

Mercury and Minamata mystery

Worksheet 1 Teacher's notes

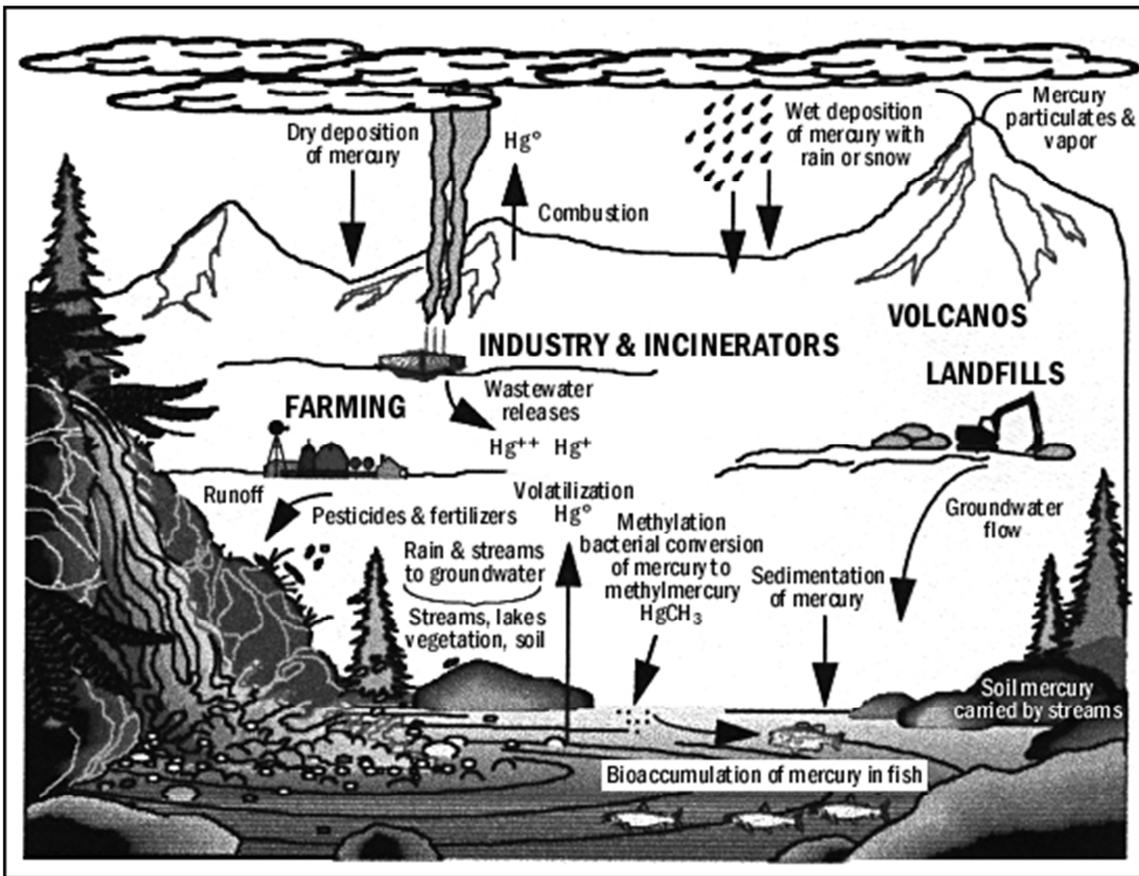
1. In pairs go online and find answers to the questions about mercury:

- What is 80Hg? What do they symbolize? *Mercury is a chemical element with the symbol Hg and atomic number 80.*
- What are other two names for mercury? *It is commonly known as quicksilver and was formerly named hydrargyrum (from Greek "hydr-" water and "argyros" silver).*
- What element category is mercury? *metal*
- What is the standard physical state of mercury? *liquid*
- Where is mercury used? *Mercury is used in thermometers, barometers, manometers, sphygmomanometers, float valves, mercury switches, mercury relays, fluorescent lamps and other devices, though concerns about the element's toxicity have led to mercury thermometers and sphygmomanometers being largely phased out. It is used in lighting: electricity passed through mercury vapour in a fluorescent lamp produces short-wave ultraviolet light which then causes the phosphor in the tube to fluoresce, making visible light.*
- Does mercury occur naturally in the environment? *Mercury is a naturally occurring metal found throughout the environment. Mercury enters the environment as the result of the normal breakdown of minerals in rocks and soil from exposure to wind and water, and from volcanic activity.*
- Why is mercury dangerous to humans? *Mercury and most of its compounds are extremely toxic and must be handled with care; in cases of spills involving mercury (such as from certain thermometers or fluorescent light bulbs), specific cleaning procedures are used to avoid exposure and contain the spill Mercury can be absorbed through the skin and mucous membranes and mercury vapors can be inhaled, so containers of mercury are securely sealed to avoid spills and evaporation.*

2. "Approximately 80% of the mercury released from human activities is elemental mercury released to the air, primarily from fossil fuel combustion, mining, and smelting, and from solid waste incineration. About 15% of the total is released to the soil from fertilizers, fungicides, and municipal solid waste (for example, from waste that contains discarded batteries, electrical switches, or thermometers). An additional 5% is released from industrial wastewater to water in the environment."

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Look at the diagram and read about mercury pollution. What is the process of mercury accumulation in fish ?

students' own answers analyzing the circuit

Go to <http://thefisheriesblog.blogspot.com/2012/10/mercury-in-fish-what-should-i-eat.html> and check which fish is safe to eat and which to avoid.

3. Mercury poisoning is very dangerous and the symptoms may include heart problems, skin allergies, nervous disorders among many. Go online and read about one of the greatest environmental disasters and the Minamata Disease.

- Where did the disaster happen? 1950s
- When was that? Japan
- How did it start ? symptoms first occurred in cats, then people
- What were the symptoms? People would stumble while walking, not be able to write or button their buttons, have trouble hearing or swallowing, or tremble uncontrollably. The physiological effects, including successive loss of motor control, were devastating, and resulted in sometimes partly paralyzed and contorted bodies.
- How many people were affected by the incident? 1,760 victims have been verified; almost 3,000 more await verification--of whom 412 have already died. Over 8,000 have been denied status. No one can be sure of the extent of the damage, but one neuropsychiatrist at a local university estimates that 10,000 victims exist currently and that at least 3,000 have died.

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- What was the cause of the Minamata disease? *mercury poisoning, Minamata is located on the coast of Japan's westernmost island. The city and the adjacent Minamata Bay form a relatively closed ecosystem: the bay was a source of fish--and almost the city's exclusive source of protein--until the mid-1950s.*

suggested pages:

<http://www1.umn.edu/ships/ethics/minamata.htm>

<http://www.einap.org/envdis/Minamata.html>

[http://en.wikipedia.org/wiki/Mercury_\(element\)#Toxicity_and_safety](http://en.wikipedia.org/wiki/Mercury_(element)#Toxicity_and_safety)

<http://www.eoearth.org/view/article/154567/>

<http://www.epa.gov/hg/about.htm>