

### Topic: Chemical Spill Control — How to Prevent and Respond to Laboratory Chemical Spills

A responsible science department will take steps to prevent spills, make sure proper safety equipment is available to contain and control the spill, and understand how to use spill control equipment.

#### Spill Prevention

The first precaution to take for spill control is spill prevention. Experiments, laboratories, and purchasing procedures should be designed to minimize the possibility of chemical spills. Experiments should use the minimal amount of chemicals whenever possible. The following guidelines will reduce the risk of chemical spills.

- Use microscale experiments whenever hazardous materials are used.
- Purchase, store, and dispense chemicals from the smallest bottle possible. Do not order or dispense from a 500-mL bottle if each student only needs 1 mL.
- Dispense chemicals from a central location (preferably a fume hood) and place all reagent bottles on a spill containment tray or absorbent chemical pads.
- Purchase, store, and dispense chemicals in unbreakable bottles, such as plastic or PVC-coated glass bottles.
- Purchase and store highly toxic materials in a secondary containment device, such as a Chem-Saf bag (heavy-duty plastic bag) or a Saf-Stor can (metal paint can).

#### Spill Control Equipment

Each laboratory should have proper spill control equipment including fire blankets, spill control materials, and a mercury spill control kit. A 100% wool fire blanket is an excellent spill control device because it will contain and control a spill and its vapors. If a spill occurs and no spill control materials are available, simply throw the fire blanket over the spill. The blanket will begin to absorb the liquid, contain the vapors, and enable a person to walk over the spill without slipping.

Spill control materials should consist of three components: sand, an absorbing agent, and a neutralizer. Spill control materials should be capable of handling a spill from the largest bottle used in your laboratory, which is usually a 2.5-L acid bottle. Sand is used to contain a spill, provide traction, and prevent the spill from rapidly spreading across the tile floor. The absorbent contains and absorbs the liquid spill so it is easier to clean up, transport, and dispose. Neutralizer is usually a base such as sodium carbonate or calcium hydroxide and is used to neutralize inorganic acid spills. If strong bases are used in your laboratory, it is wise to keep a supply of citric acid on hand to neutralize the base. A 2.5-kg bottle of citric acid is large enough to neutralize the entire contents of almost any bottle of base.

If mercury or mercury thermometers are used in your classroom, mercury spill control materials should be readily available. Mercon spill control spray, wipes, and sponges are available from Flinn Scientific and are ideal for cleaning up mercury

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spills. Sprinkling zinc dust on the spill area can also clean up small droplets of mercury. Zinc dust reacts with mercury to form a very stable and safe amalgam that is easy to handle, and safe to dispose of in the trash.

**Spill Control Procedures and Training**

A written contingency plan on how to handle chemical spills should be part of every school's Chemical Hygiene Plan. The following procedure is an example of a contingency plan.

1. Quickly assess the spill, its hazards, and the danger to yourself and your students and take appropriate action. If the spilled chemicals are unknown, assume the worst and evacuate.
2. Notify other laboratory personnel of the accident and, if necessary, evacuate the area. The safety of you and your students is always the top priority. Restrict all unprotected personnel and students from the spill area.
3. If the spilled chemical is volatile, ventilate the area or evacuate. If the spilled chemical is flammable, remove all ignition sources.
4. Tend to any injured or contaminated person and, if necessary, request help. If the chemical is splashed into an eye or onto skin, immediately irrigate using an eye-wash or shower. If the chemical is splashed on your clothes, you may have time to first contain the spill with a fire blanket or spill control materials and then treat yourself. Remember, if you use a safety shower near a chemical spill, the water may expand the spill area.
5. Take steps to contain and limit the spill if this can be done without risk of injury or contamination. Be sure to wear personal protection equipment such as chemical splash goggles, chemical-resistant gloves, and a chemical-resistant apron.
6. Clean up the spill using appropriate procedure. Dispose of contaminated materials properly.
7. Call in emergency personnel if at any time your safety or your students' safety is in jeopardy.

*Flinn Scientific has a detailed procedure on how to clean up liquid chemical spills (step 6). For your free copy, go to [www.flinnsci.com/Sections/Safety/chemicalSafety/cleanSpills.asp](http://www.flinnsci.com/Sections/Safety/chemicalSafety/cleanSpills.asp).*

**Acknowledgement of Flinn Scientific**

Flinn Scientific, your safer source for science supplies, has provided the safety information presented at today's meeting. Flinn Scientific Department Meeting Safety Notes are made possible by the orders you send to Flinn Scientific. Please continue to support the efforts of Flinn Scientific to improve safety in the high school science laboratory by sending them your valued orders.

**Next Month's Topic:** *Electrical Safety Rules*

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**Flinn Scientific  
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## **Workshop Presenter Notes**

### **Volume 5–7: Chemical Spill Control — How to Prevent and Respond to Laboratory Chemical Spills**

No matter what precautions are taken, sooner or later an accidental chemical spill will occur. A responsible science department will take steps to prevent spills, make sure proper safety equipment is available to contain and control the spill, and understand how to use spill control equipment. This month's Science Department Meeting Notes will review the basics of preventing and responding to laboratory chemical spills. With proper equipment, procedures, and training, many spills can be prevented and spills that do occur can be handled safely and effectively.

This safety meeting should take 6–8 minutes to present. The discussion period will vary depending on the issues that need to be addressed.

It is very important to keep a copy of these safety 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 meeting notes and is usually the first thing that is reviewed by regulatory inspectors.

A copy of the sign-up sheet we suggest using can be found at [www.flinnsci.com/Sections/Safety/SNotes/signup.pdf](http://www.flinnsci.com/Sections/Safety/SNotes/signup.pdf).

#### **Materials:** (one per staff member)

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Flinn Scientific Recommended Procedure for Cleaning Up a Liquid Chemical Spill (optional)

Sign-in sheet (one for group)

#### **Additional Activities or Questions for Discussion**

1. Each teacher should perform an assessment of their spill prevention procedures and spill control equipment in their laboratory.
2. Should students be allowed to clean up minor spills on their bench or should a teacher be involved to make sure the spill is properly cleaned?
3. If time allows, simulate a chemical spill with water and use sand as the control material. Note how quickly the “spill” spreads. Practice applying the spill control material around the spill and then onto the spill. Training is one of the most important components of an effective safety program.
4. Determine the most convenient location for storing your spill control materials.

#### **Additional Information**

Flinn Scientific has information on how to build a homemade spill control center. For more information go to [www.flinnsci.com/Sections/Safety/chemicalSafety/homeSpillControl.asp](http://www.flinnsci.com/Sections/Safety/chemicalSafety/homeSpillControl.asp).

#### **We Welcome Your Comments**

Please e-mail Flinn Scientific at [flinn@flinnsci.com](mailto:flinn@flinnsci.com) with your comments and feedback on the Flinn Scientific Science Department Meeting Safety Notes. Your opinions are very important to us.