

## OVERVIEW

### BIG IDEA

Chemicals may have immediate, acute effects, as well as chronic effects, often resulting from long-term exposures.

### OBJECTIVE

**10.2:** Create an educational intervention to help reduce the risk of chemical hazard exposure.

### AGENDA

1. Cartoon
2. Hazmat Who, What, Where?
3. Children & Chemical Hazards: WHO Reading
4. Lead, Merc, PCB, Pest, OH MY!
  - a. Research
  - b. Interventions
  - c. Presentation

### HOMEWORK

Which chemical hazard would you prioritize?  
Why?

## LESSON 10.2

# Chemical Hazards

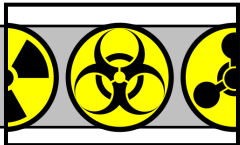
### SUMMARY:

This lesson will provide a sweeping overview of chemical hazards, especially as they relate to children, with a direct focus on four major chemicals: lead, mercury, PCBs, & pesticides. Students will begin by analyzing a cartoon and answering some questions to activate their background in the topic. Then they will pair up with another student to identify who is most affected by chemical exposures, what types of chemicals are involved, and where these exposures are taking place. Next students will read an overview on the topic by the WHO, then launch into team research projects where they will ultimately create an educational intervention for parents to help protect their kids from the chemical exposure. Teams will present to one another and take notes.

### STANDARDS:

**NHES 8.12.4:** Adapt health message to specific target audience.

**IL Learning Standard 22.C.5:** Compare & contrast how individuals, communities, & states prevent & correct health-threatening environmental problems



MODULE 10: ENVIRONMENTAL HEALTH LESSON 10.2

## Chemical Hazards

Obj. 10.2: Create an educational intervention to help reduce the risk of chemical hazard exposure.

**DO NOW** Cartoon

Image: <http://www.fishbase.org/training/Chemicals/Impagosa/Chemicals.pdf>

1. Examine the cartoon above. Describe what you see.
2. Think about your everyday life. When do you encounter potential chemical hazards? What types of hazards are they?

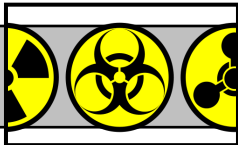
**DISCUSS** Hazmat Who, What, Where?

With a partner, brainstorm possible answers to the questions in the table below.

<b>WHO</b> is most often harmed by chemical hazards? What populations might be most commonly exposed?	
<b>WHAT</b> types of chemical hazards most commonly cause injury or death?	
<b>WHERE</b> might chemical hazard exposures commonly occur?	

**DO NOW:** Ask student to think, pair, then call on volunteers to share!

**DISCUSS:** Possible answers:  
**WHO:** children, infants, fetuses, migrant workers, farm & field workers, elderly, handicapped/mentally ill, service employees who are required to clean, housecleaners, college students, chemical plant or factory workers, etc.  
**WHAT:** lead, pesticides, mercury, laboratory chemicals, household cleaning products, etc.  
**WHERE:** at home, work, school, outdoors, fields, farms, etc.



### Children & Chemical Exposure

The World Health Organization (WHO) specifically cautions about the dangers of chemical exposures to children. Read the following overview from the WHO website and identify the recommendations for which chemicals should be at the forefront of our focus.

*The use of chemicals has increased dramatically due to the economic development in various sectors including industry, agriculture and transport. As a consequence, children are exposed to a large number of chemicals of both natural and man-made origin. Exposure occurs through the air they breathe, the water they drink or bathe in, the food they eat, and the soil they touch (or ingest as toddlers). They are exposed virtually wherever they are: at home, in the school, on the playground, and during transport.*

*Chemicals may have immediate, acute effects, as well as chronic effects, often resulting from long-term exposures. About 47 000 persons die every year as a result of such poisoning. Many of these poisonings occur in children and adolescents, are unintentional ("accidental"), and can be prevented if chemicals were appropriately stored and handled. Chronic, low-level exposure to various chemicals may result in a number of adverse outcomes, including damage to the nervous and immune systems, impairment of reproductive function and development, cancer, and organ-specific damage.*

*Sound management of chemicals, particularly heavy metals, pesticides and persistent organic pollutants (POPs), is a prerequisite for the protection of children's health. Due to the magnitude of their health impact on children, the initial focus for action should be placed on the so-called "intellectual robbers" : lead, mercury and polychlorinated biphenyl, as well as on pesticides, but this by no means implies that other chemicals should be ignored.*

Source: WHO Children's Environmental Health <<http://www.who.int/ceh/risk/cehchemicals/en/>>



### Lead, Mercury, PCBs, & Pesticides, OH MY!

With your team, research your assigned chemical hazard, answering each of the questions below. Then come up with an educational intervention targeted at parents to help them protect their children from the particular chemical hazard.

Team Members:

Assigned Chemical:

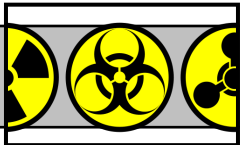
Questions:

- How common is exposure to this hazard among children?
- What is the level of exposure considered dangerous for this chemical?
- What negative effects may occur in the body upon exposure?
- Where and in what form, do exposures occur?
- What are the policies or laws related to this chemical?
- How can children be protected from this chemical?

**READ:** Another great launch point for resources is the CDC website: <http://www.cdc.gov/nceh/hsb/chemicals/default.htm>

### THINK:

Split the class into four equal teams. If smaller groups are desired, split each group further into 2-3 subgroups. Provide laptops/computers/tablets for students to conduct internet research.



**Present Your Educational Intervention**

As a team, prepare to present your educational intervention to your peers. For each presentation you hear, take notes in the following table.

	Physiological Effects	Source of Exposures	Prevention
Lead			
Mercury			
PCBs			
Pesticides			



**Prioritize for Prevention!**

After gathering the information about each serious chemical exposure in the table above, which of them would you prioritize the most? Assume that resources can only be allocated to reducing ONE of them! Be sure to explain logical rationale and/or evidence for your selection. Conduct additional background research if needed.

**ASSESS:**

Have the audience act authentically as if they were parents and leave time for Q&A. Tell audience to imagine what kinds of questions they would be asking if they were a concerned parent.

**HOMEWORK:**

The purpose of this homework assignment is to give students a chance to review, internalize, & expand upon the information they just learned. They will also simultaneously be challenged to practice making a conclusion by using the Claim-Evidence-Warrant process (see Lesson 9.10 – Conclusions).