

Discussion and Notes

Safety Guidelines for Chemical Demonstrations

Chemical demonstrations are a very effective teaching tool. Even though students may not be handling chemicals during a demonstration, it is still important that safety rules and guidelines be followed. Flinn Scientific has developed a list of twenty safety guidelines for chemical demonstrations. We recommend that all teachers who perform chemical demonstration review these guidelines and follow them to improve safety and prevent accidents.

1. Always practice all demonstrations before performing them in front of students. A demonstration should only be attempted after all the potential pitfalls and hazards have been identified.
2. Never attempt a demonstration that will place you or your students at risk.
3. Wear appropriate eye protection for all chemical demonstrations.
4. Require students to wear goggles if chemicals, heat or glassware are being used.
5. Use a safety shield if there is the slightest possibility that a container, its fragments or its contents could be propelled with sufficient force to cause personal injury. A good rule of thumb is if heat or pressure are involved, audience protection is required.
6. Ensure that all demonstrations have an educational objective. If the demonstration uses toxic chemicals or a potentially hazardous procedure, review the demonstration again and be sure it has educational benefits.
7. Know and understand the properties of the chemicals and chemical reactions involved in all demonstrations presented.
8. Comply with all local rules and regulations.
9. Use fresh chemicals and clean glassware to prevent possible contamination.
10. Plan the demonstration so that harmful quantities of noxious gases (e.g., NO_2 , SO_2 , H_2S) do not enter the local air supply.
11. Do not use "open" containers of volatile, toxic substances (e.g., benzene, CCl_4 , CS_2 , formaldehyde) without adequate ventilation as provided by fume hoods.
12. Make sure to cap all reagent bottles, especially if the chemical is a flammable liquid, after dispensing the appropriate quantities and be aware of heat sources and flammable vapors. Never repeat a demonstration using flammable liquids until all containers and surfaces are cool to the touch.
13. Make sure all glassware is borosilicate (e.g., Pyrex[®]) glass and check for chips and cracks before using.
14. Warn the members of the audience to cover their ears whenever a loud noise is anticipated.
15. Arrange to have a fire extinguisher at hand whenever the slightest possibility of fire exists.
16. Do not taste or encourage spectators to taste any nonfood substances.
17. Do not use demonstrations in which parts of the human body are placed in danger (such as placing dry ice in the mouth or dipping hands into liquid nitrogen).

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18. Provide written procedure, hazard, and disposal information for each demonstration whenever the audience is encouraged to repeat the demonstration.
19. Arrange for appropriate waste containers and subsequent disposal of materials harmful to the environment.
20. Always ensure that electrical devices are properly grounded and inspect every electrical circuit before turning the current on.

Flinn Scientific Values Your Support

Flinn Scientific has provided these Science Department Safety Training Notes. Without your orders, the safety training notes and the indispensable *Flinn Scientific Catalog/Reference Manual* would not be possible. Please continue to support our efforts to improve safety in school science labs by sending Flinn Scientific your valuable orders.

Next Month's Topic

Electrical Safety

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Chemical demonstrations are a very effective teaching tool. Even though students are not handling the chemicals, it is still important that safety rules and guidelines be followed. Flinn Scientific has developed a list of twenty safety guidelines for chemical demonstrations. These safety guidelines should be reviewed by all teachers who demonstrate with chemicals.

The safety meeting should take 10 minutes to present. The discussion period will vary depending on the issues that need to be addressed.

It is important to keep a copy of these safety training notes and a signed attendance sheet to verify that regular safety training meetings were held. The sign-up sheet is almost as important as the training notes and is usually the first thing that is requested and reviewed by regulatory inspectors. A copy of the sign-up sheet that we suggest using may be found at www.flinnsci.com/Sections/Safety/SNotes/signup.pdf.

Materials (one per staff member)

- ◆ Flinn Scientific Science Department Safety Training Notes, Volume 9–4
- ◆ Sign-up Sheet (one for group)

Questions for Discussion

1. What is considered appropriate eye protection for students and audience members during chemical demonstrations?
2. Have all teachers received appropriate training for the safety equipment in their classrooms, i.e., fire extinguisher, fire blanket, spill control materials, safety eyewash, etc.?
3. Does the school own a safety shield? When should we use it?
4. If teachers have questions about a chemical or chemical demonstration, whom should they contact?

We Welcome Your Comments

Are the Science Department Safety Training Notes useful to you? Are they working for you and your department? Do you have any suggestions for topics that you would like to see covered or for how we can improve these notes? We really want to hear from you! Please e-mail us with your comments and suggestions. Our e-mail address is flinn@flinnsci.com.