

Mercury Awareness for School Teachers

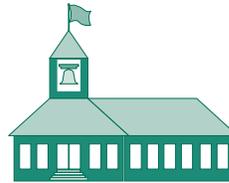
WHAT IS MERCURY?

Mercury is a silvery liquid metal at room temperature. Mercury conducts electricity, expands uniformly with temperature and easily forms alloys with other metals. For this reason, it is used in many products found in homes and schools. Mercury is also an element that occurs naturally in the earth's surface. It does not degrade and is not destroyed by combustion. Instead, mercury changes into a vapor that can travel long distances when volatilized. Mercury cycles between soils, the atmosphere and surface waters. Its toxicity can endanger living organisms and produce adverse health effects in humans. Organic mercury, especially methylmercury, can accumulate in tissue and increase its toxicity as it moves up the food chain.

WHY IS MERCURY A CONCERN?

There have been several incidents involving mercury spilled in schools, school buses or school property that cause alarm and require cleanup. Sometimes mercury comes from inside the school, and sometimes mercury is brought into the school from the community. Mercury that is spilled or spread through a school creates an immediate health issue, and may require expensive cleanup and monitoring.

Spilled mercury can evaporate at room temperature and easily be inhaled by the room occupants. Spilled mercury can spread long distances and settle in



cracks and porous materials like cloth, carpet or wood, slowly emitting vapors over a long period of time. Mercury vapors are colorless, odorless and tasteless. Short term exposure to a concentration of mercury or mercury vapors can lead to nausea, shortness of breath, bronchitis, migraine headaches, and fatigue. Long term exposure to mercury can result in damage to the nervous system, kidneys and liver; symptoms include shakiness, tremors, numbness in the fingers and toes, loss of muscle control, memory loss and kidney disease. Children, developing fetuses and women of childbearing age are the most at risk for mercury poisoning. Mercury should be handled carefully, especially around children.

Mercury is a concern in the environment. Improper disposal of mercury-containing products is one way that mercury is released into the air, land and water. Mercury easily enters its vapor form, and can travel long distances. Mercury that reaches lakes, rivers and streams can be converted into methylmercury by organisms in the water. Methylmercury builds up in wildlife tissue, especially in fish. As larger fish eat smaller fish, the mercury concentrates the farther it travels up the food chain. Methylmercury can move up the food chain and create a risk for human consumption of fish. There is a statewide fish advisory for mercury for children under the age of six, pregnant women and women of childbearing age. The fish advisory recommends that these people limit the amount of fish they eat from Ohio waters.



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For more information on the mercury in fish advisory check out Ohio EPA's Division of Surface Water Web page at www.epa.state.oh.us/dsw/fishadvisory/index.html.

It does not take a lot of mercury to have negative environmental consequences. Researchers estimate that if one gram of mercury—one-seventieth of a teaspoon—enters a 20-acre lake every year from the atmosphere, that amount is enough to raise the mercury levels in the fish. Methylmercury in large fish can be hundreds or thousands of times greater than levels in the surrounding water.

WHAT CAN SCHOOLS AND TEACHERS DO TO REDUCE THE PRESENCE OF MERCURY IN SCHOOLS?



- ✔ Help educate students, other teachers and administrators about the health hazards and environmental fate of mercury;
- ✔ promote proper management and recycling of mercury and mercury-containing products, and eliminate the use of mercury wherever possible at schools;
- ✔ prevent mercury spills and know what to do if a spill occurs;
- ✔ promote the use of alternative products that do not contain mercury; and
- ✔ promote energy efficiency.

LEARN MORE ABOUT MERCURY



Teachers can educate students about mercury by including it as part of their science lesson plans. There are several resources for teachers about mercury. One of the best resources is the Mercury in Schools Pollution Prevention project. It has created a Web site of resources located at www.mercuryinschools.uwex.edu. Ohio EPA can also answer questions about mercury including what products contain mercury, how to reduce its use and what to do in case of a spill. Ohio EPA has a mercury Web site at www.epa.state.oh.us/opp/mercury.

REDUCE THE USE OF MERCURY AND MERCURY-CONTAINING PRODUCTS

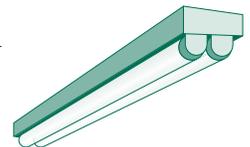
To reduce the presence of mercury in a school, you have to know where to find it. Interestingly, mercury can be found in a lot of places, some obvious and some you would not expect. You would expect to find mercury in science classrooms and the laboratory, but it also has a presence throughout the school, in the cafeteria and in the nurse's office. It may be worthwhile for schools to replace mercury-containing equipment or choose to purchase products that contain less mercury to reduce the long-term impact on the environment.

Pollution prevention examines the causes of waste and pollution to figure out the best way to reduce it. Pollution prevention avoids generating pollution at the source rather than trying to control it afterwards. This is also called "source reduction." Always reduce waste before recycling. Avoid products containing mercury if substitutes are available.

Classrooms, facilities and grounds

School classrooms and facilities may have mercury-containing thermostats, thermometers, barometers and silent wall switches. It is simple and economical to find mercury-free alternatives for these. Approximately 80 percent of thermostats currently in use contain mercury. Electronic devices are often excellent alternatives, though many digital devices may have mercury-containing batteries, so it is best to use devices that allow you to replace the batteries with batteries free of mercury.

The lamps in the gymnasium and parking lot are generally referred to as high intensity discharge (HID) lamps, and they contain mercury. Even fluorescent and neon lamps have some mercury. However, greater energy efficiency of fluorescent lamps reduces the amount of mercury discharged by power plants generating electricity. There are also low-mercury alternatives that contain less mercury than older lamps. Other items that contain mercury include



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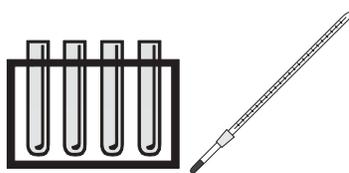
button cell batteries and old microwave ovens that could be in the school's cafeteria. Newer microwaves do not contain mercury. Batteries now contain much less mercury, but the mercury content is still worth considering. Button batteries may contain up to 25 milligrams of mercury per battery. Some lithium button batteries may be free of mercury. It is always best to send old lamps and batteries to a recycling facility.



The janitorial and grounds staff also need to be aware of the materials they are using. Old latex paint produced before 1992 may contain mercury to act as a fungicide. Pesticides produced before 1994 may also contain mercury. If old mercury-containing paints or pesticides are still at the school, dispose of them properly as hazardous waste. Newer paints and pesticides do not contain mercury.

Laboratories

Unlike other classrooms, laboratories may have a large number of thermometers, air pressure gauges, calomel electrodes, mercury compounds and elemental mercury for use by the students. Mercury may have been used historically in a school's laboratory, and the laboratory may still have containers of mercury or mercury compounds in storage.



There are several mercury-free thermometers available, including red alcohol and digital thermometers. Generally, alcohol or electronic thermometers are sufficiently accurate and readily available.

If mercury is used in experiments, often it is possible to use other chemicals to illustrate the same chemistry principles, or do microscale experiments to reduce the amount of materials necessary and reduce the need to have large quantities of mercury at the school. If mercury is used as part of the curriculum, make sure to have a mercury spill kit available.

Nurse's Office

The nurse's office may have the most elemental mercury in the school, including thermometers and blood pressure measuring devices. Blood pressure gauges or sphygmomanometers may contain several pounds of mercury. Aneroid blood pressure devices and digital thermometers are available, and are as accurate as mercury-containing ones.



There are also nasal sprays and contact lens solutions that contain thimerosal, phenylmercuric acetate or phenylmercuric nitrate. These compounds all have mercury in them, and have mercury-free alternatives.

ENERGY EFFICIENCY

Electricity generation is currently the largest source of mercury emissions in the United States. Practicing energy conservation by using energy efficient products and practices reduces the amount of mercury released by power plants and reduces the amounts of other pollutants released as well.



Energy efficiency also reduces carbon dioxide, sulphur oxides and nitrogen oxide releases, and makes good economic sense.

PROPER MANAGEMENT AND RETIREMENT OF MERCURY-CONTAINING DEVICES

Many mercury-containing products can be recycled. Mercury metal, thermostats, batteries, thermometers and fluorescent lights are some products that can be safely recycled. Mercury recycling companies are listed on Ohio EPA's Web page under the Office of Pollution Prevention at www.epa.state.oh.us/opp/recyc/mercrec.html. You may also contact the Bowling Green State University Mercury Collection Program at www.bgsu.edu/offices/envhs/mercury.htm to pick up your mercury or retired mercury-containing devices free of charge. The Bowling Green State University can make pick-ups

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throughout Ohio. If these products are not recycled, they may have to be disposed as hazardous waste. Other products such as older mercury-containing latex paints and pesticides also must be disposed as hazardous waste. Always properly dispose of mercury and mercury-containing products. Never pour mercury down a drain. Mercury may sit in pipes for a long time and continue to be a hazard.

Bowling Green State University
Mercury Collection Program
Bowling Green, Ohio 43403
(419) 372-2173; Fax (419) 372-2194

IN CASE OF A SPILL

By monitoring, properly maintaining mercury products and replacing them with mercury-free alternatives, the risk of a mercury spill is greatly reduced. If a spill does occur, it is important to have a plan to address it.

The safest and best way to clean up a mercury spill is by hiring a licensed professional contractor.



When mercury spills or an item containing mercury breaks, carefully evacuate the area around the spill and move students to a different room. Mercury and its vapors are very difficult to remove from items such as clothes, carpet, floors, walls, and furniture.

Keep everyone away from the area to prevent them from inhaling the mercury, since it can evaporate quickly. Never wear shoes or clothing that are contaminated with mercury, since it is absorbed in cloth and easily spread from one place to another. If possible, open windows to ventilate the spill area to the outdoors. Close the doors and place signs prohibiting entry on the entrances to the impacted rooms. Contact the school maintenance personnel to turn off heating, air-conditioning systems and fans. This will help avoid circulating contaminated air to other rooms. **NEVER clean up a spill with a vacuum cleaner.** This contaminates the vacuum and circulates some mercury into the air. Do not use brooms or paintbrushes to clean up, since mercury will disperse into smaller beads and be harder to collect.

The Ohio Department of Health has a fact sheet on what to do if mercury spills at school. The Web page is located at www.epa.state.oh.us/opp/merc_school_FS.html.

For more information on what to do if a mercury spill occurs contact:

Your local fire department
phone # _____
or
Ohio EPA Spill Hotline
(800) 282-9378

www.epa.state.oh.us/opp

The Office of Pollution Prevention was created to encourage multi-media pollution prevention activities in Ohio to reduce risk to public health, safety, welfare and the environment. Pollution prevention stresses source reduction and, as a second choice, environmentally sound recycling while avoiding cross media transfers. The office develops information related to pollution prevention, increases awareness of pollution prevention opportunities, and can offer technical assistance to business, government, and the public.



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