Responding to Laboratory Chemical Spills

Introduction

No matter what precautions are taken, sooner or later an accidental chemical spill is likely to occur in your laboratory. A responsible science teacher will take steps to prevent spills, make sure proper safety equipment is available to contain and control a spill, and understand how to use the safety equipment.

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 help 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 a smooth 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 available. Mercon™ spill control spray, wipes, and sponges are available from Flinn Scientific and are ideal for cleaning up mercury 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.

To save money, a homemade spill control kit is easily prepared using three 5-gallon plastic buckets. Fill the first 5-gallon bucket with 30 pounds of clean, dry sand (available as play sand at a discount or hardware store). Fill a second 5-gallon bucket with a 20-lb bag of unodorized kitty litter or oil absorbent. Fill the last bucket with 30 lbs of sodium carbonate, anhydrous, also known as soda ash. Soda ash is available at industrial chemical, building supply, and swimming pool supply distributors. Label each bucket with the contents and cover the top with plastic wrap to keep the contents fresh and so the containers aren't used as garbage cans. Place a plastic broom, plastic dustpan, and several large heavy-duty plastic garbage bags near the spill control kit for cleanup and disposal.

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 eyewash or shower. If the chemical is splashed on your clothes, there may be time to first contain the spill with a fire blanket or spill control materials and then treat yourself. Remember, if a safety shower is used near a chemical spill, the water may expand the spill area and make the situation worst.
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. To contain a spill, gently pour sand or an absorbent material around the spill and onto the spill. Placing a fire blanket over the spill also works well. The object of this step is to prevent the spill from spreading, begin to absorb the

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liquid, and contain some of the vapors.

6. Neutralize the spill if necessary. Use a solid base such as sodium carbonate, sodium bicarbonate, or soda ash to neutralize an acid. Use citric acid powder to neutralize a base spill. The neutralizer needs to be mixed well with the sand and absorbent to come in contact will all the spilled material.
7. Clean up the spill. Use a plastic dustpan and plastic broom to sweep up the now solid mass and place it into large, heavy-duty garbage bags for disposal.
8. Dispose of contaminated materials properly.
9. Call in emergency personnel if at any time your safety or your students' safety is in jeopardy.

For more information on laboratory safety, chemical hazards, or the storage and disposal of chemicals, review a current edition of the *Flinn Scientific Catalog/Reference Manual*. For more information on spill prevention, please request Flinn *SafetyFax* #10311.

Materials for *Responding to Laboratory Chemical Spills* are available from Flinn Scientific, Inc.

Catalog No.	Description
SE102	E-Z Pour Spill Control Kit
SE103	E-Z Pour Acid Neutralizer, bottle
SE104	E-Z Pour Absorbent, bottle
SE105	E-Z Pour Sand, bottle
SE107	E-Z Pour Base Neutralizer, bottle
S0005	Sand, 25 lbs
SE101	Absorbent, Super Sorb®, 20 lbs
SE106	Neutralizer, 25 lb
AP1663	Polypropylene Broom
AP1662	Polypropylene Dustpan
SE121	Absorbent Chemical Pads
AP8771	Mercon™ Mercury Spill Control Kit
Z0005	Zinc Dust, 500 g

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.