Laboratory / Classroom Safety Practice Drills For Middle / Secondary

1. Students develop their own set of safety icons. These symbols can be especially helpful for students with language barriers.
   a. Poison
   b. Explosive
   c. Extremely flammable
   d. Highly flammable
   e. Flammable
   f. Oxidizing
   g. Toxic
   h. Very toxic
   i. Harmful
   j. Irritant
   k. Mutagen
   l. Carcinogen
   m. Dangerous for the environment

2. Students develop their own safety rules for the Student Safety Acknowledgement.

3. Students make pictoral safety signs laboratory / classroom. This can be especially helpful for students with language barriers.
   a. Goggles
   b. Shower
   c. Eyewash
   d. Fire extinguisher
   e. Fire blanket
   f. Exit
   g. Non-exit

4. Students learn to read a chemical label on commercially-purchased chemicals, as well as household chemicals.

5. Students prepare worksheets using MSDSs of chemicals they will use in the science lab following Table 56. “Student Practice in reading an MSDS,” pg 201, Science Laboratory Safety Manual S&SCS.

6. Have students design posters to highlight the “whys” for guidelines and regulations. Whenever a rule is not followed, revisit why it was put forth as a guideline.

7. Practice emergency procedures in the event of an accident occurring in the lab. Type these scenarios on notecards, one per card. When students are conducting lab, randomly give one of these cards to a student to read to the others. The students are to go into “Accident Mode!” What do we do? Develop: “A PLAN INSTEAD OF PANIC.”
Problem-Solving Scenarios for Laboratory Safety

a. Electrical short occurs using a hotplate. The cord starts burning.

b. Electrical short occurs using a hotplate. The cord starts burning and is laying in water. Sparks are being created, popping noises are being made. There are no GFIs.
Problem-Solving Scenarios for Laboratory Safety

c. While heating a test tube that contains a boiling liquid, the contents of the test tube explode out of the test tube into the face of a student walking by the lab table. Injured student has on an apron and chemical splash goggles. The teacher had given specific safety warnings about how to heat the test tube by moving it gently through the flame and the appropriate PPE for the lab. There is an eyewash in the laboratory.

d. A beaker containing about 100 mL 1 M HCl (aq) (hydrochloric acid) is knocked off the lab bench onto the floor. The acid splashes onto the leg and foot of a student wearing flip flops. The beaker is also broken. There is not a shower in the laboratory.
Problem-Solving Scenarios for Laboratory Safety

e. A beaker containing about 100 mL 1 M HCl (aq) (hydrochloric acid) is knocked off the lab bench onto the floor. The acid splashes onto the leg and foot of a student wearing flip flops. The beaker is also broken. There is a shower in the laboratory.

Problem-Solving Scenarios for Laboratory Safety

f. The teacher is conducting a flame test demonstration at the lecture desk. The metal salts are dissolved in methanol. Students are around the desk (without PPE) watching the teacher ignite the methanol to see the different colored flames of different metal ions. A flash fire occurs and the fire self extinguishes; however, two students receive burns on their arms.
Problem-Solving Scenarios for Laboratory Safety

g. A student leans over the flame of a burner. He / she has on a long sleeve shirt which catches on fire.
   - Shower in the laboratory.
   - No shower, only a fire blanket and water on lab stations.
   - No shower, water, or fire blanket in the laboratory; however, fire extinguisher outside the laboratory door.

h. A student splashes alcohol on his / her hands when it is poured down the sink drain.
Problem-Solving Scenarios for Laboratory Safety

i. A student goes into the chemical prep room to find a thermometer. He / she finds one that contains mercury. As the student is walking back to the lab table, he / she accidentally hits the thermometer bulb on the corner of the lab table. The mercury falls to the floor, breaking into hundreds of little balls. Students are fascinated with the liquid. They begin pushing the beads back together and then separating them again and again.

Problem-Solving Scenarios for Laboratory Safety

j. A student cuts his / her hand while accidentally breaking a beaker—not serious enough to have stitches; however, it is bleeding sufficiently. No blood vessels are cut.
Problem-Solving Scenarios for Laboratory Safety

k. A student starts to shake, feel faint; his/her skin feels cold and clammy. His / her vision is also blurred. The student is a known diabetic. There is no record of the student having such a reaction prior to this attack.

l. In a biology classroom there is a cage that contains a gerbil. One student starts poking at the gerbil with a pencil. Another student tries to get the student to stop antagonizing the animal. The student finally opens the cage and reaches in to get the gerbil. The gerbil bites the student on the hand. Students have been given rules regarding the handling and proper care of animals.
Problem-Solving Scenarios for Laboratory Safety

m. A student who wears contact lenses is wearing safety glasses in the laboratory while working with baking soda and vinegar. The reaction is rapid. The bubbles of carbon dioxide are forming quickly and some of the wet baking soda splashes into the student's eye.

n. Students are working in the laboratory when alcohol vapors ignite. A student attempting to smother the blaze knocks over the bottle of alcohol. The flames race across the laboratory table, down the side where the alcohol is dripping onto the floor. There is water in the laboratory.

• What if there is a fire extinguisher nearby at the exit door of the laboratory?
• What if there is no fire blanket and a fire extinguisher is available?
• What if there is no fire blanket available and no fire extinguisher available?
Problem-Solving Scenarios for Laboratory Safety

o. Ms. Jones takes her Environmental Science Class to a wooded area adjacent to the school to make measurements of temperature, relative humidity and rainfall accumulations at several different climate stations in the area. She has warned students to be observant and cautious when touching various kinds of plants, to watch their step, and not to swat at bees/wasps with their hands. A bee / wasp stings a student on his / her neck. Almost immediately, swelling appears more than normal. The student appears to have some difficulty breathing.

Problem-Solving Scenarios for Laboratory Safety

p. A teacher is assigned to a non-science room to teach the chemistry portion of Physical Science by the school principal. The teacher indicated the problems inherent in conducting science inquiry in this classroom. The room does not have any safety equipment, gas or water. There is only one exit from the room. Students are conducting an experiment which requires heat. The teacher uses alcohol burners. About five minutes before the bell is to ring, the teacher instructs the students to clean up the lab table and refill the alcohol lamps from the gallon jug of alcohol. There is one burner still lit on a table when the student who is refilling his / her lamp spills alcohol on the table. The arm of one student is burned severely enough to have blisters.
Problem-Solving Scenarios for Laboratory Safety

q. In Earth Science, students are identifying rocks. A dilute solution of hydrochloric acid is used to determine if the rock contained a carbonate. Students are not wearing goggles or safety glasses. Two boys start squirting each other with the pipet containing the acid from the dropper bottles that were at each lab station. One student is hit in the eye with the acid solution. The teacher gets the student to the eyewash station; however, when the paddle is pushed, only brown water came out.

r. On Friday in Biology class, students are observing plant cell structures under a microscope. All the students at the lab table develop conjunctivitis over the weekend.
Problem-Solving Scenarios for Laboratory Safety

s. In a middle school science class, students are wearing goggles with adjustable elastic bands. There is not a Goggle Sanitation Cabinet or water in the classroom where students are conducting the lab. The teacher typically takes the goggles home every weekend and washes them in her dishwasher. Within a week, there is a head lice epidemic in the teacher’s science classes.

t. The door to the chemical stock room is left open. Two students go in, take some magnesium ribbon, sulfuric acid and potassium permanganate. The teacher walks in as they are about to leave.