# Hazard Communication & GHS Training

# Module at a Glance

| Activity | Time | Materials & Resources |
|---|---|---|
| **A. Introduction**<br><br>The instructor reviews the OSHA disclosure statement and the workshop objectives. Class takes the pretest and the OSHA rights Quiz. The class brainstorms a list of chemicals they use on the job. | 20 minutes | ▪ Sign in sheet<br>▪ Slide #2, Training Objectives<br>▪ Slide #3, OSHA disclosure statement<br>▪ Slide #4, *What Chemicals Do You Work With?*<br>▪ Handout: Pretest<br>▪ Handout: OSHA Quiz |
| **B. What Makes a Chemical Likely to Cause Harm?**<br><br>The instructor reviews the factors that make a chemical likely to cause harm. | 10 minutes | ▪ Factsheet A, pages 1- 4, *Chemical Hazards* |
| **C. How Do Chemicals Affect the Body?**<br><br>Pairs discuss the different ways chemicals can affect the body and then the class learns about acute and chronic and local and systemic health effects. | 15 minutes | ▪ Slide #5, Acute Effects<br>▪ Slide #6, Chronic Health Effects |
| **D. How Can Chemical Hazards Be Controlled?**<br><br>The class learns about Cal/OSHA exposure limits and how to control chemical hazards. | 15 minutes | ▪ Factsheet A, pages 5-7, *Controlling Chemical Hazards*<br>▪ Slide #7, How Can Chemical Hazards Be Controlled? |

| Activity | Time | Materials & Resources |
|---|---|---|
| **E. Hazard Communication Standard & GHS**<br><br>The following information is reviewed:<br>-Cal/OSHA's Hazard Communication Standard<br>-Globally Harmonized System (GHS)<br>--New GHS label<br>-Pictograms<br>-Safety Data Sheet (SDS) | 25 minutes | ▪ Factsheet A, page 14 & 15, *Evaluating Your Workplace Hazard Communication Program*<br>▪ Factsheet A, pages 8 - 10, *Chemical Labels*. Factsheet A, pages 10-13, *Safety Data Sheets*<br>▪ Slide #7, Elements of Hazard Communication Standard<br>▪ Slide #8 - #25, GHS<br>▪ Slide # 26 - SDS Small group activity |
| **F. Evaluating An SDS**<br><br>Small groups study a sample SDS, answer questions on a worksheet, identify target organs on a T-shirt and report back to the class. | 25 minutes | ▪ Colored dots<br>▪ Sample SDSs<br>▪ Worksheet #1, *SDS Worksheet*<br>▪ Toxic T-Shirts |
| **G. Wrap Up**<br><br>Instructor distributes post test and workshop evaluation. | 10 minutes | ▪ Post test<br>▪ Workshop evaluation |

**Total time: 2 hours**

# Preparing to Teach This Module

Before you present this Supplemental Module:

1. Obtain Factsheets A-E and Worksheet #1, one for each participant. Insert these into the course manuals in advance.

2. Collect an SDS of a chemical participants work with on the job. Make copies for everyone in the class.

3. Obtain 20-30 colored dots (stickers) in any color.

4. Obtain 4 "Toxic T-shirts" (white T-shirt with body organs drawn on it) for the class.

# Detailed Instructor's Notes

## A. Introduction to This Module

(20 minutes)

**1.** Distribute the sign in sheet, pretest and OSHA Quiz. Ask participants to complete them.

**2.** Show **Slide #2,** and tell the class that we are going to learn about chemical hazards, Cal/OSHA's Hazard Communication standard and the Globally Harmonized System (GHS). Review the objectives for this class. By the end of this session you will be able to:

- List factors that can influence the likelihood a person will develop health effects from a chemical exposure.
- Identify three ways chemicals can enter the body.
- Explain how chemicals can affect the body.
- Describe and evaluate three ways to eliminate or reduce chemical hazards.
- Describe five requirements of Cal/OSHA's Hazard Communication standard.
- Describe the new Globally Harmonized System.
- Get information from a Safety Data Sheet (SDS).

**2.** Show **Slide #3** and explain the OSHA disclosure statement.

**3.** Show **Slide #4** and ask the class what chemicals they work with?

Write the names of the chemicals people mention on a flipchart page. If necessary, ask for names of other chemicals that participants are familiar with, so your list includes many different forms of chemicals. Save this list for later use. Your completed flipchart may include:

- Solvents such as methyl ethyl ketone, toluene, and benzene
- Cleaning products
- Paints

- Wood dust
- Asbestos
- Pesticides
- Heavy metals such as cadmium, lead, and mercury
- Gasoline

Ask if anyone has ever been injured or made sick by a chemical they used. Ask for at least two or three stories. After participants have explained what happened, tell the class:

It is very important for workers to be trained about the chemicals they use. They need to know how these chemicals can harm them and how to work safely with them.

Training about specific chemicals used on your job is required by Cal/OSHA's Hazard Communication standard. Today's class will provide a basic overview of chemical hazards. It is not intended to substitute for training required by the Hazard Communication standard.

## B. What Makes a Chemical Likely to Cause Harm?

(10 minutes)

The instructor explains all chemicals have the potential to cause harm. But, some are more likely to cause harm than others. There are five factors that make a chemical more likely to cause harm: (list on flipchart as each is presented)

### Toxicity

Toxicity is the ability of a chemical to cause harm. If the chemical can cause harm only if the person is exposed to a very large amount of it, that chemical would be considered relatively non-toxic. If only a small amount of exposure to a chemical can cause harm, the chemical is considered highly toxic. An example of a highly toxic chemical is Cyanide (and other substances called poisons). It takes very little of this substance to cause significant harm.

### Route of Exposure and Chemical Forms

A second factor that determines if a chemical will cause harm is whether it is in a form that can easily enter the body. Chemicals get into the body through:

- Breathing (also called *inhalation)*. This is the main way workers are exposed to chemicals on the job.

- Skin and eye contact. A chemical can damage your skin or eyes. Some can also pass through the skin and get into your bloodstream.

- Swallowing (also called *ingestion*). Although you don't usually swallow chemicals deliberately, they can be carried on cigarettes, food, or unwashed hands. Also, some chemicals may get swallowed when you cough up dust.

How chemicals get into the body is related to the **form** the chemical is in. Chemicals come in the form of liquids, solids, dusts, mists, vapors, fumes, gases, and fibers. Sometimes you can see or smell them, sometimes you can't.

The form a chemical is in can determine whether it will cause harm. For example, although some things are absorbed through the skin, lead paint is not absorbed through the skin and so it won't get into your body if you get it on your hands. However, if you sandblast lead paint and then breathe the dust, it can enter your body to affect your central nervous system and other organs.

Sometimes chemicals change forms. For example, liquid cleaning products can be put into a bottle and then sprayed. In this case they are turned into **mists**. Liquid solutions, when they evaporate, give off **vapors** that can be inhaled.

### Dose and Duration

Dose is how much of the chemical a person is exposed to. Generally, the greater the dose, the greater the harm. For example, breathing a lot of organic solvents will affect the central nervous system but breathing just a little may just give you a headache.

Duration is how long a person is exposed to the chemical. Generally, the longer the exposure, the greater the harm.

### Reaction and Interaction

Reaction and interaction is what other chemicals a person is exposed to. Some chemicals, in combination, can create a different chemical. This is called **reaction.** For example, bleach and ammonia mixed together produce a different, more toxic gas.

Some chemicals, in combination, increase the likelihood the person will get sick. For example, being exposed to asbestos and also being a cigarette smoker will increase the likelihood of getting cancer. This is called **interaction**.

**Individual Differences**

A final factor is individual differences. Some people are more susceptible to getting sick from chemicals. Examples of individual differences that put some people at increased risk include family history, age, pregnancy, previous exposures, and whether the worker is a smoker, has sensitivities, or uses certain medications.

Refer the class to Factsheet A, *Chemical Hazards,* and tell them that this resource provides more information about chemicals.

## C. How Do Chemicals Affect the Body?

(15 minutes)

**1.** Ask participants to take two minutes to talk with the person next to them about the different health effects chemicals may cause. Suggest that they think about the chemicals they listed at the beginning of the class, or other chemicals they are familiar with that aren't on the list. If you wish, display the flipchart page you made earlier that has the list of chemicals.

After about two minutes, ask people to share examples of chemicals they talked about and health effects they identified. Write these health effects on a flipchart page. Examples may include:

- A rash from getting a solvent on the skin
- Difficulty breathing or dizziness from exposure to solvent vapors
- Burns to the skin or eyes from a harsh chemical like drain cleaners
- Lung problems from inhaling asbestos or cement dust.

**2.** Show **Slide #5** and tell the class:

Notice that some of these health effects occur right away and others take a long time to develop. When they occur right away, we call them **acute effects.** What are some examples of acute effects?

Examples include a chemical burn to the skin or eyes, or a skin rash from handling a solvent. Some acute effects take a few hours to develop (like nausea from pesticide exposure).

When health effects occur a long time after exposure, we call them **chronic effects**. What are some examples of chronic effects?

Examples include lung disease or cancer after many years of exposure to asbestos or neurological problems caused by long-term exposure to lead dust.

Some chemicals can cause both acute and chronic effects. For example, breathing solvent vapors could give you a headache or make you dizzy right away. Breathing those vapors for years may also cause liver damage.

What are clues that might tell a worker that a health effect he or she is experiencing is related to exposures at work?

- Symptoms go away after time off from work, like weekends or vacations.
- Other workers doing the same job have similar symptoms.

Since chronic health effects develop a long time after exposure, it may be harder to recognize when they are work-related. Workers need to be aware when a chemical can cause a long-term health effect, so they can protect themselves and prevent future disease.

**3.** Tell the class about chemicals and cancer.

Can all chemicals cause cancer? No. Cancer is the uncontrolled growth and spread of abnormal cells in the body, and is caused by some chemicals but not others. It is not true that all chemicals cause cancer in large enough doses. It is important to know when a particular chemical is believed to cause cancer so you can protect yourself.

**4.** Tell the class about the reproductive effects of chemicals.

As we have mentioned, some chemicals affect the reproductive systems of men and women. Examples of the reproductive effects of chemicals on men and women include the inability to conceive children, lowered sex drive, disturbances in menstruation, miscarriages, stillbirths, and defects in children that are apparent at birth or later in the child's development.

**5.** Summarize the information just presented:

We've learned that:

- Chemicals can cause **acute** (short-term) and/or **chronic** (long-term) health effects. Some chemicals can cause both.
- Symptoms can be a clue that you are experiencing acute health effects but chronic effects don't show up right away.
- Not all chemicals cause cancer, no matter how much you are exposed to.

## D. How Can Chemical Hazards Be Controlled?

(15 minutes)

**1.** Brainstorm a list of the main ways to control exposure to hazardous chemicals:

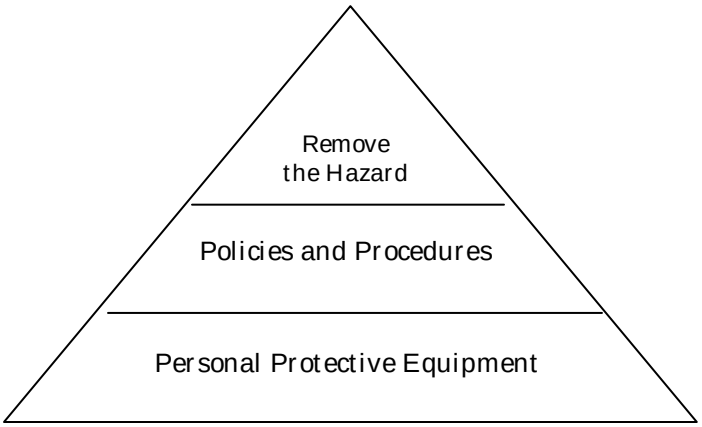
Let's make a list of some ways to reduce or eliminate exposure to chemicals at work.

As participants respond, list their ideas on a flipchart page. Answers may include:

- Substitute a safer chemical product in place of a toxic one.
- Enclose a process that uses toxic chemicals so no one is exposed.
- Use good ventilation so workers don't breathe in a chemical.
- Limit how much time a worker is exposed to a chemical.
- Train workers in how to use chemicals safely.
- Use personal protective equipment such as gloves, goggles, respirators, etc.

There are many ways to protect workers from hazards. But not all solutions are equally effective.

**2.** Show **Slide #6** and tell the class the best way to protect workers is to remove the hazard from the workplace altogether or at least keep the hazard away from workers.




Refer to the list of solutions on the flipchart you just created. Ask the class:

Which of the solutions on the flipchart is an example of "removing the hazard?"

- Substituting safer chemical products, such as water-based cleaners instead of organic solvents. However, remember that "water-based" doesn't always mean it's non-toxic or safe.
- Enclosing or isolating a process that uses toxic chemicals.
- Installing ventilation to reduce the amount of chemicals from the air workers breathe.

These are called **engineering controls**. They are considered the most effective kind of solutions because they get rid of the hazard at the source. They don't rely on workers to follow correct procedures and they don't allow for workers to take shortcuts that might be dangerous.

Explain:

Another way to protect workers is to set up work policies and procedures that cut down exposure to hazards by changing how the job is done.

Which of the solutions on the flipchart is an example of "policies and procedures?"

- Providing breaks.
- Training workers in using chemicals safely.

These are called **administrative controls**.

Explain:

**Personal protective equipment,** or PPE, is worn on the body and protects you from exposure to a hazard. What are some examples of PPE used for chemicals?

- Respirators
- Goggles
- Gloves
- Coveralls or other protective clothing

Ask the class:

Why is PPE usually considered less effective than the other methods?

Possible answers include:

- It doesn't get rid of the hazard itself.
- Workers may not want to wear it because it can be uncomfortable, hot, and may make it hard to communicate.
- It has to fit properly to work.
- In many cases it must be cleaned and inspected often.
- It has to be the right type for the particular hazard, such as the right respirator cartridge or glove for the chemical being used.
- Workers must know and remember how to use it properly.
- Some PPE creates its own hazards, such as heat, heavy weight, reduced visibility, reduced hearing, restricted movement, and discomfort.

**3.** Refer the class to Factsheet A, pages 5-7, *Controlling Chemical Hazards*. Tell them that this provides more information about controlling chemical hazards.

# E. Cal/OSHA's Hazard Communication Standard

(25 minutes)

**1.** Explain to the class that you will next discuss how to find information about specific chemicals.

**2.** Ask people to call out what things they would like to know about the chemicals they work with.

Write their answers on a flipchart page, and then add any they may not have mentioned. The list may include the following:

- How toxic is it?
- Who makes it?
- How do you handle it safely?
- What should you do in an emergency?
- How do you dispose of it safely?
- What health effects does it cause?
- How flammable is it?
- Is there a safe level of exposure?
- Do you need a respirator or other PPE when you work with it?

**3.** Show **Slide #7** and tell the class:

You have the right to get information from their employer about chemicals under **Cal/OSHA's Hazard Communication standard**.

The standard has five major requirements that employers must follow:

- Develop a written hazard communication program.
- Prepare an inventory of all hazardous substances in the workplace.
- Make sure all chemical products in the workplace have labels.
- Obtain Safety Data Sheets (SDSs), once known as Material Safety Data Sheets (MSDSs), for all chemicals in the workplace and make them available to employees.
- Train employees about the hazards of the specific chemicals they work with or work around, how to protect themselves against chemical exposure, and how to read SDSs and labels.

Refer the class to Factsheet A, pages14 & 15, *Evaluating Your Workplace's Hazard Communication Program.* It has more information on what should be in an employer's hazard communication program.

**4.** Show **Slide #8** and tell the class:

The Hazard Communication standard has been revised to come into compliance with the new **Globally Harmonized System** which has been adopted by many countries around the world. The changes involve:

**5.** Show **Slide #9** and tell the class:

Since 1992, the United Nations have been working to create and enhance a globally harmonized system for the classification and labeling of chemicals that can be used by importers, distributers and manufacturers worldwide.

The goal is to provide a common and coherent approach to classifying chemicals. This will benefit employees as it will:

- Reduce confusion and increase understanding of the hazards.
- Facilitate training
- Help address literacy problems particularly due to use of pictograms

**6.** Show **Slide #10** and review the timeline on the slide.

**7.** Show **Slide #11**, and tell the class:

Previously, chemical hazards were evaluated in a more subjective manner. Chemicals must now go through a specific, prescriptive classification process to determine which hazards are present and which hazard and precautionary statements apply. This can be a lengthy process.

Hazard classification: Provides specific criteria for classification of health and physical hazards, as well as classification of mixtures.

**8.** Show **Slide #12**, and tell the class:

Now there are 10 established chemical health classifications; that are further defined and described in Appendix A of the Haz Com Standard.

Appendix A is to be used by manufacturers, importers and distributers to determine if any of their products are classified as a health hazards. If the product is classified as a health hazard in one or more of the 10 health hazard classifications listed on this slide, Appendix A is used to determine the severity of the hazard (or hazard category) under the

applicable hazard class. More information noted in the chart on the next slide.

**Note:** Simple Asphyxiants are not part of the current GHS (international standard) but were specifically included by OSHA as a hazard classification under the 2012 Haz Com Standard

**9.** Show **Slide #13 and #14,** and tell the class:

Each of the chemical physical classifications are further defined and described in Appendix B of the Haz Com Standard.

Appendix B is to be used by manufacturers, importers and distributers to determine if any of their products are classified as a physical hazard. If the product is classified as a physical hazard in one or more of the physical hazard classifications, Appendix B is used to determine the severity of the hazard (or hazard category).

**10.** Show **Slide #15** and tell the class:

This is an example of the new product label style that is to appear on products beginning no later than June 1, 2015 (or Dec. 1, 2015 for distributers who still have product in inventory after the June 1, 2015 deadline).

Under the new GHS, labels must include signal words, pictograms and hazard statements.

For each hazard class and category of chemical, labels must now include:

- Product identifier
- Supplier information
- A signal word
- Pictogram
- A hazard statement and a precautionary statement

(One very confusing thing about the GHS system of doing things is that the categorization scheme for the severity of physical hazards will be the opposite of what you currently see on National Fire Protection Association placards or the *Hazardous Materials Identification System where* "1" under NFPA or HMIS is least severe and a "4" is most severe. Under GHS it is the opposite – category "1", under GHS, is most severe.)

**11.** Show **Slide #16** and tell the class:

Note the difference in the shipping label compared to the product label on the previous slide. Department of Transportation (DOT) requires that additional information be noted on shipping containers.

**12.** Show **Slide #17** and tell the class:

As of June 1, 2015, the Hazard Communication Standard will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s).

There are 9 pictograms; **only 8 are regulated by OSHA.** There is 1 for environment: Environmental Hazards are not regulated by OSHA.

There are 3 pictograms specific to health hazards: exclamation, health hazard (silhouette of a person with starburst on the chest) and skull and crossbones.

There is 1 pictogram that can represents both physical and/or health hazard of corrosive.

There are 4 pictograms specific to physical hazards: exploding bomb, flame, flame over circle (oxidizer) and gas cylinder.

**13.** Show **Slide #18** and tell the class:

In the past, there have been several **signal words** that may have been used to indicate a hazard like caution, warning, danger.

The GHS permits the use of only 2 **signal words:** "Danger" and "Warning". Only 1 of the signal words is permitted to appear on the label based on the classification of the chemical.

**14.** Show **Slide #19** and tell the class:

"**Hazard statement**" means a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.

**15.** Show **Slide #20** and tell the class:

"**Precautionary statement**" is a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, improper storage or handling.

**16.** Show **Slide #21** and tell the class:

"**Product identifier**" means the name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.

**17.** Show **Slide #22** and tell the class:

This slide is animated to identify each required section/element of the new label.

**18.** Show **Slide #23 & #24** and tell the class:

Manufacturers, importers and distributers must begin using the new 16-section format **SDS** by June 1, 2015. They are required to provide a revised copy of the MSDS/SDS to the employer anytime changes are made.

Employers are required to maintain copies of all SDSs for the chemicals used and/or stored within the work area. They should have a system to ensure all SDSs are present/accounted and to periodically check for the most current SDS (usually based on revision date) when received from a manufacturer, importer or distributer.

The employer is to maintain a copy of the most current SDS and archive prior MSDSs/SDSs. SDSs are to accessible/available to employees.

**19. Show slide #25, and tell the class.**

Employers must provide facility specific instruction to employees as described on this slide and the next slide to be compliant with the Hazard Communication training requirements.

Employers must also maintain and periodically review the written Haz Com program for the facility which contains all of the information on this slide and the next slide.

**20. Show slide #26, and tell the class.**

Next we are going to do a small group activity to evaluate an SDS.

# F. Evaluating An SDS

(25 minutes)

**1.** Introduce the small group activity. Explain that in this activity the class will be divided into small groups to learn how to read and understand the health effects section of a SDS.

Explain that each group will be given a SDS for a particular chemical, a Toxic T-shirt with the outline of a body draw on it with organs, and several colored dots. Each group will answer some questions about the chemical, using the health effects section of the SDS. A volunteer will put on the Toxic T-shirt and will explain what target organs the chemical affects in the body.

*Note to Instructor:* Remember, you will need a SDS for this session. Be sure to collect it in advance and have copies available (see Preparing to Teach this Module, p.4).

**2.** Divide the class into 3 - 4 small groups, with no more than six people in each group.

Pass out Worksheet #1, *SDS Worksheet.* Also give each group a copy of the SDS. Also distribute a Toxic T-shirt and several colored dots to each group.

**3.** Before the groups begin working, read aloud the questions on Worksheet #1. Explain that they should use their SDS to answer Questions #1 - 4. Point out that when answering Question #4, they should mark the target organs affected by the chemical on the Toxic T-shirt using the colored dots. Question #5 asks for their opinion about what health effects concern them the most.

Ask each group to have a volunteer take notes. Each group should also select another two people to report back to the whole class: one to hold up the Toxic T-shirt and one to report on their worksheet answers.

Give the groups 10-15 minutes to answer the questions on the worksheet. As they work, check in to see if there are any questions.

Bring the whole class back together after 10-15 minutes. Have each small group report back on a different question on the worksheet. Ask for a volunteer to explain the target organs the chemical affects in the body on the Toxic T-shirt. Ask if any of the small groups have a different answer.

## G. Wrap UP

(10 minutes)

1. Distribute the posttest and ask people to complete. Review the answers with the class.

2. Distribute the course evaluation.

3. Thank people for attending the workshop.