

Lab Equipment



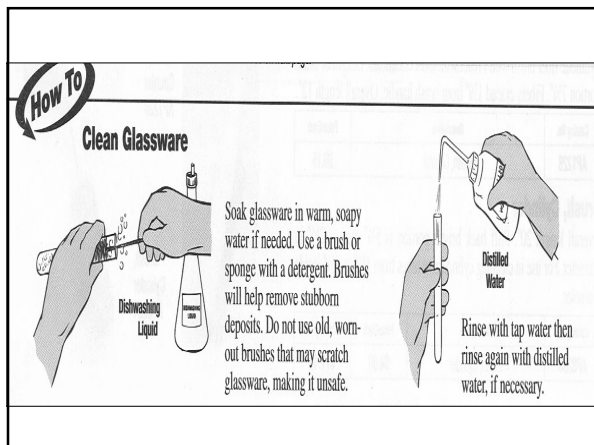
Pre-AP Chemistry
Charles Page High School
Stephen L. Cotton

Lab Equipment

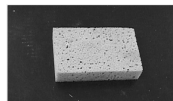


Your lab equipment should:

1. Be CLEAN before using it.
2. Be CHECKED (if glassware) for cracks, broken edges, and "stars"—discard anything damaged.
3. Be washed, dried, and carefully stored in the proper place after using it.

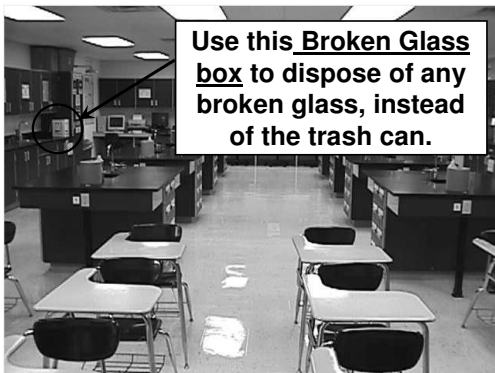


Cleaning Supplies



1. Each lab station has plenty of paper towels, soap, water, sponge and a sink. (2 sinks are also located on the east wall desktop)
2. Used for cleaning lab equipment, the table top, and to wash your hands when finished.
3. We have floor brooms, table brushes, and dustpans to clean up any spills.

Keep our lab area neat and clean!

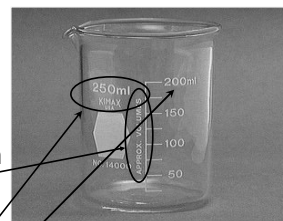


Beakers hold and/or heat solids or liquids that will not release gases when reacted, or are unlikely to splatter if stirred.

Beaker

Very poor item to measure volume with (+/- 5% error!)

Note the total size capacity = 250 mL (upper mark is 200 mL)

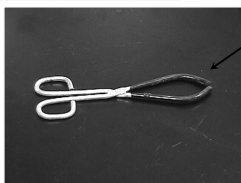


There are six sizes of beakers in your lab table for you to use: 50, 100, 150, 250, 400, & 600 mL

Beaker Tongs

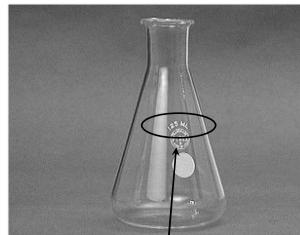


Beaker tongs are used to hold and move beakers containing hot liquids.



Note the rubber coating to improve grip on the glass beaker - do not hold these in a burner flame.

Erlenmeyer Flask

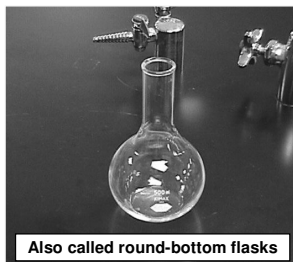


Erlenmeyer flasks hold and/or heat solids or liquids that may release gases during a reaction, or that are likely to splatter if stirred.

Note the size = 125 mL

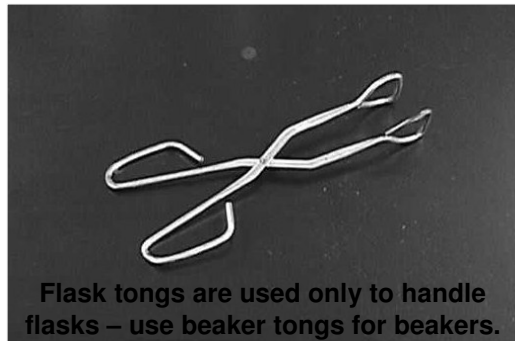
Florence Flask

Rarely used in first year chemistry, it is used for the mixing of chemicals. The narrow neck prevents splash exposure.



Also called round-bottom flasks

Flask Tongs



Flask tongs are used only to handle flasks – use beaker tongs for beakers.

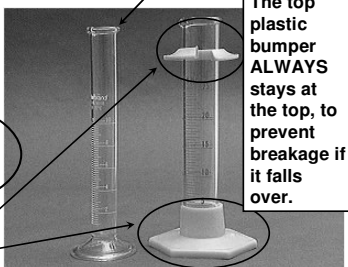
A graduated cylinder is used to measure volumes of liquids; probably your best everyday measuring tool, there are three sizes in your desk: 10, 50 and 100 mL

Graduated Cylinder

Some graduated cylinders that are smaller may not have "bumpers", but have reinforced glass rims.

***NOT to be used for heating or mixing chemicals**

Note the rubber "bumpers".

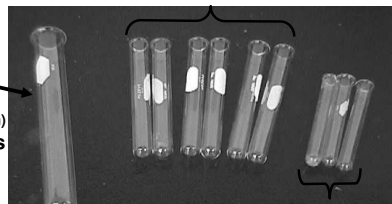


The top plastic bumper ALWAYS stays at the top, to prevent breakage if it falls over.

Test Tube - we commonly use 2 sizes:

18 x 150 mm

Larger tube
(25 x 200 mm)
sometimes used



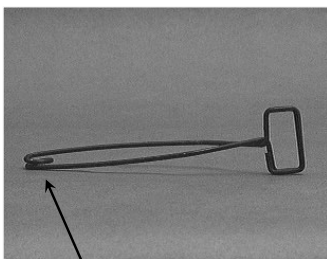
The size is determined by the *diameter* across the top and the *length* of the test tube. Example: 13 mm x 100 mm
(diameter) (length)

Test tubes are used to mix chemicals, and also used to heat chemicals in.

Test Tube Holder

A test tube holder is useful for holding a test tube which is too hot to handle with your hands.

Knowing where to hold this piece of equipment is important.



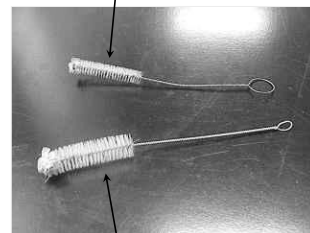
Holding it here will keep your hand as far as possible from the fire, and prevent you from squeezing the holder and dropping the tube.

Test tube brushes are used to clean test tubes and graduated cylinders.

Caution: Forcing a large brush into a small test tube will often break the tube. **Don't worry about drying the inside of a tube or cylinder** - Let them air dry instead of forcing a paper towel down inside.

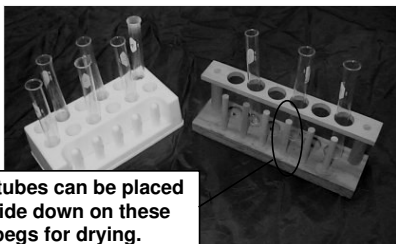
Test Tube Brush

Small test tube brush



Large test tube brush

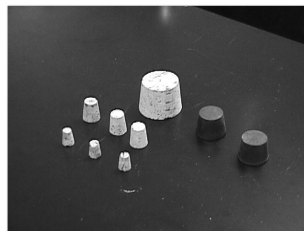
Test Tube Rack



Test tubes can be placed upside down on these pegs for drying.

Test tube racks are for holding, drying, and organizing test tubes in a vertical position, and are located in the side wall cabinets.

Stopper



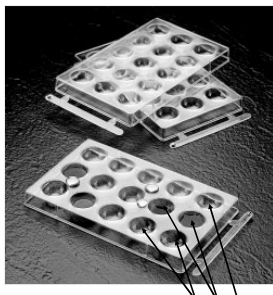
Rubber and cork stoppers are used to close test tubes and flasks, thus avoiding spillage or contamination.

Containers should **NEVER** be heated when there is a stopper in place – pressure will build up, and an explosion could occur.

Spot plates are used when we want to perform many “small-scale” reactions at one time.

We will use these many times during the year, and is like having *lots of test tubes* available at one time!

Spot Plate

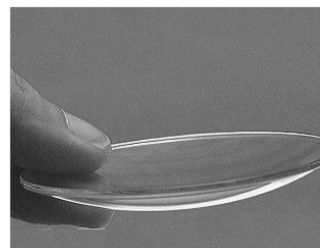


Numerous “well” depressions

A watch glass is used to hold a small amount of solid, such as the product of a reaction.

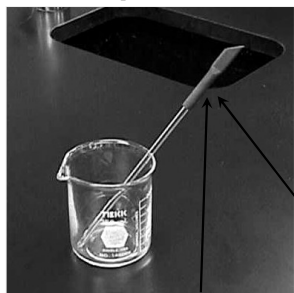
Can also be used as a cover for an evaporating dish or beaker.

Watch Glass



Since they may not be made of heat-resistant glass, they are usually not heated – they break!

Stirring Rod (with rubber policeman)

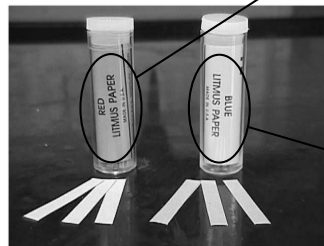


Stirring with this end will prevent scratching.

The stirring rod will:
a) manually stir solutions;
b) assist in pouring liquids; and
c) transfer a single drop of a solution to test papers (like litmus)

Rubber policeman tip can be used to remove precipitates.

Litmus Paper



Use a stirring rod to transfer a single drop of liquid to the paper; don't drop the paper in the tube

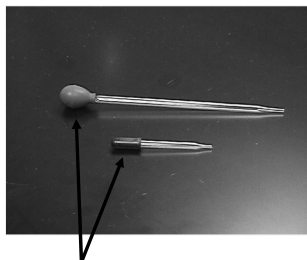
Red litmus paper is used to identify bases:

-Red turns blue,
-Blue stays blue

Blue litmus paper is used to identify acids:

-Blue turns red,
-Red stays red

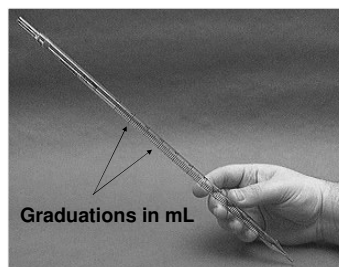
Dropper Pipet



The dropper pipet is used to transfer a small volume of liquid, usually one drop at a time – you have both short and long pipets.

On top of each dropper is a “rubber bulb” for suction – never put your mouth on the dropper to provide suction.

Graduated Pipet

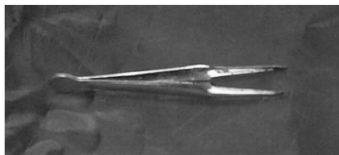


Many different sizes of graduated pipets are available. Example: 10 mL or 25 mL

A graduated pipet measures and delivers exact volumes of liquids.

These will also use a rubber bulb for suction.

Forceps

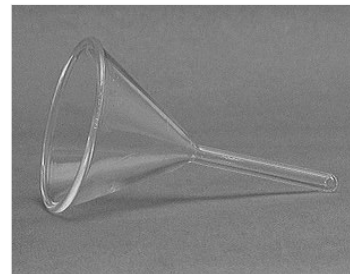


Forceps are used to hold or pick up small objects – Remember: it is best to never touch chemicals with your hands.

Funnel

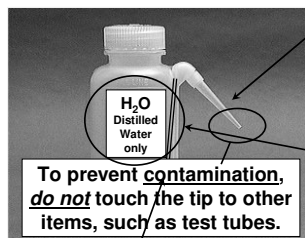
A funnel is used to:

- 1) aid in the transfer of liquids from one vessel to another, and
- 2) hold filter paper while filtering.



(Some pieces of equipment are plastic, others are glass.)

Wash Bottle



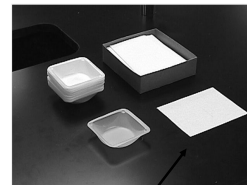
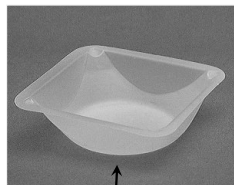
During use, keep the bottle upright as shown, since there is a tube that goes to the bottom of the bottle.

A wash bottle has a tip that delivers a stream of water to a specific area when squeezed.

Distilled water is the only liquid that should be used in a wash bottle.

-Refill from the gallon jugs on the east desktop.

Weighing Boat - A small plastic dish



- ✓ Weighing boats are used for holding and determining the mass of solid chemicals.
- Never put chemicals directly on the balance scale – they will leave a contaminating residue.
- ✓ We will also use paper squares for this purpose – we can throw the papers away after using.

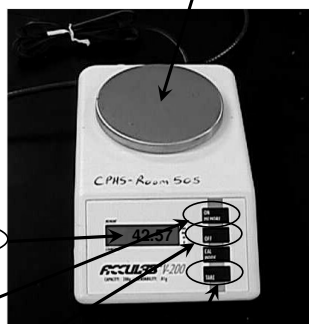
Electronic Balance

- ✓ Located on Table 8
(try to use the same balance during an experiment for consistency)

✓ The electronic balances are very accurate, highly dependable, and rugged.

✓ The digital display makes the mass value very easy to read.

Place item here to mass



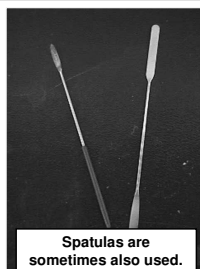
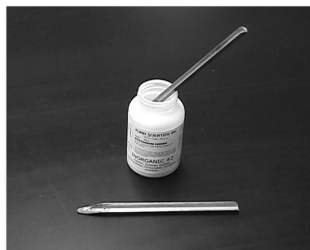
"On" button "Off" button "Tare" button

Using the Electronic Balance Scale

1. Obtain the chemical.
2. Turn the balance ON.
3. Place an empty container on the balance.
4. Press TARE.
(the balance will now read "0")
5. Carefully add the chemical.
6. When you are done, press OFF.
7. Clean up any spills around the balance and on the table top.

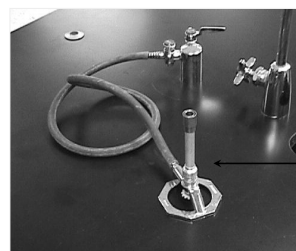
Scoopula

Scoopulas are used to dispense solid chemicals from their containers.



The chemicals should never be transferred with your bare hands.
(assume they are all dangerous)

Burner



In order to get the best flame, you might need to make adjustments each time you use the burner – practice this!

Burners are used for the heating of nonflammable liquids and solids.

We have Tirrell burners to use in our classroom.

Hot plates will be used to gently heat any flammable chemicals.

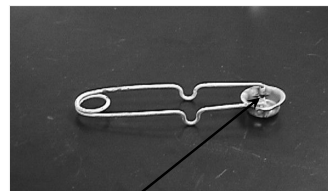
How to Light the Lab Burner

1. Examine the hose for any damage.
2. Perform initial adjustments.
3. Attach rubber hose to outlet.
4. Turn ON gas outlet.
5. Wait a few moments.
6. Light the burner with a striker. (next slide)
7. Perform any required final adjustments.

Lighter

Striker-style flint lighters are used to light your lab burners.

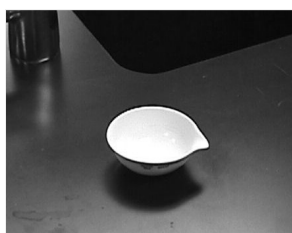
The flints on strikers are expensive; do not operate the striker repeatedly just to see the sparks!



Spark occurs here.

Squeezing the flint against the file causes a spark, thus lighting the burner.

Evaporating Dish



The evaporating dish is used for heating stable solid compounds and elements, as well as for evaporating solutions.

These are made of a porcelain material, and therefore can withstand high heat temperatures, but are thin and fragile, and break easily – handle with care.

Crucible and cover



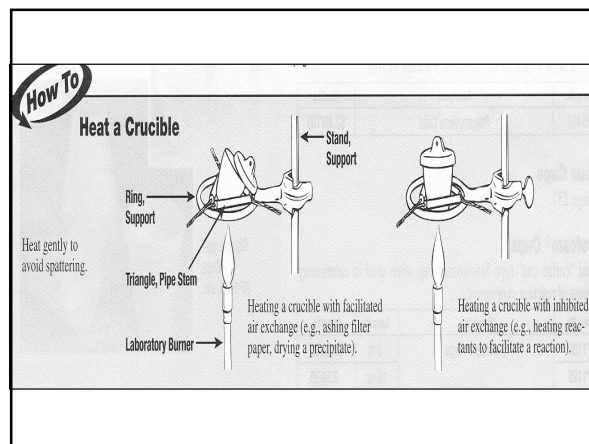
Crucibles are used for heating certain solids, particularly metals, to very high temperatures. The cover can be used to contain any smoke particles.

The crucible and cover are also made of a porcelain material, and thus can withstand high temperatures.

Clay Triangle

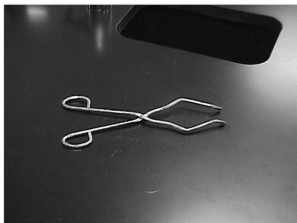
The clay triangle is used as a support for crucibles when being heated over a lab burner.

It can also be used to support a funnel when filtering.



Crucible Tongs

For handling hot crucibles and their covers; also used to pick up other small hot objects - **NOT** to be used for picking up beakers!



Triangular File

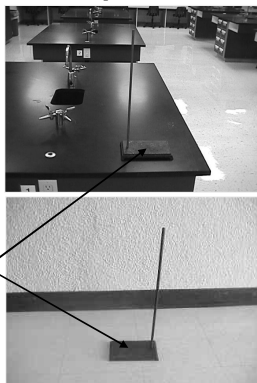


Triangular files are used primarily to cut glass tubing, a skill that your instructor will share with you later.

Ring stand (and their Components)

Ring stands are a safe and convenient way to support equipment holding reactions that require heating using a lab burner.

The base can also be used as an insulating pad to place hot objects on while they cool.



(Ring stand and their Components) Ring Clamp

Ring clamps connect to a ring stand, and when used with a wire gauze provide a stable, elevated platform for a beaker to rest when heated.

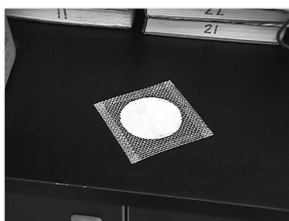


Will hold a clay triangle and funnel during filtering, and will be used with a clay triangle to hold a crucible when they are heated.

(Ring stand and their Components) Wire Gauze

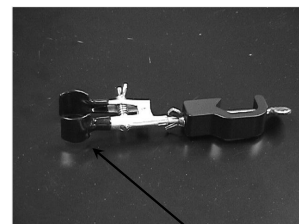
Wire gauze sits on the ring clamp to provide a platform to stand a beaker.

On older wire gauze, the white material was asbestos – currently it is a ceramic.



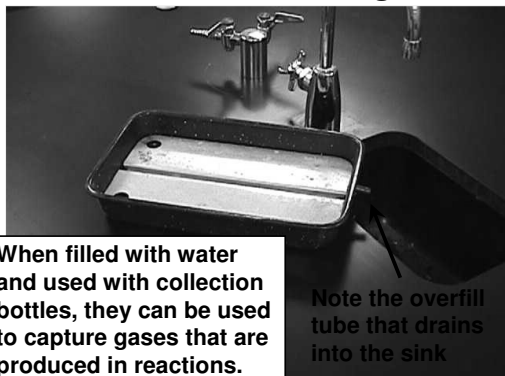
(Ring stand and their Components) Test tube Clamp

Test tube clamps are used to secure test tubes, burets, and distillation condensers to the ring stand.



Many test tube clamps have a rubber coating on the jaws to improve their grip.

Pneumatic Trough



When filled with water and used with collection bottles, they can be used to capture gases that are produced in reactions.

Note the overflow tube that drains into the sink

Ruler

We always use the Metric System (also called the International System) to make our measurements.



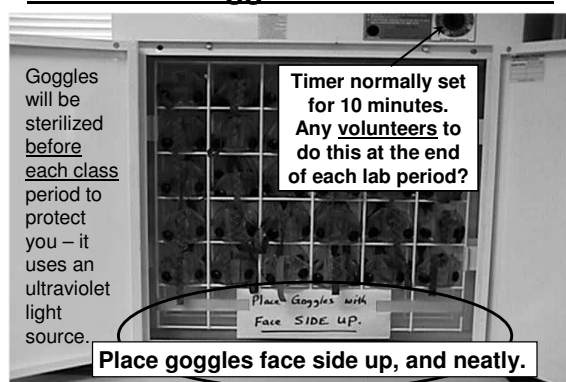
Record your numbers as decimals, not as fractions.

Examples: 3.5 mm or 6.2 cm

Goggles and Goggle Sterilizer Cabinet

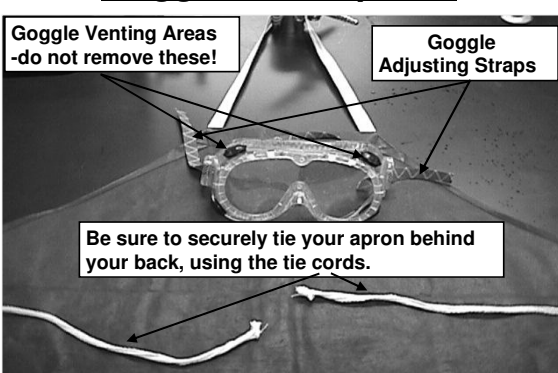


Inside the Goggle Sterilizer Cabinet

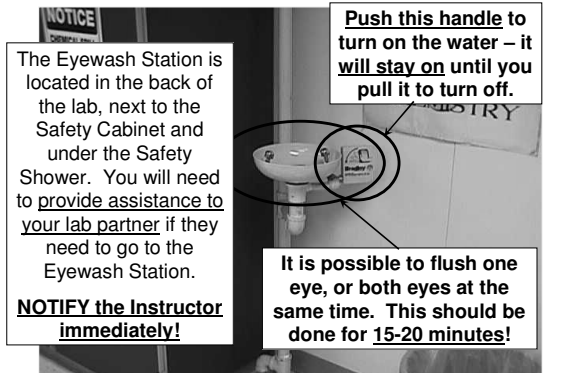


Place goggles face side up, and neatly.

Goggles and Aprons



Eyewash Station

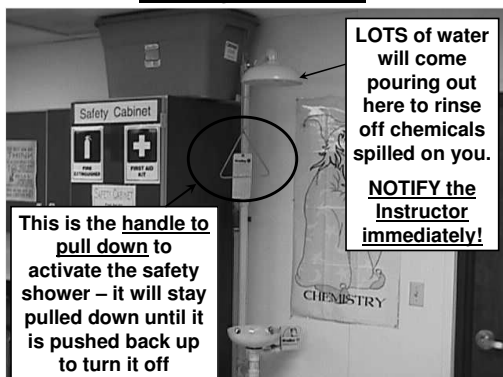


The Eyewash Station is located in the back of the lab, next to the Safety Cabinet and under the Safety Shower. You will need to provide assistance to your lab partner if they need to go to the Eyewash Station.

NOTIFY the Instructor immediately!

It is possible to flush one eye, or both eyes at the same time. This should be done for 15-20 minutes!

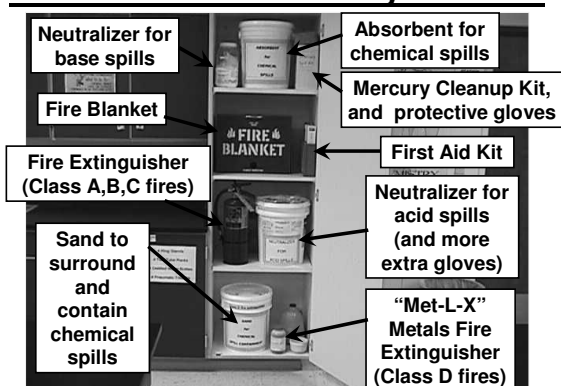
Safety Shower



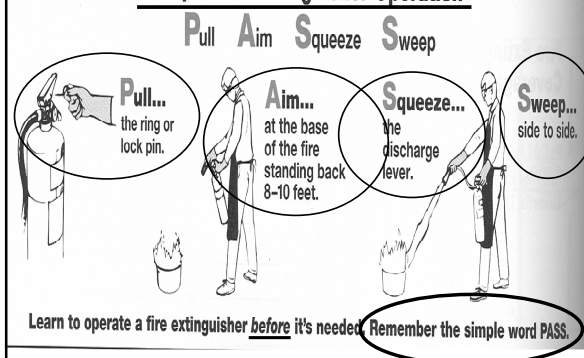
Safety Cabinet and Contents



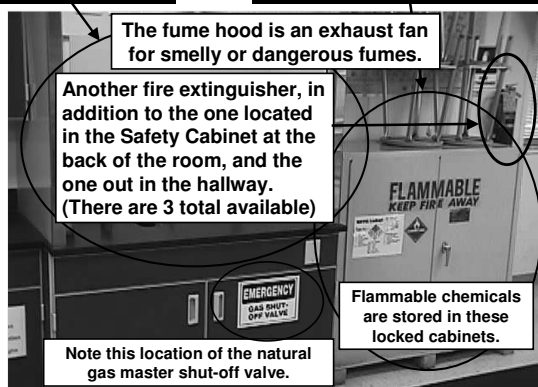
Items inside the Safety Cabinet



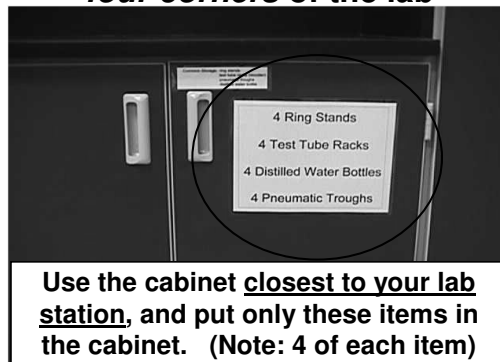
Simple Fire Extinguisher Operation



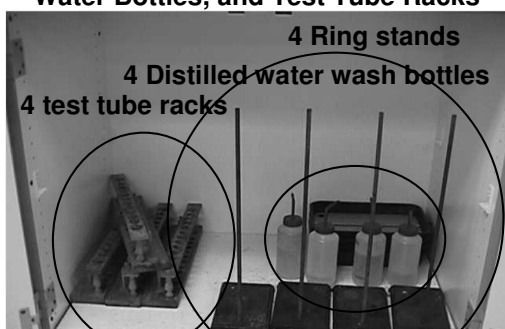
Fume Hood and Flammable Cabinet



Side Cabinet Storage – located in the four corners of the lab

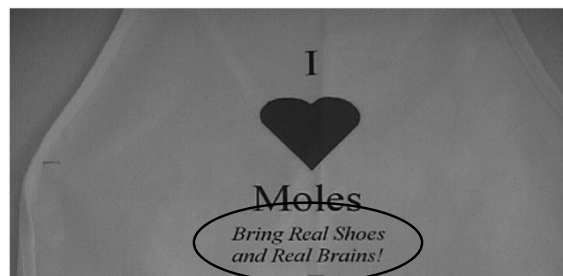


Side Cabinets are for Ring stands, Distilled Water Bottles, and Test Tube Racks



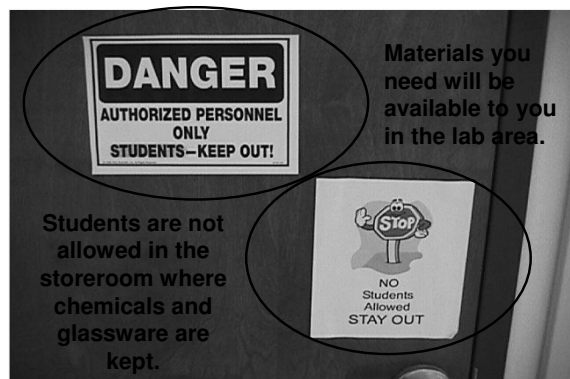
All items neatly stored when you are finished!

**** On lab experiment days ****



Bring **REAL SHOES, REAL BRAINS**, and your **LABORATORY MANUAL**. Your calculator, textbook, and class notes are also suggested.

The Chemical Storeroom



To clean up spills and/or broken items, use the:



Table brushes and dustpan



Floor brooms for larger spills

**Pay Attention:
Proceed with Caution**

End of Lab Equipment