NatureBridge
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# The Problem with Mercury


## A God, a Planet, and a Metal

The word mercury has several meanings. In ancient Rome, Mercury was the name of a god that could run as fast as the wind. In our solar system, Mercury is a small, fast-moving planet that is closest to the sun. Mercury is also the name for a metal, or an element or chemical found in the Earth's crust. It usually comes from the mineral or rock called cinnabar. When heated at high temperatures, mercury is removed or extracted from cinnabar.

## Quicksilver

Mercury is the only metal on earth that is liquid at room temperature. Since mercury looks like shiny liquid silver, it is sometimes called quicksilver. Mercury is used for many different things around the world. It is used to mine or extract gold from ore, which is rock that contains metals like gold. Mercury is also used to make or manufacture different things like computer monitors, fluorescent lights, and dental fillings. Because mercury expands or gets bigger when heated, it is sometimes used in thermometers. As the temperature rises, so does the mercury.

## Mad as a Hatter

Mercury is a very poisonous substance. In fact, mercury is one of the most deadly poisons on Earth. Inhaling mercury vapors or gases, and eating, or ingesting, mercury can be very dangerous and even deadly. In the 1800's, mercury was used to manufacture felt hats in England and the Eastern United States. Many of the factory workers inhaled mercury fumes. It damaged their brains and they became brain damaged or "mad." The term "mad as a hatter" comes from the hat makers that got brain damage from using mercury to make all those hats!

## Mercury in our Environment

Even though mercury exists naturally in the Earth's crust and is sometimes put into the air when volcanoes erupt, the largest cause of mercury pollution is the burning of fossil fuels like coal. When coal is burned to fuel factories and power plants, mercury gets released into the air as air pollution. When mercury pollutes the land or air, rain eventually washes it into streams, lakes, rivers and oceans, where it eventually enters the food chain.

## Mercury in our Food

The food chain is the natural order of how living things or organisms get food. The food chain shows how some animals eat plants and other animals to survive. For example, in the San Francisco Bay, one food chain begins with a tiny organism called plankton. Plankton live in the bay and are eaten by many different underwater animals like minnows, which are baby fish of any kind. The minnows that eat plankton are then eaten by larger fish, such as perch or striped bass. These large fish are then eaten by even larger fish like sharks. If plankton get contaminated, or polluted, with mercury, the contamination will spread to the minnows that eat the plankton. Then the contamination will spread to the larger fish that eat the minnows, and finally, it will spread to the largest fish that eat them.



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When contamination moves up the food chain like this, the process is called biological magnification. In this example, by the time mercury has moved up the food chain, from the plankton eventually to the shark, it has become very concentrated, or magnified, in the shark's body.

## Mercury Magnified

When mercury moves up the food chain it gathers in the bodies of the fish and animals that have been contaminated. Because human beings eat fish, many of us become contaminated with mercury too. In fact, the most famous case of mercury poisoning occurred during the 1950s and 1960s in Minamata, Japan. Thousands of people became severely poisoned with mercury after eating contaminated fish out of the Minamata Bay. A nearby chemical factory had been discharging or dumping mercury into the bay for over thirty years and it contaminated the fish that lived there. Local villagers ate fish from the bay, and their bodies absorbed the mercury in the fish, which made them very sick. Over the years more than a thousand people died from mercury poisoning, and thousands of others got sick or were born with birth defects.

## Mercury in the San Francisco Bay

Although not as contaminated as the Minimata Bay in Japan, the San Francisco Bay is also contaminated with mercury. Gold miners in the 1800's used mercury when they mined for gold in the Sierra Mountain foothills. Much of this mercury came from a local mine in San Jose! A lot of mercury from the goldmines and from the mercury mine was washed down hillsides into streams, rivers and eventually into the San Francisco Bay. Mercury from these old mines is the biggest cause of mercury pollution in the bay today. Because of this, fish that live in the San Francisco Bay are contaminated with mercury and scientists warn us (especially children and pregnant women) not to eat them. The safest fish to eat out of the bay are migrating fish, or fish that travel long distances from one place to another. Migrating fish in the San Francisco Bay include wild salmon and herring.

## Protecting our Health

There are many things we can do to help protect our health from the dangers of mercury. We can reduce, or eat less, fish that commonly contain a lot of mercury. These fish include: tuna, mackerel, shark, marlin, and swordfish. Instead of eating tuna sandwiches several days a week, only eat them once a month. Choose other foods to eat that are tasty and nutritious, especially foods that are lower on the food chain like fruits, vegetables, grains, nuts and legumes or beans. For example, a peanut butter and banana sandwich is made with fruit, grains and legumes!

## Keeping it Safe

We should never play with mercury or use it for certain hobbies. We can also stop using mercury thermometers and use digital ones instead. If a mercury thermometer breaks, leave the area and tell your parents to visit www.noharm.org/details.cfm?type=document&id=309 so they can learn how to clean it up as safely as possible.

## National Science Standards Addressed:

Grades 5-8: Characteristic properties (8BPS1.1)
Energy transfer, food webs (8CLS4.3)
Causes of environmental degradation and resource depletion vary (8FSPSP2.3)
Environments may contain substances that are harmful to human beings (8FSPSP1.7)
Natural hazards (8FSPSP3)

Grades K-4: Materials and their properties (4BPS1.2)
Types of resources (4FSPSP3)
Humans and the environment (4CLS3.4)
Abilities to distinguish between natural objects and objects made by humans (4EST3)
Different substances can damage the body and how it functions (4FSPSP1.4