don't mess with MERCURY

LESSON PLAN A
Teacher-led Learning with Student Public Service Announcements

Overview of Lesson Plan A (Grades 6–8)

Teachers, ATSDR's Don't Mess With Mercury website is 508 compliant and available in English & Spanish.

This lesson introduces students to the properties of mercury and the possible health hazards of exposure to mercury. In addition, it introduces students to a scientific career as a health educator. It is based on Next Generation Science Standard (MS-PS1-3) and Common Core Language Arts Standards (RST.6-8.1, WHST.6-8.8, RST.6-8.9, RST.6-8.10, SL.6-8.4, and SL.6-8.5) for grades 6–8. Following an introduction to elemental mercury, students begin with Part 1, in which they learn about public service announcements (PSAs) that promote health and safety. Then, individually or in groups of up to four, they proceed to Part 2, in which they create public service announcements using print and on-line resources. This lesson is designed for two to three class periods.

We recommend that teachers familiarize their students with the following concepts prior to using this lesson plan:

- Periodic Table of Elements, including classes of elements (e.g., metals, nonmetals, etc.)
- Physical properties of matter

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ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Learning Objectives

Students will be able to

1. Describe characteristics (physical properties) of elemental mercury.
2. Explain health effects of exposure to elemental mercury.
3. Identify objects that may contain elemental mercury.
4. Explain what to do if they find mercury.
5. Use evidence from various resources to communicate about mercury exposure.

Materials

1. Audiovisual equipment to play Internet-based public service announcement for class
2. Computers with Internet access to on-line resources. If computers are not available in the classroom, consider reserving computers in the library/computer lab.
3. Double-sided copies of Student Handouts (pages 7–15), one grading rubric and project specific handout per student
4. Materials for making posters and brochures
5. If available, books about mercury (see page 21 for suggestions)

Optional: Obtain recording devices to record audio PSAs

Preparation

1. Reserve library books about mercury.
2. Print double-sided copies of Student Handouts, (pages 7–15) one set per student. Be sure to modify the grading rubric to your preferences prior to printing.
3. Print copies of Mercury Stories handouts (pages 16–19), for students so that each student group has a different story.
4. Print one copy of lesson plan for yourself.
5. Set up audiovisual equipment in order to play online PSAs about mercury.
6. Divide students into groups of up to four (moving desks is optional).
7. Write/project warm-up questions, on chalkboard or screen.

Recommended: To save time, open Don't Mess With Mercury—For Students webpage on available computer(s) prior to students' arrival. (www.atsdr.cdc.gov/dontmesswithmercury/students.html)

Optional:

1. Print 1 copy of Teacher's Supplementary Sheet (pages 20–21) to have handy.
2. Talk to school leadership about sharing students' public service announcements during school assembly and/or over intercom.
3. Invite guests who may encounter mercury to attend student presentations (e.g., school janitors, science department safety specialist, other teachers and students).
4. If necessary, obtain permission to post student work throughout the school to educate student body.

Teacher's Guide—Lesson Plan A

Lesson Componenets

1. Warm Up—15 minutes
2. Mercury Stories handouts—25 minutes
3. Part 1—Introduction to Public Service Announcements (PSAs)—10 minutes
4. Part 2—Students Develop PSAs—1.5 class periods (at least)
5. Part 3—Exit Poll—5 minutes
6. Part 4—Share PSAs

Warm Up *(15 minutes)*

Display the warm-up questions for all to see.

Read the warm-up questions aloud and ask students to discuss answers with their neighbors and write them down.

When students are done with the three questions, let volunteers share answers for each question and provide the correct answers.

Tell students:

We are going to learn about a very interesting element, mercury. Mercury is a very toxic metal that is liquid at room temperature. Toxic means that it is harmful to our health. You might be wondering:

- *What does it look like?*
- *Where is it?*
- *How is it toxic?*
- *What should I do if I ever find it?*

You'll find out all the answers to these questions and more as we study about mercury.

Warm Up Questions

1. **What is an element?**
   (Answer: A chemical substance made of only one kind of atom; a chemical in its purest form)
2. **What are the three main classes of elements on the Periodic Table?**
   (Answer: Metals, metalloids, and non-metals)
3. **List five physical properties you could use to describe an element:**

(Answer: color, ability to conduct electricity, state of matter at room temperature, density, luster, malleability, hardness, boiling point, melting point, etc.)

Mercury Stories *(25 minutes; Distribute Mercury Stories handouts, one set per group)*

A. Reading stories in groups and sharing.

Tell students:

Here are some interesting stories about what happened at different schools throughout the United States when students were exposed to mercury. When we say someone was "exposed", or "had an exposure" to a hazardous chemical we mean that their body came into contact with it by touching, swallowing, or inhaling it. Take a few minutes to read these stories. Each group has a different story. Once you are finished reading, write down some of your thoughts.

What did you find surprising or interesting?

Once all students seem to have finished reading and writing some thoughts, ask students to share their thoughts with their group.

B. Ask one person from each group to summarize the story for the rest of the class. Allow all groups to share major events of their stories and what they found interesting.

Part 1—Introduction to PSAs *(10 minutes; use on-line public service announcements)*

Tell students:

As you can see from these stories, being exposed to mercury can be a serious problem.

- *Because mercury is so toxic to living things, even a tiny amount can be poisonous.*
- *Exposure to mercury can happen from touching it, inhaling it, or swallowing it.*
- *Liquid mercury gives off invisible and odorless vapor. People around it may be breathing it in and may not even realize it.*

One of the ways to educate people about mercury exposure is to use public service announcements, commonly referred to as PSAs. Public service announcements are advertisements. Instead of promoting a product for sale, they deliver educational messages. These messages can be presented on the radio or TV, announced at events, or printed in materials like newspapers or magazines.

- *Raise your hand if you have watched, seen, or heard a commercial about how smoking is bad for your health.*
- *How about if you have watched, seen, or heard a message about wearing seatbelts?*
- *Making an emergency plan for your family in case there is a natural disaster?*
- *Can anyone think of others? (e.g., hazards of drinking and driving, texting and driving)*

We are now going to watch public service announcements about mercury.

Play:

1. ATSDR's Don't Mess with Mercury PSA: http://www.atsdr.cdc.gov/dontmesswithmercury/students.html and ask volunteers for feedback:

   Raise your hand to share with the class how this PSA was educational. In other words, what could someone who doesn't know about mercury learn from watching this video?

   A PSA is more effective if it is appropriate for its audience. For which age group is this PSA targeted?

2. Ohio EPA's PSA about mercury vapors http://www.youtube.com/watch?v=tpqP3ReC1cQ and have students volunteer feedback:

   What does this PSA teach you about mercury vapors?

Tell students:

Throughout history, advances in science and technology have revealed different uses for mercury. Scientific research has also discovered the dangers of exposure to mercury. Not everyone knows about health hazards, so health educators must teach the public how to be safe and healthy.

To learn about mercury, you will do some research about where it could be found and what to do if you encounter it. Then, you will become a health educator and design your own PSAs.

Part 2—Students Develop PSAs *(at least 1.5 class periods)*

Tell students:

You may work individually or in groups of up to four to develop your own public service announcement about mercury. You may wish to create a skit, a poster, or a radio announcement. If you don't want to create a PSA, you can work by yourself and write an article that could be published in a newspaper.

I will provide you with resources to learn more about mercury. You can use books, selected websites, and other printed material.

Teacher should:

- Help students get into their groups and distribute project-specific handouts (skit, poster, radio announcement and newspaper article). Assign groups if necessary.
- Show all students how/where to find additional resources: Internet, books, pamphlets, etc.
- Once students are ready to begin working, inform them about citing information.

Tell students:

As you find useful information about mercury for your project, keep track of your sources, or where you got the information. The Project Submission Form has instructions on how to make a list of the sources you used for the Works Cited Page. Why might someone want to know where you got your information?

(Appropriate responses may include the audience wanting to find more information about mercury or determine if the sources are reliable.) Consider explaining what a reliable source is.

Part 3—Exit Poll *(5 minutes)*

Read these questions aloud. Students should raise their hands to vote for what they think is the correct answer. If you suspect that students may not answer honestly, consider asking them to put their heads down while voting. After voting, provide students with correct answers (in **bold** text).

Tell students:

Let's take a quick poll to see what you have learned about mercury. On your own, answer the following questions, which I will read aloud. After you listen to all the answers, write the letter corresponding to your answer in the Exit Poll section of your Grading Rubric. Once everyone answers all the questions, raise your hand when I say the letter that corresponds with your answer. The Exit Poll is not graded, so please answer honestly.

1. At room temperature, mercury is not a
   - **a. solid** *(correct)*
   - b. liquid
   - c. gas
2. Inhaling mercury can lead to
   - a. trembling
   - b. mood changes
   - c. memory loss
   - **d. all of these** *(correct)*

3. Which of the following objects could contain mercury?
   a. thermostat
   b. certain light bulbs
   c. a thermometer
   d. all of them *(correct)*

2. If you find mercury, you should
   a. play with it and show it to your friends. This could be fun!
   b. pour it down the drain if it gets messy. Better clean it up before somebody else finds it!
   c. leave the room and tell an adult right away. This could be bad! *(correct)*
   d. smell it to see if it has an interesting odor.

Part 4—Share PSAs *(time will vary)*

Allow students to share their presentations with the class (and invited guests).

SKIT

Project Submission Form—Side A

Instructions

Your group has decided to do a skit to educate your peers about the dangers of mercury exposure.

Names of group members: _____

_____

Your skit should teach your audience answers to the following four questions:

1. What are the characteristics (physical properties) of elemental mercury?
2. How can exposure to mercury affect the human body?
3. Which objects might contain mercury?
4. What should a student do if s/he finds mercury?

Step 1: Background Research

Your group will need two separate sheets of paper.

- One should be used as your "Answer Sheet" to write down the answers to the four questions above.
- The second sheet is your "Works Cited" page—a list that includes every source of information you used to answer these questions.

Use available **Internet** and **print** resources (like books and pamphlets).

Here is the format for listing sources on your Works Cited page:

For books or other printed resources:
Author(s). "Title of Article or Chapter". Publication Title. Date published. pages #–#

For websites:
Author(s). "Website Title". Date published or updated. www.websitelink.com

For photos:
Photographer's Name. www.websitelink.com

Authors or photographers name should be listed as last name, first initial. If there are multiple authors, separate each individual by a comma, e.g., Doe A., Ray B., and Mei C.

If no author is listed, you can use an organization's name instead, e.g., National Institutes of Health.

If you cannot find one of the components mentioned in the format above, just skip that part and provide the information that is available.

Where can you find reliable information about mercury for your presentation?

- Websites:
  - » Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury Website—For Students: http://www.atsdr.cdc.gov/dontmesswithmercury/students.html
  - » Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury—Videos https://www.atsdr.cdc.gov/dontmesswithmercury/videos.html
  - »"Mercury" by National Institutes of Health: https://kids.niehs.nih.gov/topics/pollution/mercury/index.htm
  - » US EPA's Mercury page: http://www.epa.gov/mercury/index.html
  - » Mercury in Schools Case Studies: https://www.epa.gov/schools/case-studies-about-mercury-cleanups-schools

You may also want to consult library books on mercury.

Step 2: Write the script

On a new sheet of paper, write what each actor will say. The skit should take three to four minutes to perform. If you need help, ask your teacher. Assign roles to group members and practice your skit.

Completion: Your group should turn in one package containing one copy of each of the following:

- **Project Submission Form**
- **Answer Sheet**
- **"Works Cited" page**
- **Script**
- **Each member's grading rubric**

POSTER

Project Submission Form —Side A

Instructions

Your group has decided to design a poster to educate your peers about the dangers of mercury exposure.

Names of group members: _____

_____

Your poster should teach your audience answers to the following four questions:

1. What are the characteristics (physical properties) of elemental mercury?
2. How can exposure to mercury affect the human body?
3. Which objects might contain mercury?
4. What should a student do if s/he finds mercury?

Step 1: Background Research

Your group will need two separate sheets of paper.

- One should be used as your "Answer Sheet" to write down the answers to the four questions above.
- The second sheet is your "Works Cited" page—a list that includes every source of information you used to answer these questions.

Use available Internet and print resources (like books and pamphlets).

Here the format for listing sources on your Works Cited page:

For books or other printed resources:
Author(s). "Title of Article or Chapter". Publication Title. Date published. pages #–#

For websites:
Author(s). "Website Title". Date published or updated. www.websitelink.com

For photos:
Photographer's Name. www.websitelink.com

Authors or photographers name should be listed as last name, first initial. If there are multiple authors, separate each individual by a comma, e.g., Doe A., Ray B., and Mei C.

If no author is listed, you can use an organization's name instead, e.g., National Institutes of Health.

If you cannot find one of the components in the format mentioned above, just skip that part and provide the information that is available.

Where can you find reliable information about mercury for your presentation?

- Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury Website—For Students: http://www.atsdr.cdc.gov/dontmesswithmercury/students.html
- Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury—Videos https://www.atsdr.cdc.gov/dontmesswithmercury/videos.html
- "Mercury" by National Institutes of Health: https://kids.niehs.nih.gov/topics/pollution/mercury/index.htm
- US EPA's Mercury Page: http://www.epa.gov/mercury/index.html
- Mercury in Schools Case Studies: https://www.epa.gov/schools/case-studies-about-mercury-cleanups-schools

You may also want to consult library books on mercury.

Step 2: Design the poster

Think carefully about the messages and images that will best deliver the answers to the four questions above. Design your poster to present that information along with other information that may help protect people's health

Completion: Your group should turn in one package containing one copy of each of the following:

- **Project Submission Form**
- **Answer Sheet**
- **"Works Cited" page**
- **Poster**
- **Each member's grading rubric**

NEWSPAPER ARTICLE

Project Submission Form—Side A

Instructions

You have decided to write a newspaper article to educate your peers about the dangers of mercury exposure. You are going to work on this alone.

Your name: _____

Your article should teach your audience answers to the following four questions:

1. What are the characteristics (physical properties) of elemental mercury?
2. How can exposure to mercury affect the human body?
3. Which objects might contain mercury?
4. What should a student do if s/he finds mercury?

Step 1: Background Research

You will need two separate sheets of paper.

- One should be used as your "Answer Sheet" to write down the answers to the four questions above.
- The second sheet is your "Works Cited" page—a list that includes every source of information you used to answer these questions.

Use available Internet and print resources (like books and pamphlets).

Here the format for listing sources on your Works Cited page:

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For websites:
Author(s). "Website Title". Date published or updated. www.websitelink.com

For photos:
Photographer's Name. www.websitelink.com

Authors or photographers name should be listed as last name, first initial. If there are multiple authors, separate each individual by a comma, e.g., Doe A., Ray B., and Mei C.

If no author is listed, you can use an organization's name instead, e.g., National Institutes of Health.

If you cannot find one of the components in the format mentioned above, just skip that part and provide the information that is available.

Where can you find reliable information about mercury for your presentation?

- Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury Website—For Students: http://www.atsdr.cdc.gov/dontmesswithmercury/students.html
- Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury—Videos https://www.atsdr.cdc.gov/dontmesswithmercury/videos.html
- "Mercury" by National Institutes of Health: https://kids.niehs.nih.gov/topics/pollution/mercury/index.htm
- US EPA's Mercury Page: http://www.epa.gov/mercury/index.html
- Mercury in Schools Case Studies: https://www.epa.gov/schools/case-studies-about-mercury-cleanups-schools

You may also want to consult library books on mercury.

Step 2: Draft your article

Provide your readers the answers to the questions above, along with other health-promoting information. Make your story interesting and use one or two pictures.

Completion: You should turn in one package containing one copy of each of the following:

- **Project Submission Form**
- **Answer Sheet**
- **"Works Cited" page**
- **Newspaper article**
- **Grading rubric**

Find out if you can get your article published in the school newspaper!

RADIO ANNOUNCEMENT

Project Submission Form—Side A

Instructions

You have decided to create a radio announcement to educate your peers about the dangers of mercury exposure.

Names of group members: _____

_____

Your announcement should teach your audience answers to the following four questions:

1. What are the characteristics (physical properties) of elemental mercury?
2. How can exposure to mercury affect the human body?
3. Which objects might contain mercury?
4. What should a student do if s/he finds mercury?

Step 1: Background Research

You will need two separate sheets of paper.

- One should be used as your "Answer Sheet" to write down the answers to the four questions above.
- The second sheet is your "Works Cited" page—a list that includes every source of information you used to answer these questions.

Use available Internet and print resources (like books and pamphlets).

Here the format for listing sources on your Works Cited page:

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For websites:

Author(s). "Website Title". Date published or updated. www.websitelink.com

For photos:

Photographer's Name. www.websitelink.com

Authors or photographers name should be listed as last name, first initial. If there are multiple authors, separate each individual by a comma, e.g., Doe A., Ray B., and Mei C.

If no author is listed, you can use an organization's name instead, e.g., National Institutes of Health.

If you cannot find one of the components in the format mentioned above, just skip that part and provide the information that is available.

Where can you find reliable information about mercury for your presentation?

- Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury Website—For Students: http://www.atsdr.cdc.gov/dontmesswithmercury/students.html
- Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury—Videos https://www.atsdr.cdc.gov/dontmesswithmercury/videos.html
- "Mercury" by National Institutes of Health: https://kids.niehs.nih.gov/topics/pollution/mercury/index.htm
- US EPA's Mercury Page: http://www.epa.gov/mercury/index.html
- Mercury in Schools Case Studies: https://www.epa.gov/schools/case-studies-about-mercury-cleanups-schools

You may also want to consult library books on mercury.

Step 2: Write the script

On a new sheet of paper, write what each actor will say. The radio PSA should take 1 to 2 minutes to perform. If you need help, ask your teacher. Assign roles to group members and practice your radio PSA.

Completion: Your group should turn in one package containing one copy of each of the following:

- **Project Submission Form**
- **Answer Sheet**
- **"Works Cited" page**
- **Script**
- **Each member's grading rubric**

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STUDENT HANDOUT

PART 2
Grading Rubric

Name: _____ Class period: _____ Date: _____

Questions	Points Possible	What I think I earned (manual input)	Points Earned (manual input)
Question 1: What are the characteristics (physical properties) of elemental mercury? • Provided 4 physical properties of mercury (1 point each)	**4**		
Question 2: How can exposure to mercury affect the human body? • Provided 5 health effects of exposure to mercury (1 point each)	**5**		
Question 3: Which objects might contain mercury? • Listed 3 objects that contain elemental mercury (1 point each)	**3**		
Question 4: What should a student do if s/he finds mercury? • Correctly explained what students do if they find mercury (2 points)	**2**		
Works cited • Listed at least 4 sources (1 point each) • Used the correct format (1 point)	**5**		
Quality of work • Neat in appearance (3 point) • Clearly written & used helpful pictures (if newspaper article or poster) (3 points)	**6**		
Classroom Presentation • Spoke audibly and clearly (3 points) • Spoke with enthusiasm (2 points)	**5**		
	Final Grade		

Exit Poll

My answers:

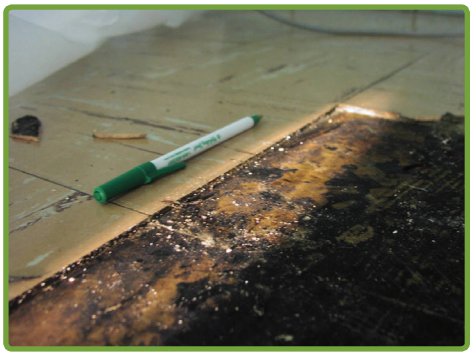
1. _____ 2. _____ 3. _____ 4. _____

MERCURY STORIES
Ballou High School, Washington DC

On October 2, 2003, Washington, D.C.'s Fire Department responded to an emergency call unlike any call Ballou High School had ever made. What the D.C. Fire Department found that afternoon was a mercury spill that had spread around the school. This discovery began a long, exhausting search for all the mercury and then a difficult clean-up process.

A student had obtained 250 milliliters (a little more than a cup full) of liquid elemental mercury from a science laboratory and had sold some of it to other students. Students had to be dismissed early. By the time the D.C. Fire Department and the D.C. public health officials arrived, it was too late to prevent the mercury from spreading. Varying amounts of mercury were found in the classrooms, gymnasium, and cafeteria. The U. S. Environmental Protection Agency (EPA) responded by setting up a mobile command post; measuring mercury vapors in the air; and mapping mercury spills in the science laboratory, cafeteria, gym, and administration areas.

Contamination did not stop at the school. Students unknowingly carried mercury on contaminated shoes and clothing through the streets, onto city and school buses, and into their homes. EPA helped test over 200 homes for mercury contamination and found that 11 were contaminated. About 16 families had to move out of their homes for a month.



Top image: Even a small amount of mercury can contaminate a large area.

Bottom Image: Small mercury beads have made their way underneath floor tiles.

Because of the spill, Ballou High School was closed for 35 days. However, school was not interrupted. Students were bussed to attend classes at an alternative location, the D.C. Convention Center, where conditions were challenging.

Total cleanup costs were about $1,500,000.

Adapted from source: U.S. EPA "Mercury on Schools Case Studies" March 10, 2014
https://www.epa.gov/schools/case-studies-about-mercury-cleanups-schools

MERCURY STORIES

Teen and Dog Sick After Mercury Exposure

(Jan. 12, 2004)—A teenage boy and his dog are suffering from a rare case of mercury poisoning. The 17-year-old had been playing with the toxic liquid metal for months. Now the home he lives in has been sealed off by the US Environmental Protection Agency (EPA).

EPA workers clean-up the family's home and family dog, Snowball.

EPA workers have been at the home since Sunday decontaminating the scene. The metal belonged to the boy's uncle who used to work at a mine. Reportedly, the teen was rummaging through his uncle's things and took it. "I didn't even know what it was, I thought it was silver paint," said the boy's aunt.

Now the house is sealed off and only EPA workers in protective suits are allowed on the property. "Outside, we did see visible mercury in the cracks on the sidewalk around the pool and its silver liquid in droplets all around. It looks like tinsel, shiny and strange looking," said Harry Allen, EPA.

Mercury is a liquid that turns to vapor when exposed to room temperature. It is invisible and can be extremely dangerous. EPA found that the amount of mercury vapor measured in the air was 10 to 100 times what is considered safe for a home.

Snowball, the family's dog, was exposed to the mercury and is sick. "Snowball actually has mercury in her fur, so our goal right now is to remove [shave] all her fur," said Jake Moersen, EPA. Snowball is being treated by a veterinarian.

The teen lost feeling in his hands, was unable to run, and had sky-rocketing blood pressure. He has been out of school for the past two months. He's now at the hospital in the Intensive Care Unit. "He just sounds scared. I don't blame him, I'm scared," the boy's aunt said.

EPA workers say neighbors are not at risk because mercury levels have only been found in the home.

Health workers want to remind parents and children that the liquid is dangerous. Children have been known to break open thermometers and play with mercury. If you find any in your house, health workers say you shouldn't touch it and should call the health or fire department immediately.

Adapted from source: Janine Gill. KLAS-TV Las Vegas. Jan 12, 2004.
https://www.epa.gov/schools/case-studies-about-mercury-cleanups-schools
Photo from: http://www.epa.gov/mercury/casestudies.htm#3

MERCURY STORIES

Student in Odessa takes mercury to school

LUBBOCK—Classes were canceled at a West Texas school and at least 60 people were taken to hospitals to be examined after being exposed to mercury when a student brought in about an ounce of the toxic element.

Nobody was injured in Tuesday's incident at John B. Hood Junior High School in Odessa, Ector County, a school district spokesman said Wednesday. School was closed Tuesday afternoon and Wednesday for air quality tests.

Mercury is a naturally occurring element that is most dangerous when heated because vapors can be inhaled.

Twenty students handled or touched the silver liquid on tables in the cafeteria and in two classrooms, and about 40 other students and teachers could have gotten secondary exposure by being nearby. The group of students and teachers were isolated, and they showered before being taken to two area hospitals.

Mercury separates into beads as it spills out of a jar.

"We wanted to make sure any students and staff who were close by were OK," the school spokesman said of the 60 people whom doctors cleared of contamination. "There's just no way to tell how long they were exposed to it."

The boy who brought the mercury to school could face disciplinary action. The student told administrators he found the mercury in a plastic bottle in an alley on the way to school. It was not clear Wednesday whether the boy knew what the substance he found was.

Once the mercury was discovered by school officials, all the students contacted their parents.

"Parents were very concerned," the school spokesman said.

School officials and investigators with the district's police department are investigating.

Adapted from source: The Associated Press. March 19, 2014.
http://amarillo.com/news/latest-news/2014-03-19/student-odessa-takes-mercury-school

MERCURY STORIES

Clean up in Detroit, MI gone wrong

DETROIT (WJBK)—March 4, 2014

A woman says some mercury spilled in her home last year, and it was cleaned up by professionals who used her vacuum.* Now her son has mercury poisoning and she has learned that the spill was not handled properly.

The woman says the spill happened in November 2013 after her younger son found mercury in an old garage. He accidentally spilled some in his older brother's room and also took it to school in a plastic bag to show a science teacher.

Officials say the school was put on lockdown and chemical clean-up specialists, police, and the fire department were called. After officials determined that no one had come into contact with mercury, the lockdown was lifted and the clean-up specialists went to the woman's home.

*An ordinary home vacuum cleaner should NEVER be used to clean-up mercury.

"They came in. They had just the blue gloves…and they tried to clean it up with tape and little pieces of cardboard, and then they asked me did I have a vacuum. I said yes. They used my vacuum and vacuumed it up and told me it was clear," the woman tells FOX 2.

The homeowner says she thought the mercury was gone. Then her 17-year-old son became extremely ill a month later. "Body aching and nerves, like, my body was twitching, and I was sweating," the teen remembers. He also experienced burns and vision loss. He was rushed to the hospital and diagnosed in January with mercury poisoning.

The woman says that the US Environmental Protection Agency (EPA) and Health Department cleaned and stripped her home. The teen says he is finally starting to feel better.

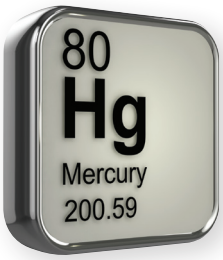
The EPA says exposures to mercury can affect the human nervous system and harm the brain, heart, kidneys, and lungs. Common symptoms, or signs, of mercury poisoning include a burning feeling, itching, and pain. You may also notice abnormal changes in skin coloration in your cheeks, fingertips, and toes. Your skin could even start peeling.

Other symptoms include swelling, profuse sweating, and high blood pressure.

Adapted from source: WJBK. March 4, 2014.

TEACHER'S SUPPLEMENTAL INFORMATION

for Don't Mess with Mercury Lesson Plans—Side A



What is mercury?

Mercury is a naturally occurring element that is found in oceans, rocks, and soils. It can be found as a pure element—elemental (metallic) mercury—or as a compound—organic and inorganic mercury.

Note: ATSDR's Don't Mess with Mercury Lesson Plans are about elemental mercury and do not discuss the other forms of mercury.

Quick facts about elemental mercury

1. Mercury's symbol on the Periodic Table of Elements is "Hg," which is an abbreviation for the Greek word hydragyrum (liquid silver). Its atomic number is 80.
2. Physical properties of elemental mercury:
   - Mercury is the only metal that is liquid at room temperature.
   - Even at room temperature, mercury evaporates into an odorless vapor that is invisible to the unaided eye.
   - Mercury is very dense. Two tablespoons of mercury weighs about 1 pound.
   - Mercury has a high surface tension, which makes it very slippery. When it is spilled, it breaks into many small drops, known as beads.
   - Mercury is a good conductor of heat and electricity.
3. Some people call elemental mercury quicksilver.
4. Breathing in mercury vapors is the most common way to get mercury poisoning—and also the most dangerous.
5. Spilled mercury beads easily spread and hide in small spaces (like cracks in the floor). They can release vapors that can be inhaled by students and staff even years after a spill.
6. Mercury has been used to make many different kinds of products, including devices used in schools. These include glass thermometers, thermostats, electrical switches, gauges, and science laboratory equipment, among others.
7. Because mercury is a hazardous chemical, many manufacturers have removed it from consumer products.
8. Mercury is not a banned substance and some products still contain it. For example, compact fluorescent light (CFL) bulbs contain a small amount of mercury. Note, that if a bulb breaks, the amount of mercury in the CFL is so small that it will not produce enough vapor to make people sick. However, it is still important to clean up safely and properly.

Instructions for students who find mercury

- **DON'T** mess with it.
- **DON'T** touch it.
- **DON'T** walk through it or get it on your clothes, backpack or other things.
- **DO** find an adult and ask for help.

Health effects of mercury

- Mercury poisoning can affect the nervous system, lungs, and kidneys.
- Inhaling mercury vapors can cause different symptoms depending on how long and how much of the vapor people inhale.

Inhaling high levels of vapors for a short period of time

- Nausea, vomiting, diarrhea
- Headaches
- Shortness of breath
- Eye irritation and vision problems
- Chest pain

Inhaling low levels of vapors for a long period of time

- Feeling anxious or tired
- Lack of appetite
- Trembling (shaking)
- Memory problems
- Hearing problems

Differences between elemental mercury and other forms of mercury

- Unlike organic and inorganic mercury, which are compounds, elemental mercury is pure, i.e., it is not chemically bonded to other elements.
- Organic mercury is mainly methylmercury. Due to environmental pollution, fish may contain mercury that they have accumulated through the food chain.
- Ethylmercury is another form of organic mercury. It is found in some vaccine preservatives and some antiseptics.
- Inorganic mercury compounds are found in batteries, some disinfectants, and some health remedies and creams.
- All three forms of mercury are harmful to human health.

Elemental mercury resources

- Websites:
  - » Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury—For Students website: http://www.atsdr.cdc.gov/dontmesswithmercury/students.html
  - » Agency for Toxic Substances and Disease Registry's Don't Mess with Mercury—Videos: https://www.atsdr.cdc.gov/dontmesswithmercury/videos.html
  - » Mercury Containing Devices/Products: https://www.atsdr.cdc.gov/dontmesswithmercury/pdfs/Mercury-containing-objects-in-schools-and-homes_teachers.pdf
  - » Ohio EPA public service announcement highlighting mercury vapors: http://www.youtube.com/watch?v=tpqP3ReC1cQ
  - » US EPA's Mercury Page: http://www.epa.gov/mercury/index.html
  - » Mercury in Schools Case Studies: https://www.epa.gov/schools/case-studies-about-mercury-cleanups-schools
- Books:
  - » Lew, Kristi. Mercury (Understanding the Elements of the Periodic Table). New York, NY: Rosen Publishing Group, 2009.
  - » Watt, Susan. The Elements: Mercury. Tarrytown, New York: Benchmark Books, 2005.

Contact ATSDR for more information about elemental mercury

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