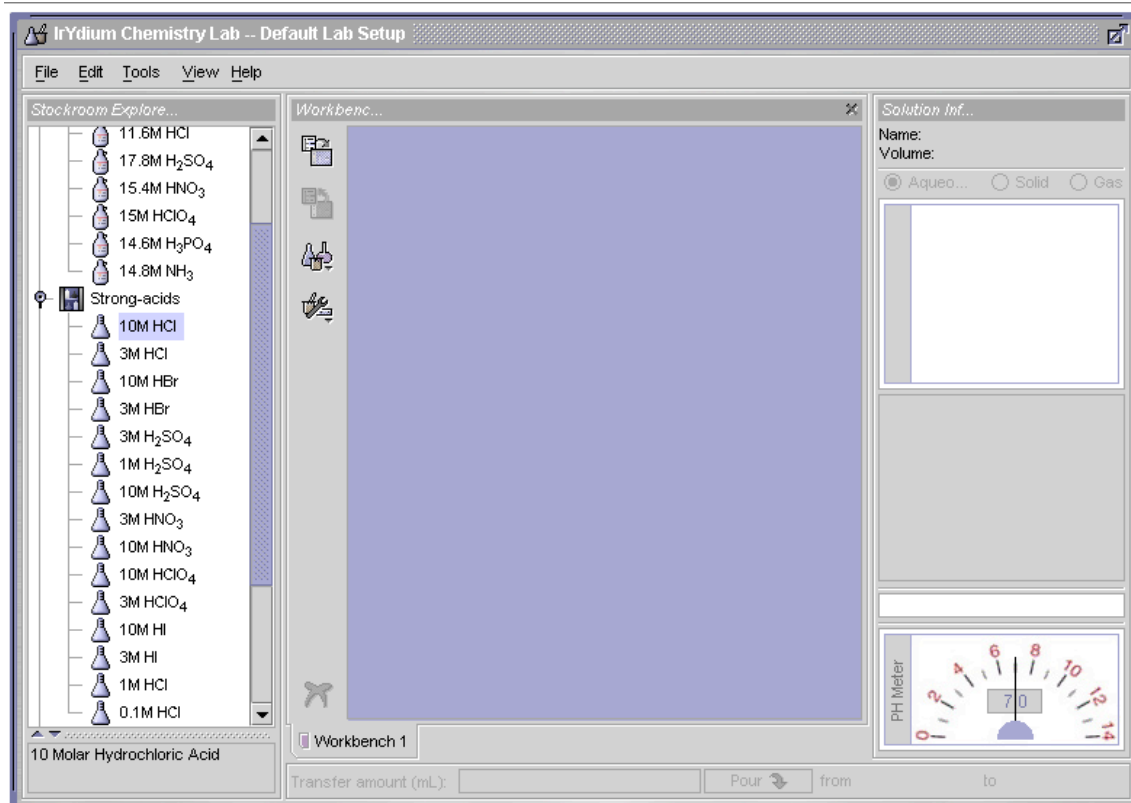
Name----- Lab Section-----

How can you test the effect of different chemicals on the color change of an Acid-Base indicator.

1. Data collection:

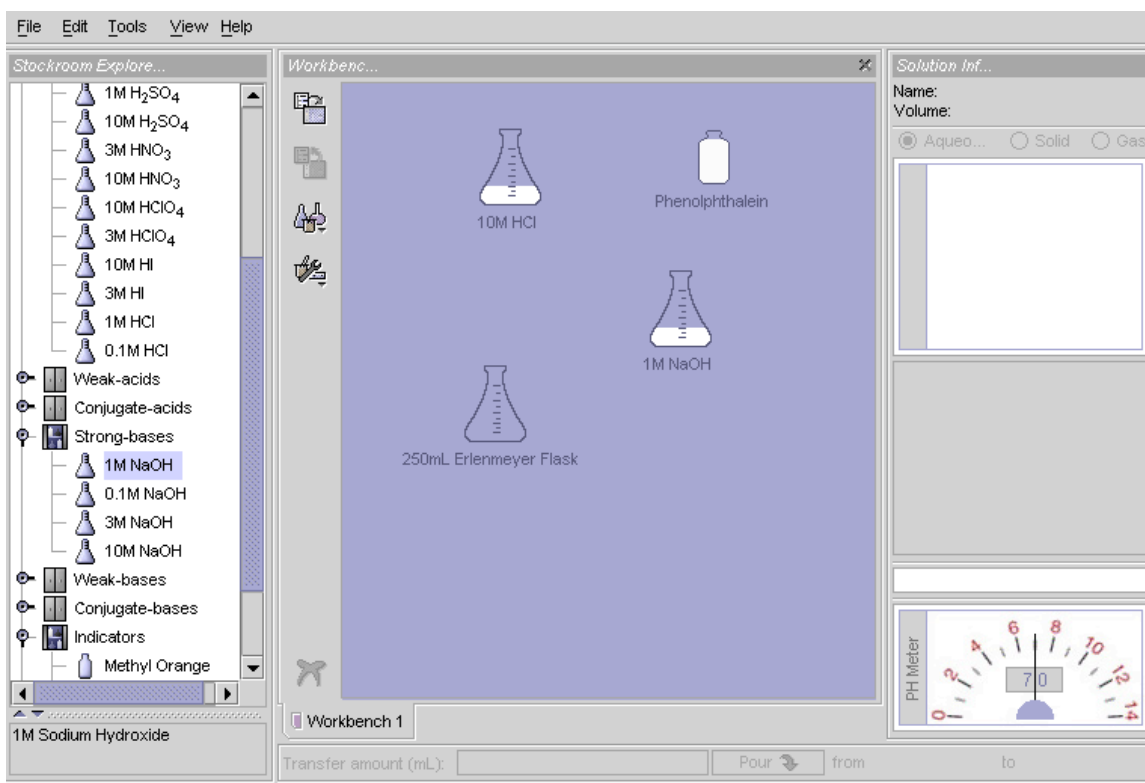
Go to <http://www.chemcollective.org/vlab/vlab.php> and open the simulation page.

The simulation page should look like this page.



A. Obtaining a solution.

1. in the stockroom explorer window, double click on the Iridium solutions cabinet to open it.
A list of cabinets containing solutions will be displayed. Double click on the cabinet from which you want to retrieve a solution.
2. Double click the solution you wish to add to your workbench.
An Erlenmeyer flask containing 100 ml will appear on your workbench, labeled with the name of the solution.



B. Pouring a solution.

1. click the flask you want to pour solution from (your source solution).
2. Drag the source solution on top of the flask you want to pour the solution into (your recipient flask) so that the pieces of glassware overlap.

The source solution will become titled above the recipient flask and the name of the recipient flask will become highlighted.

3. in the transfer bar below the active workbench, type the amount of source solution (in ml) you want to pour into the recipient flask and press enter.

In the solution information window, the volume of the recipient flask 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 or pH are updated after you click the pour button.

4. in this demonstration I mixed 30 ml of NaOH and 5 ml of phenolphthalein., so the solution color turned pink to show that NaOH work as a base.

The screenshot shows a chemistry simulation interface with the following components:

- Stockroom Explore...**: A list of chemical solutions including various concentrations of H₂SO₄, HNO₃, HClO₄, HI, HCl, and NaOH, along with weak acids, conjugate acids, strong bases, weak bases, conjugate bases, indicators, and Methyl Orange.
- Workbench...**: A central workspace containing three flasks: 10M HCl, Phenolphthalein, and 1M NaOH. A 250mL Erlenmeyer Flask is highlighted with a blue box.
- Solution Inf...**: A panel on the right showing solution information for the selected flask. It includes a bar chart of log(Molarity) for various species and a table of species and molarities.
- pH Meter**: A digital display showing a pH of 13.92.
- Transfer Bar**: A bar at the bottom showing "Transfer amount (mL): 5" and a "Pour" button.

Species	Molarity
H ⁺	1.179e-14
OH ⁻	8.569e-1
Na ⁺	8.571e-1
PhenolphthaleinH	2.906e-8
Phenolphthalein ⁻	2.285e-4

D. Obtaining solution information.

1. click on the solution about which you want to obtain information.
2. the flask will become highlighted, the solution info panel to the right of the workbench will show the name , volume , concentration, temperature, and pH of the selected solution.
3. in the solution info panel to the right of the workbench, click on the circle to the state of species (aqueous, solid, gas) you wish to view.
4. the concentration viewer, located beneath the circles, will show the amounts of each element in the solution.

E. Heating with a bunsen burner.

1. click and drag the solution you want to heat on top of the Bunsen burner. Release the mouse button when the pointer is within the outline of the burner, the flask will become centered above the flame, and the temperature will begin to rise on the thermometer, on the right side of the workbench.
2. to adjust the height of the flame, click on the up or down arrows., click and hold the up arrow to increase the flame. Click and hold the down arrow to decrease the flame. To remove the heat , click and hold the down arrow until the flame disappears.

F. Removing Equipment.

1. click on the equipment you want to remove, the name of the glassware or tool will become highlighted.
2. press delete or Backspace, the equipment will disappear.
3. you can also right click on the object and select remove from the pop-up menu.

G. pick 7 (250 ml beakers), and fill them with, (3M HCl, 3M HBr, 3M H₂SO₄, 3M HNO₃, 3M HClO₄, 3M HI, 3M NaOH) and check the effect of each of these solutions on the color change of the different indicators. (methyl orange, methyl red, phenolphthalein, Bromocresol green) record your observations.

Samples/ indicators	methyl orange	methyl red	phenolphthalein	Bromocresol green
(3M) HCl				
(3M) HBr				
(3M) H ₂ SO ₄				
(3M) HNO ₃				
(3M) HClO ₄				
(3M) HI				
(3M) NaOH				