

Chemistry is Magic

A Potions Manual



This book belongs to _____

Hands On Gainesville



Inspiring a new generation of problem-solvers.



Hands-On Recipes

Deathly Hallows Ink Race (Paper Chromatography)

Materials:

Filter paper (like coffee filters or you can use paper towels)
water based marker (black works best because it has the most colors in it)
water in a container
pencil, dowel or something to fit across the top of the container to hold the filter paper
tape

What to do:

1. Draw a shape on the filter paper near the bottom (but not at the very bottom). Leave room for the paper to soak up the water without the ink submerged in the water.
2. Tape the paper to a pencil at the right height so that when you rest it on the cup top the bottom of the filter paper is just above the bottom of the cup.
3. Add water to the cup carefully making sure you keep the water level below the ink mark on your paper.
4. Watch the water travel up the paper and separate out the different colors of ink as it carries the colors at different speeds up the filter paper.

Troll Snot Slime

Materials:

Elmer's all-purpose white glue or clear glue (must be Elmer's for best result)
Borax laundry detergent 1 tablespoon dissolved in water (super saturated- that means not all should dissolve)
Food coloring (optional)
Container or sealable plastic bag for reacting

What to do:

Empty glue into a container Dilute the glue 1:1 with water by adding equal amounts of water as you add glue. Mix well.

Make a super saturated solution of borax in water (put about a tablespoon of borax in a cup of water (warm water works best). Add the food coloring if you want it!

Slowly add the borax solution to the glue mixture until you get the feel of the slime that you like.

Make your own Indicators

Materials:

Strong colored fruits, vegetables, or flowers like red cabbage, cherries, blueberries, golden rod, red rose petals, turmeric spice, etc.

Water (and a pot to boil the fruit, vegetables or flowers in – one at a time, of course)

Small paper cups (or small containers)

Testing liquids (vinegar, lemon juice, baking soda solution, milk, juice, or any other safe liquids that you have in the house)

DO NOT USE CLEANING SOLUTIONS BECAUSE THEY MAY BE DANGEROUS!

What to do and notice:

Grind up the fruit and boil it in a little water until the color comes out into the water.

Strain the water into a new container, discard the solid material.

Use the colored liquid as is or soak filter paper in the liquid and make your own indicator paper. (Let the paper dry out on wax paper before you use it). The darker the paper or liquid, the more effect you will see.

Place a little bit of liquids that you have around the house into little paper cups (keep each liquid separate) Add the indicator liquid (or dip a different piece of the indicator paper) into each cup of the testing liquids. Does the indicator change colors in any of the testing liquids?

Density Column in a Test Tube

Materials we used:

water with added food coloring,

oil (mineral, vegetable, olive, etc.)

dish soap

corn syrup, (optional molasses)

Tall clear container and small objects like beads and plastic toys to float in the liquids

Try other liquids too, like salt water, soda, Gatorade.

**Use food and drink liquids
instead of cleaners to be safe!**

What to do:

Add the liquids to the tall narrow container one at a time and carefully so as not to mix them. When the column is complete, add the small objects.

What to Notice:

Which liquid falls through the others? Which ones stay on top? Do some mix while others stay separate? It is not only about density when making a floating column, it is about whether the liquids are miscible (they mix) or immiscible (they don't mix). You may want to do this in little test tubes first until you figure out which are the more dense (sink to the bottom) and which are less dense (stay on top of others). Don't forget to keep good notes so you can make the big column work!

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Dragon's Eggs

Materials needed to make your own:

Eggs Vinegar Corn syrup

What to do:

To make the clear eggs: Place the eggs in vinegar (fully submerged). They may float but that is ok.

Leave overnight or longer.

Carefully rinse the remaining shell off the egg. If it doesn't come off right away, soak it for a little longer in more vinegar.

To make the shriveled eggs- take the clear rinsed egg and place it in a cup of corn syrup until it is submerged. Leave for 24-48 hours.

Note: To make a leathery egg, soak it first in vinegar overnight but do NOT wash off the remaining shell layer. Gently rinse the egg and place it in the corn syrup with the thin shell remaining on it. Wait 24-48 hours.

What to Notice:

The vinegar dissolves the shell and rubberizes the egg-white. The corn syrup dehydrates the egg (pulls the water out of the egg through the membrane) causing the egg to shrivel up.

Demonstration Spoilers -

Learn the science behind the magic

Leprechaun's Test Tube Rainbow

Will you find gold at the end of the Leprechaun's test tube rainbow? Maybe just gold paper with a cool trick! You know how leprechauns are, right?

Our rainbow is made with acid/base indicator solutions which are special liquids that change color in different pH liquids like acids and bases. We add different pH liquids to the tubes and then add the indicator solution which changes color as it contacts the acids or the bases (or neutral water).

Acid/base indicators occur in nature. Most strong colored plants like red cabbage, blue berries, cherries, turmeric spice, or the goldenrod flower used to make our "gold" paper will change color if they are put in a basic solution like ammonia or baking soda or an acidic solution like vinegar or lemon juice.

Moaning Myrtle is a Gas and So is Peeves

Screaming pot lids and "ghosts" walking down the stairs?

SUBLIMATION is the key to this effect. Dry ice (solid CO_2 which means carbon dioxide) doesn't melt at atmospheric pressure. It sublimates (goes directly from a solid to a gas). It sublimates so quickly at room temperature that it vibrates as the gases go off and you press the solid on to the metal pot lid. It causes a screaming vibration sound.

CO_2 also has a greater density than air, so it sinks below the air in the room and rests in what appears to be the empty container. CO_2 is colorless so you can't see it as it steps down the candle staircase and snuffs out the candles.

Kind of spooky!

Wingardium Leviosa in Liquids

Is it density or buoyancy? Whatever floats your boat! A buoyant force in a fluid (liquid or gas) depends on its density. Whether a solid object floats or sinks depends on its volume. So a crumpled piece of aluminum foil and the same mass of a flat piece of foil may not behave the same in a fluid. This is a fun project to try at home. What objects can you make sink (negatively buoyant) or float (positively buoyant) or hover (neutrally buoyant)?

Our density column was made with Corn Syrup (colored red), Dawn Dishwashing Detergent (because it was blue), green colored water, and cooking oil.

They are all different densities, so they sit at different levels in our column and they each have a different buoyant force so the objects we put in them float at different sections depending on where they are held up the best by the buoyant force.

But don't shake it up! Some of these liquids will combine (they are miscible) to form a new mixture that will have a different density but won't look as cool!

Grawp's Toothpaste

Giants may like decomposing hydrogen peroxide to brush their teeth but you shouldn't use it! Grawp's toothpaste is a combination of a catalyst (we use yeast) added to H_2O_2 , that's hydrogen peroxide (like you use on your cuts to clean them but we use a much greater concentration- like the one you use to "bleach" your hair) and dish washing liquid that makes the really small bubbles as the H_2O_2 decomposes to become water and oxygen gas. It is also quite exothermic- which means it gives off heat and gets hot. **So be careful if you do this at home.**

Giants must have really clean teeth if they ever brush them!