

## Making Chemistry Fun with Common Products

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Demonstrations make it easy to bring Chemistry to life for students. I will share several of my favorite demonstrations that use common products, such as snap beads, balloons, paper clips, cheese and softdrink cans. Most of these demonstrations illustrate Chemical principles but some are just fun.

1. **EDIBLE CANDLE.** Make a candle out of mozzarella cheese with a wick made of an almond sliver. Light candle to observe a "burning candle," then blow it out and take a bite.
2. **SNAP BEAD MOLECULAR MODELS.** Use large toy snap beads to illustrate the difference between pure substances and mixtures, and between elements and compounds.
3. **OXIDATION STATES OF IRON.** Fill a 1000-liter beaker about 1/3-1/2 full with an iron fortified cereal (like Wheaties). Crush the cereal somewhat. Add water to about 800 mL. Add a Teflon coated stirring bar. Put the beaker on a stirring motor and get the slurry to slowly stir. Leave the slurry stirring for at least 15 minutes. When the magnet is removed from the slurry, it should be slightly coated with fine iron filings. The longer the slurry is stirred, the more iron. It shows that the iron in cereal is elemental iron.
4. **BALLOONS TO DEMONSTRATE TETRAHEDRAL GEOMETRY.**
5. **POLYMER PROPERTIES.** When you are finished with the balloons, a fun way to discard them, is to show that you can put a pin in the balloon without breaking it. Dip the pin in Vaseline and insert it slowly into the thick part at the bottom of the balloon. The balloon will not burst. Then withdraw the pin and insert it quickly into the side of the balloon to make it burst.
6. **PAPERCLIP POLYMER.** To demonstrate the structure of a copolymer, link colored paperclips together so that the colors alternate. Make it into a "magic trick" with loose paperclips.
7. **SUPERABSORBANT POLYMER IN DISPOSABLE DIAPERS.** Cut apart a disposable diaper in a gallon ziplock bag. Free as much polymer as possible from the cotton fluff (it feels like a crystalline solid). Discard the cotton and plastic, leaving the crystalline polymer in the bag. There should be at least 1/2 teaspoon. Add water (amount depends on the amount of polymer you've obtained, but start with 100 mL) to the bag and watch the beads of polymer swell. Choose a diaper brand that says "extra absorbant."
8. **CHARCOAL FILTERS.** Put a cone of filter paper in a funnel in a 250 mL Erlenmeyer flask. Put a scoop of activated charcoal in the filter. Activated charcoal adsorbs aromatic compounds. Make a solution that has food coloring plus vanilla, peppermint or wintergreen. Pour a small amount of the colored/odored solution through the charcoal filter and it should come through clear, colorless and odorless. Pickle juice and red cabbage juice also work. This shows that the colors and flavors used are aromatic hydrocarbons. As a "control," you can filter a  $\text{CuCl}_2$  or  $\text{FeCl}_3$  solution to show that the activated charcoal doesn't filter all "color."
9. **WHITE GLUE SLIME.** Pour about 15 mL white glue into a small paper cup. Add an equal volume of water (about 15 mL), a drop of food color (if desired) and mix thoroughly with a wooden stick. Add about 10 mL (two tsp) of a 4% borax solution and stir. (If the slime is too

watery, add more borax solution, 1/2 teaspoon at a time. Be careful, too much borax will make the slime too stiff.) Use the stick to remove the blob of slime and store in a zip-lock bag.

10. **WATER & OIL BOTTLES.** Fill a clear plastic bottle about 1/2 full with salad oil. Add a drop of food coloring and fill to the top with water. Close tightly. Mix the liquids by inverting the bottle. This shows “like dissolves like” as the food coloring will only dissolve in the water.

11. **RIPPING A POP CAN.** Using a file, score a line around the inside of a pop can. Pour a solution of 1 M  $\text{CuCl}_2$  into the can and leave for 3-4 minutes. Pour out the  $\text{CuCl}_2$  and rinse the can. (The same  $\text{CuCl}_2$  solution may be reused for many cans.) Tell your students they make you so mad, you can rip a pop can in half. After you rip the treated can, you can let them see if they can repeat the feat with untreated cans. The inside of pop cans are coated with a thin layer of plastic to prevent the acid drinks from eating away at the can. The file cuts through the plastic coating and the  $\text{CuCl}_2$  etches a ring around the can, making it easy to rip in half. Do this demonstration when teaching redox. Be careful as the edges of a ripped can are sharp.

#### Other Demonstrations

12. **BURNING DOLLAR.** Make a 50% alcohol solution by diluting rubbing alcohol (usually comes as 70%) or from denatured ethanol. Immerse a dollar bill *completely* in the alcohol solution. Put away the alcohol solution. Holding the bill with tongs, light it with a match. The alcohol will burn off but the dollar remains intact due to the presence of the water. (If even a small amount of the dollar remains dry, it will burn. Be careful to keep the alcohol solution far away from any flame.)

13. **COLLAPSING CANS.** Put a small amount of water in a pop can. Holding the can with tongs, heat it over a bunsen burner for several minutes after the water has begun to boil to replace as much air as possible with steam. As quickly as possible invert the can into a bowl of water. The can should collapse, producing a loud noise. It is now ready for recycling.