

First Day Demonstrations

at Flowing Wells High School

Acetylene Can

Put 1-2 cm of water into the bottom of a 1 gallon paint can. Place 3 equal size pieces of calcium carbide into the can and quickly seal the lid. Count to 1004, light a match, and at 1007 or 1008, bring the lit match to the hole in the side of the can. Watch out for what's above you!

Student knowledge pellets

On a sheet of paper make happy and sad faces to put around two beakers. Place about 50 ml of acetone into one beaker, and nothing in the other. Add styrofoam pellets to the empty beaker until it overflows. Then add pellets to the beaker with acetone -- shake and swirl occasionally -- keeping adding as many pellets as possible.

“Not all students can absorb the same amount of knowledge. Some will become saturated right away, while others will take all that is offered them. Sometimes they might need a little nudge and they keep on absorbing as much knowledge as they can. I hope that you are one of these students”

Sodium and Potassium on water

Show the students where on the Periodic Table these elements are located. Stab with a knife blade, cut off a small piece and drop into a 400 ml beaker about one-third full of water. Repeat using potassium. Talk about trends in the Periodic Table and how the elements are different from each other.

Black and White

Prepare these solutions: 0.1M HgCl_2 (27.2 g/L)
 0.1M SnCl_2 (22.6g in 125g of 12M HCl, warm to dissolve, dilute to 1 L with water.)

Mix 10 ml of SnCl_2 with 90 ml of HgCl_2 (white ppt. forms).

Mix 90 ml of SnCl_2 with 10 ml of HgCl_2 (black ppt.. forms).

Water Activated Flare

In a clean 13x100 mm test tube, place 4 g of Zn dust (granular will not work reliably).

To a second test tube add:

- 4g of ammonium nitrate
- 1g of ammonium chloride
- 0.5g of barium nitrate

Stopper both test tubes until ready to use. All test tubes must be kept dry! Keep everything dry!!

Using either an evaporating dish or a fire proof mat, pour out test tube #2. Sprinkle out the contents of test tube #1 over the chemicals, mix carefully with the end of the test tube.

When ready to use, spray a few drops of water onto the mixture. Stand back!

Acid activated Flare

Pour a strip of Potassium Chlorate onto a piece of **very clean** smooth paper (ie. 20# Xerox quality paper...**not** paper towels).

Pour an equal amount of sugar next to the first strip. Carefully mix the two strips of chemical together. Crush any lumps.

Separate into thirds. To the bottom third, add a generous portion of degreased iron filings. To the middle third, add a generous amount of strontium nitrate. To the top third, do nothing.

Using either a 15 x 1500 mm or an 18 x 150 mm test tube, carefully pour equal amounts of the three mixtures into the test tube. Clamp to a ringstand.

Start the reaction in a well ventilated area by **CAREFULLY** adding 2-3 drops of concentrated sulfuric acid. **STAND BACK!**

Potato Gun

Plunge one end of the PVC pipe into a potato to seal the end. Do the same with the other end. Press the wooden rod into one end until the rod is inserted about 5 cm's. Point down an aisle and over the student's heads. Hold the pipe in one hand and push the rod all the way into the pipe. This is an example of Boyles' Law in action.

Bottle Rocket

Add about 3 ml of methanol to a 2 liter soft drink bottle. Swirl around and pour out the excess. Screw on cap. Set on ring stand and aim above the student's heads. Bring a lit match to the hole in the can. Gas laws in action! (or reaction?)

Old Nassau Reaction

Solution A: 15g of KIO_3 / L water.

Solution B: 4g soluble starch in 500 ml of boiling water; add 15g of NaHSO_3 ; dilute to 1L.

Solution C: 3g of HgCl_2 / L water.

Pour 100 ml's of Sol. A into a 400 or 600 ml beaker. Pour 100 ml's of Sol. B and Sol. C into separate 250 ml beakers. When ready, simultaneously pour Sol. B and Sol. C into the beaker with Sol. A.

This is a two step reaction controlled illustrating chemical kinetics.

Elephant's Toothpaste

Add to a 1000 ml or bigger graduated cylinder in the following order:

30 ml of 30% hydrogen peroxide
30 ml of Dawn dishwashing detergent
30 ml of 6M (saturated) KI

“You may have come here with a little knowledge of chemistry (peroxide), and we'll give you some colorful bits of information (add Dawn), but the key ingredient is your motivation (add KI). When you put this all together, you too may just overflow with knowledge!”

Blue Bottle

Dissolve 5g of KOH in 250 ml of water and add a very small pinch of methylene blue. On the day of the demo, add 3g of dextrose. Cap bottle.

Solution is blue, shake to turn colorless, allow to stand and it will return to blue. This is an equilibrium reaction of the oxidation of dextrose by the hydroxide. Open bottle between classes for about 20 mins.

Invisible Ink

Paint a design on a piece of paper towel with a solution of phenolphthalein. Allow to dry. Spray with Windex with ammonia to show design. Spray with Windex with vinegar to hide design. This is an acid-base reaction.

Can Ripper

About half-way down the inside of an aluminum soft drink can, use a metal file or a teasing needle to score a line around the can. Fill the can with a saturated solution of CuCl_2 and let sit for several minutes. Pour the solution into other cans or save for future use. The can should easily rip apart. This is a good opportunity to explain your tardy policy.