

Discussion and Notes

Keep a copy of these safety training notes and a signed attendance sheet to verify regular safety training. Regulatory inspectors will usually request proof of safety training. A copy of the sign-up sheet that we suggest using may be found at www.flinnsci.com/media/412875/signup.pdf.

Safety Precautions

This demonstration is meant to be a fun and engaging way to help students generate their own list of laboratory safety rules. Do not actually use any harmful chemicals or hazardous laboratory techniques. Choose a demonstration with a safe procedure.

Laboratory Safety Challenge

Inspire your students to take ownership of the safety rules and to accept responsibility for lab safety for their own benefit. A great way to show students that the safety rules make a lot of sense is to role-play what happens when the rules are deliberately ignored or violated. The purpose of the laboratory safety challenge is to have students witness lab procedures gone comically awry, and use these observations to derive a common-sense set of safety rules.

Laboratory Safety Challenge—Free Online Video Available

This activity is a slight departure from our traditional safety training notes. It is one of the most popular and most viewed videos in the Flinn Scientific Teaching Chemistry Video Series. All of our videos, more than 700 total, are now available free online. Please visit the Flinn Web site to view the offbeat, fun [Laboratory Safety Challenge](#) video, discover more exciting chemistry activities, and also to learn about the Flinn Scientific Laboratory Safety Course.

Setting the Stage

Before class, plan your improper laboratory attire and prepare an “unsafe” demonstration to showcase improper lab techniques. (A safe “unsafe” demonstration is the reaction of sodium bicarbonate with vinegar.) Add your own dramatic flair to the suggestions provided below to present an unforgettable safety lesson for your students. Be creative!

Set up the demonstration table with the necessary materials and equipment for the activity—make sure the table looks cluttered and disorganized. Designate a student or another teacher to introduce the “guest” presenter for the demonstration. The student should explain to the class that you (the teacher) are unavailable today and a guest presenter has been invited to fill in. Students should evaluate the presenter based on their appreciation of a safe lab environment. Note in the summary below that the corresponding laboratory safety rules are included in parentheses next to the description of each safety “violation.”

Improper Lab Attire

- ◆ Goggles hanging loosely on forehead or around neck. (Wear safety eyewear at all times in the laboratory.)
- ◆ No lab coat—bring one in as you enter and set it down. (Wear a lab apron or lab coat to protect skin and clothing.)
- ◆ Long messy hair, not tied back—use a wild, out-of-control wig for dramatic flair. (Tie back long hair, especially when working with open flames.)
- ◆ Shorts and open-toed shoes or sandals. (Always wear long pants or a dress, and close-toed shoes to protect against spills.)
- ◆ Loose, billowing or baggy sleeves, and long, dangling necklaces and bracelets. (Do not wear clothing or jewelry that presents a safety hazard in the lab.)

Improper Lab Technique

The activity can be performed either as a silent demonstration (no talking, only acting) or as a walking monologue (read aloud the steps in the lab procedure and talk to yourself, perhaps muttering under your breath). *Example:* Let’s see, the procedure says I need 25 grams of baking soda. Oops, it looks like I accidentally weighed 35 grams here. No problem—I’ll just pour some back in the bottle. Hmmm, 28 grams? I’m sure that’s close enough.

- ◆ Take a drink from a can of soda that is on the demonstration table. (No drinking in the lab.)
- ◆ Blow big bubbles of gum throughout the demonstration. (No eating or gum chewing in the lab.)

Discussion and Notes

- ◆ Fumble around through the great clutter and jumble of chemical bottles on the table, looking for the right ones to use. (Keep work area neat and clean at all times.)
- ◆ Weigh out too much sodium bicarbonate into the beaker; pour the excess right back into the bottle. (To prevent contamination, do not return unused chemicals to reagent bottles.)
- ◆ Add water to the beaker and, while stirring vigorously, spill the beaker of sodium bicarbonate solution all over a demonstration tray, and then blithely ignore the spill. (Clean up all spills immediately.)
- ◆ Weigh out another sample, adding the sodium bicarbonate directly to the balance pan. Then pick up the balance pan and pour the baking soda into the just used, “dirty” beaker. (Do not weigh directly on the balance pan.) Add water to the beaker and stir, splashing everywhere.
- ◆ Set up a Bunsen burner (don’t actually hook it up to the gas); pretend to turn on the gas jet and *then* start looking for matches to light the burner. (Do not turn on the gas jet until you are immediately ready to light the burner.)
- ◆ Pretend to heat the beaker by holding it at the top rim with your fingers; say “ouch” as you nearly drop the beaker. (Use tongs or forceps or wear heat-protective gloves when handling hot glassware.)
- ◆ Set up a ring stand and place the beaker on wire gauze; put a thermometer in the beaker to measure temperature but then use it to stir the solution. (Do not use a thermometer as a stirring rod.)
- ◆ While pretending to wait for the solution to heat up, pull out a candy bar from your pocket and take a bite. (No eating in the lab.)
- ◆ Fumble through a purse and pull out a mirror and hair spray. Fix your hair (wig) by pretending to spray it with hair spray. (Keep flammable and combustible materials away from open flames.)
- ◆ Pick up an unlabeled bottle of water and try to determine what it is. (Always label all chemical bottles; do not use chemicals from unlabeled bottles.) Smell the water by putting your nose directly over the mouth of the bottle. React as if the odor is unpleasant. (Do not smell a chemical directly—use a wafting motion to direct the odors to your nose.)
- ◆ Measure some vinegar into a graduated cylinder by holding the cylinder at eye level near your face and carelessly pouring. (When transferring chemical reagents from one container to another, hold the containers away from your body or set glassware level on the table before pouring.)
- ◆ Add food coloring or dishwashing detergent, if desired, and then pour the sodium bicarbonate solution into the vinegar in the cylinder. The mixture will erupt out of the cylinder and overflow all over the table—act surprised. (Always practice a demonstration beforehand so you know what to expect.)
- ◆ After the demonstration, say thanks and walk out. (Clean and wipe up all work surfaces thoroughly after a demonstration or lab.)

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