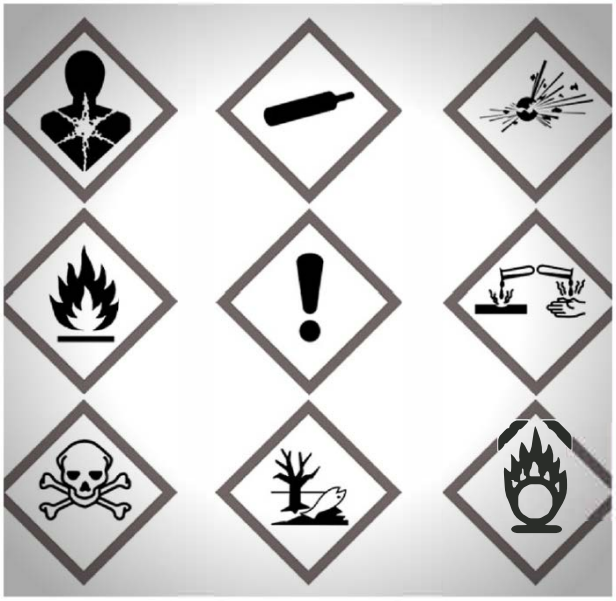

CHEMICAL HAZARD COMMUNICATION

Trainer's Guide

A SUSAN HARWOOD GRANT

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Disclaimer:

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B E P R E P A R E D !

INTENDED TARGET AUDIENCE:
The intended target audience for this training are workers and employers in high-hazard industries, temporary workers, minority, or other hard-to-reach workers, non-literate, low-literacy, or limited English proficiency workers, young workers (ages 16-24), or workers and employers in new small businesses.

TRAINER EXPERIENCE:
Trainers presenting this curriculum should have a minimum of three years' experience with this topic, should be knowledgeable in regards to OSHA's rules and regulations, and have a safety and health administration background.

TIPS:
What is the secret to confidence when giving a presentation? **BEING PREPARED**!

The following list is a guideline with items that you will need to help you give a successful presentation!

- ☐ Laptop with Accessories (charger, etc.)
- ☐ Electronic Copy of Presentation
- ☐ Projector
- ☐ Laser Pointer (with extra batteries)
- ☐ Microphone
- ☐ Mobile Wi-Fi Pack
- ☐ Speakers
- ☐ Document Holders
- ☐ OSHA Pamphlets (that coordinate with topic)
- ☐ Business Cards
- ☐ Pens
- ☐ Name Tags
- ☐ Pre-Printed Sign-in-Sheets
- ☐ Whistleblower Handout (OSHA Publication DWPP FS-3638 04/2018)
- ☐ Clorox SDS
- ☐ Pre and Post Test
- ☐ Pre and Post Answer Key
- ☐ Pictogram Activity with Answer Key
- ☐ Training Evaluations
- ☐ Chemical Hazard Communication Training Script

LOGISTICS

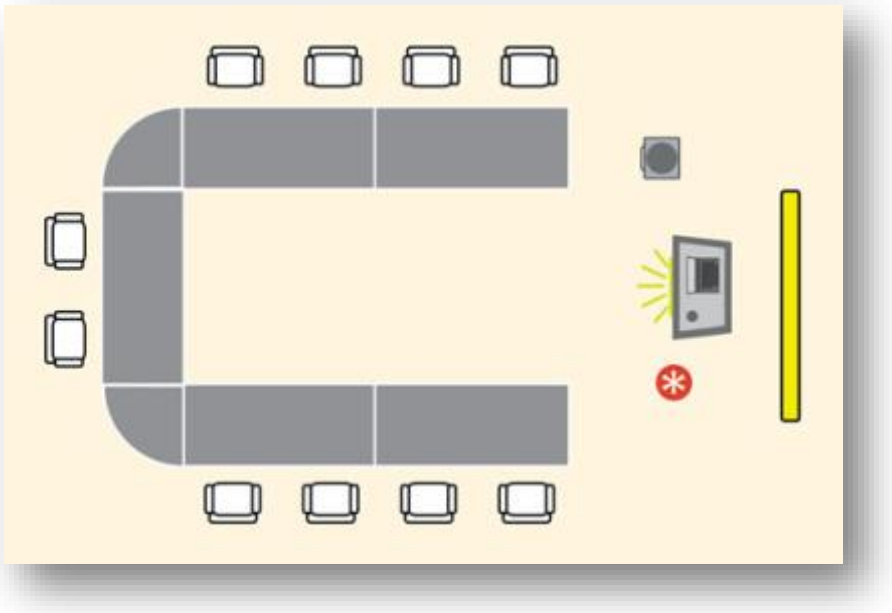
When providing training, you may not be in a location that you are familiar with. Allow yourself a minimum of 30 minutes to set up.

Somewhere towards the entrance of the room a table should be set up with your pre-printed sign in sheets, at least 2 pens, and your OSHA publications that students can take if they wish.

Arrange the room to promote active learning. According to Evergreen Safety Council's book, Presentation & Training Techniques, the room should be arranged for the learning situation. "A learner-centered arrangement allows for the learners to participate and to interact easily with others in the group."

This style allows learners a relaxed environment where they are encouraged to participate while you still maintain control of the class.

When possible, the following classroom arrangement is highly recommended for an effective learning environment:



The Whistleblower Flyer, Pre-Test, and a pen should be at each place setting prior to the trainee's arrival.

The center should be kept clear for activities.

Set up your projector, speakers, laptop, and other electronic equipment needed, test the WIFI to ensure you have a strong connection and you are ready to go!

SCRIPT

Chemical Hazard Communication

CHEMICAL HAZARD COMMUNICATION SCRIPT

The following is a script for a 2 hour Chemical Hazard Communication presentation. You may tailor as you see fit.

Slide 1:
Good morning/afternoon, my name is _____ and is my colleague_____. We are with

Slide 2:
The Susan Harwood training grant provides funding to eligible non-profit organizations to deliver safety and health training to eligible workers and employers. With this training, workers and employers will be able to recognize workplace safety hazards, incorporate accident prevention plans, and be informed of their rights and responsibilities as it pertains to OSHA.

Slide 3:
The primary law covering worker safety is the Occupational Safety and Health Act, or

_____

OSH Act, of 1970. The primary goal of this law is to reduce workplace hazards and implement safety and health programs for both employers and their employees.

The OSH Act created the Occupational Safety and Health Administration otherwise known as OSHA. OSHA sets and enforces workplace safety and health standards. As well as provide safety information, training, and assistance to employers and workers.

Slide 4:
One of the ways that OSHA protects workers is through the Whistleblower Protection Program. OSHA's whistleblower statutes protect you from retaliation. What does this mean? This means, an employer cannot retaliate against you for reporting injuries, safety concerns, or other protected activity.

You should always report any safety concerns to your immediate supervisor first. If you feel the safety concern was not resolved, you have the right to file an OSHA complaint. Under the Whistleblower protection program, you have the right to participate in an inspection or talk to an inspector, seek access to employer exposure and injury records, report an injury, and/or raise a safety or health complaint with the employer without fear of retaliation. If you feel you have been retaliated or discriminated against for exercising your rights, you must file a complaint with OSHA within 30 days of the alleged adverse action.

Slide 5:
Employers have a responsibility to provide a safe workplace environment, free from all recognized hazards. The workplace should comply with OSHA standards, rules and regulations.
Operating procedures should be established and communicated with employees, and employers must provide safety training in a language employees can understand.

Slide 6

Specifically when it comes to an employer's responsibility with a hazard communication program, employers are responsible for ensuring the following 5 components are included:

- Employers must keep and maintain an inventory or list of all chemicals being used.
- They must have a written hazcom program
- They must ensure that all chemicals being used are labeled according to OSHA standards
- They must keep and maintain current Safety Data Sheets on all chemicals used
- They must train employees on all chemicals being used

Slide 7:
What does OSHA require from you? As an employee it is your responsibility to read any workplace safety, and health posters at your jobsite. Comply with all OSHA safety standards and follow all lawful employer safety and health rules and regulations. Always use and wear your personal protective equipment when required, and report hazardous conditions and job-related injuries as soon as possible.

Slide 8:
Ok guys, why is it important to know what your employer, and what you are responsible for? At the end of the day, we want everyone to go home to their loved ones. When you follow OSHA and workplace safety rules and guidelines, you are not just protecting the employee of an organization, you are protecting someone's mother, father, son, daughter, aunt, uncle, and the list goes on. Someone's loved one gets to go home to their family, and that is the ultimate goal of these safety trainings.

Slide 9:
In this presentation we will discuss Hazard Communication Standard and the 7 major elements of the Globally Harmonized System

Slide 10:
Pre test

Slide 11:
When we think of chemical hazard communication, most of us only think of the Safety Data Sheets or SDS's, however it is much more complex than that.

Today, we will refer both to the Hazard Communication Standard or HCS, and to the Globally Harmonized System otherwise known as the GHS.

Under the provisions of the Hazard Communication Standard, employers are responsible for informing employees of the hazards and the identities of workplace chemicals to which they are exposed. Not only does it give the employee the right to know what the hazards are, but it also gives the employee the right to understand them!

Slide 12:
About 32 million workers work with and are potentially exposed to one or more chemical hazards. There are an estimated 650,000 existing chemical products, and hundreds of new ones being introduced annually. This poses a serious problem for exposed workers and their employers.

Slide 13:
Chemical exposure may cause or contribute to many serious health effects such as heart ailments, central nervous system, kidney and lung damage, sterility, cancer, burns, and rashes. Some chemicals may also be safety hazards and have the potential to cause fires and explosions and other serious accidents.

Slide 14:
Because of the seriousness of these safety and health problems, and because many employers and employees know little or nothing about them, the Occupational Safety and Health Administration (OSHA) issued the Hazard Communication Standard. The basic goal of the standard is to be sure employers and employees know about work hazards and how to protect themselves; this should help to reduce the incidence of chemical source illness and injuries.

Slide 15:
The Hazard Communication Standard (HCS) is now aligned with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). The purpose of the system is to provide a uniform manner to communicate and classify chemical hazards around the globe. This update to the Hazard Communication Standard (HCS) will provide a common approach to classifying chemicals and communicating hazard information on labels and safety data sheets. This update will also help reduce trade barriers, result in productivity improvements for American businesses, and will provide a cost savings for businesses that periodically update safety data sheets and labels for chemicals that are covered under the hazard communication standard.

Slide 16:
What is GHS Video?

Slide 17:
Within the Globally harmonized system there are 7 major elements that we need to familiarize ourselves with. They are:

- Signal Words, Hazard Statements, Precautionary Statements, Pictograms, the SDS, Labels, and Training.

Slide 18:
Signal words indicate the relative degree of the severity of a hazard. The signal words used in the GHS are "Danger" for the more severe hazards, and "Warning" for the less severe hazards. Some lower level hazard categories do not use signal words. Only one signal word corresponding to the class of the most severe hazard should be used on a label. If a chemical qualifies as both, the standard will use "Danger".

Slide 19:
Hazard statements are basic standardized phrases about the hazard of a chemical substance. This is part of the GHS of classification and labeling. These statements must be easily translated into different languages.

Hazard Statements describe the nature of the hazard of a chemical, including the degree of hazard. An example of such would be: "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin."

All of the applicable hazard statements must appear on the label. They are specific to the hazard classification categories. Chemical users should always see the same statement for the same hazards no matter what the chemical is or who produces it.

An appropriate statement for each hazard should be included on the label for products possessing more than one hazard.

Slide 20:
Precautionary Statements describe recommended steps that should be taken to minimize or prevent negative effects resulting from exposure, improper storage, or improper handling of the hazardous chemical.

There are four types of precautionary statements:

- Prevention: statement to minimize or prevent an adverse action resulting from exposure to a hazardous chemical. For example, "Wash face, hands and any exposed skin thoroughly after handling" or "Wear eye/face protection".
- Response: Tells you what to do in case of accidental spillage or exposure in terms of either emergency response or first-aid. For example, "If skin irritation occurs: get medical advice/attention".
- Storage: Tells you how a hazardous chemical should be stored if needed. For example, "Store in a dry place."
- Disposal: Tells you how to dispose of a chemical if needed. For example, "Dispose of contents to…"

Slide 21:
The Hazard Communication Standard (HCS) requires 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.

The pictograms OSHA has adopted improve worker safety and health, and they conform to the GHS, which are used worldwide. While the GHS uses a total of nine pictograms, OSHA will only enforce the use of eight.

Slide 22:

The "Health Hazard" pictogram identifies chemicals and products which could lead to chronic (means slow developing) or sometimes acute health problems.

This pictogram is used when a chemical substance presents the following hazards:

- Carcinogens - which can lead to the development of a cancer
- Mutagens – these can alter your DNA, which can lead to defects in future offspring
- Reproductive Hazards - which can affect the ability of healthy men and women to conceive healthy children
- Respiratory Sensitizers – this means you might have a hyper-allergic reaction when re-exposed to the chemical at even low levels after you have been initially over-exposed
- Target Organ Toxicity – which means the chemical or products affects the normal function of specific organs (such as liver, kidney, blood, and others); and
- Aspiration Toxicity – this can lead to the development of chemical pneumonia.

For example, you would see this symbol used for Antifreeze.

Slide 23:

As the picture implies, this "Flame" Pictogram is associated with products and chemicals that are flammable or combustible. But it also appears on the label of pyrophoric materials, which in a gaseous state will ignite spontaneously in air at a temperature of 130 degrees Fahrenheit or below, as well as all self-heating materials, materials that emit flammable gas, self-reactive materials, and organic peroxides.

This pictogram is used when a chemical substance presents the following hazards:

- Flammables–which are gases, aerosols, liquids, or solids that will burn or ignite under certain conditions,
- Self-Reactives–heating alone, without air, may cause fire or explosion,
- Pyrophorics–in small amounts, may ignite within 5 minutes after contact with air,
- Self-Heating–which may catch fire only in large amounts and after long periods of time when exposed to air,
- Emitters of flammable gas, *and*
- Organic peroxides–which, when heated, may cause fire or explosion; may be sensitive to impact or friction; and may react dangerously with other chemicals.

For example, you would see this symbol used for Gasoline.

Slide 24:

Containers displaying the "Exclamation Mark" pictogram on their product label contain a hazardous material that, while still potentially harmful to your health or safety, they represent the lower end of the scale for specific hazards when compared to products bearing some of the other Pictograms. Here is an example: A material that is highly corrosive and will burn the skin or cause serious eye damage will display the "Corrosive" pictogram, whereas the "Exclamation Mark" pictogram could appear on products that are only irritants to the eyes or skin.

This pictogram is used when a chemical substance presents the following hazards:

- Irritant–irritates the skin or eyes;
- Skin sensitizer–which is an allergic response following skin contact;
- Acute toxicity–which may be fatal or cause organ damage from a single short-term exposure;
- Narcotic effects like drowsiness, lack of coordination, and dizziness; and
- Respiratory tract irritation.

For example, you would see this symbol used for Clorox Bleach.

Slide 25:

The "Gas Cylinder" pictogram identifies compressed gases, which present various safety hazards. Products bearing this pictogram include compressed gases, dissolved gases, liquefied gases, and refrigerated liquefied gases. Many containers displaying the "Gas Cylinder" pictogram on a product label can explode when the cylinder is heated because the gas expands as the temperature rises. So be sure to read and follow the precautionary statements on the container label related to the placement and storage of these products away from sources of high heat and/or flames.

Use care when moving and storing compressed gas cylinders, as they can become a projectile if they are dropped or knocked over and their valve breaks. Always store these cylinders securely per the gas suppliers' instructions and handle them with care.

This pictogram is used when a chemical substance presents the following hazards:

- Gases under pressure

For example, you would see this symbol used for Helium.

Slide 26:

The "Corrosion" pictogram is specific to certain types of chemicals such as acids and bases, inorganic salts, aldehydes, phenols, and surfactants that can have a corrosive effect on skin and membranes. In addition, some highly-corrosive materials can cause metal containers to corrode and rupture, so take care not to store corrosive materials near metal containers.

The corrosive effects of the material you are working with may vary, from a slight irritant to highly corrosive, and the container label can provide more information about the level of hazard you are dealing with.

This pictogram is used when a chemical substance presents the following hazards:

- Flammables–which are gases, aerosols, liquids, or solids that will burn or ignite under certain conditions,
- Self-Reactives–heating alone, without air, may cause fire or explosion,
- Pyrophorics–in small amounts, may ignite within 5 minutes after contact with air,
- Self-Heating–which may catch fire only in large amounts and after long periods of time when exposed to air,
- Emitters of flammable gas, *and*
- Organic peroxides–which, when heated, may cause fire or explosion; may be sensitive to impact or friction; and may react dangerously with other chemicals.

For example, you would see this symbol used for batteries.

Slide 27:

Products bearing the "Exploding Bomb" pictogram are capable of exploding. First thing that may come to mind as being explosive, is dynamite or gunpowder. However, materials that are classified as self-reactive (like picric acid) and organic peroxides are also included in this category.

Containers displaying the "Exploding Bomb" pictogram on their product labels contain an explosive substance or mixture that is capable of a violent chemical reaction. They can produce gas at such a temperature, pressure, and rapid speed that it can cause damage to its surroundings if it explodes. The dangers of an explosive material could include excessive force from the blast (a shock wave), fire, or projectiles.

Products bearing the "Exploding Bomb" pictogram may be relatively rare in most workplaces, but if any container does display this particular warning icon, it is vitally important to pay attention to the Warning Statements that appear on the container label. For example, explosions involving some materials could be triggered by improper handling techniques; sometimes just dropping or bumping up against the container or package may be all it takes for the product inside to detonate. And in other cases, a spark or flame making contact with the material might be all that is needed to set off the explosion.

This pictogram is used when a chemical substance presents the following hazards:

- Explosives—which is a solid or liquid chemical capable of a chemical reaction that causes damage to the surroundings,
- Self-Reactive—heating may cause fire or explosion without the need for air, or
- Organic peroxides—again, heating may cause fire or explosion.

For example, you would see this symbol used for dynamite.

Slide 28:

This is the "Flame over Circle" pictogram. It is specific to solids, liquids, and gasses that are classified as "Oxidizers". DO NOT confuse this pictogram with the similar-looking "Flame" Pictogram discussed earlier, as that one identifies products and chemicals that are flammable.

So what is an Oxidizer? Oxidizers are gasses, such as oxygen, fluorine, and chlorine, which cause any combustible material (like wood or gasoline) to burn much more rapidly or intensely than normal. There are also oxidizing liquids such as perchloric acid and bromine, as well as oxidizing solids like strontium peroxide and aluminum nitrate, that have the same effect.

For example, you would see this symbol used for hydrogen peroxide 35%.

Slide 29:

This is the "Skull and Crossbones" pictogram that identifies acute and potentially fatal toxicity hazards. This Pictogram is specific to certain chemicals that, depending on the toxicity of the chemical, indicate that the chemical may be highly toxic (poisonous) or fatal if swallowed, if contact is made with skin, and/or if it is inhaled.

For example, you would see this symbol used for Formaldehyde Solution 37%.

Slide 30:

There is one more pictogram that is used in the GHS, it is "Environment". This pictogram is used when there are acute or chronic aquatic toxicity hazards.

This is not regulated by OSHA, but may be used to provide additional information. Workers may see the ninth symbol on a label because label preparers may choose to add the environment pictogram as supplementary information.

For example, you would see this symbol used for Mercury (Metallic).

Slide 31:

Pictogram Match Game

Slide 32:

Now that we are familiar with some of the basic terms used in the GHS, let's dig deeper into how to read a Safety Data Sheet or SDS.

Slide 33:

Most of you are probably familiar with the term Material Safety Data Sheets or MSDS's, as these documents have been around for almost 30 years. However, depending on the product, manufacturer, and importer, they often look very different. This can make it

difficult to find important safety and health information about a product. In comes the Globally Harmonized System! OSHA recently revised their hazard communication standard to require manufacturers and importers of hazardous products to replace their old MSDS's with new GHS-compliant Safety Data Sheets, also known as an SDS's, and in turn, employers must make them available to their workers.

These new SDS's are similar to the old MSDS's, with a couple of major differences; First of all, the new SDS's will always be comprised of 16 separate sections, and those sections will always appear in the same order for any product, regardless of where it comes from. The new SDS's will also incorporate the applicable Signal Word, Hazard Statements, Precautionary Statements, and Pictograms that also appear on the new GHS compliant labels which we will discuss shortly.

Let's take a look at each section individually.

Slide 34:

Section 1: Identification - If you want to know the name of the product or its common chemical name, this is the section where you will look. It also identifies the manufacturer, their address and emergency contact information, and recommendations or restrictions for the product's use.

Slide 35:

Section 2: Hazard(s) identification – This section lists the hazard classifications, signal word, hazard statements, precautionary statements, and pictograms that appear will also appear on the container label. Basically, it includes all hazards regarding the chemical, and the required label elements

Slide 36:

Section 3: Composition/Ingredients – Here you'll find information on the chemical ingredients, including the name of each hazardous chemical present in the product (including percentages for each chemical if the product is a mixture). You will also find the identity of any impurities and stabilizing additives which are hazardous and contribute to the classification of the chemical, along with any unique identifiers such as the Chemical Abstracts Service (CAS) number. You can also find trade secret claims in this section.

Slide 37:

Section 4: First-aid measures – Here is where you will find a description of the initial care that should be given to an individual who has been exposed to a chemical. It includes important information regarding symptom effects whether acute or delayed; as well as required medical treatment. This care can be provided by an

untrained individual. This section includes necessary first-aid instructions by routes of exposure. For example, inhalation, skin and eye contact, and ingestion.

Slide 38:

Section 5: Fire-fighting measures – In Section 5 you will find recommendations of suitable equipment for extinguishing a fire involving the chemical, as well as information about extinguishing equipment that is not appropriate. There are also warnings about any hazardous by-products created when the chemical burns.

Slide 39:

Section 6: Accidental release measures – This section lists emergency procedures and protective equipment to be utilized during clean up. It will also provide recommendations on appropriate response to spills, leaks, or accidental releases of the chemical, including containment and cleanup practices to prevent or minimize exposure to employees and the general environment.

Slide 40:

Section 7: Handling and storage – Section 7 provides guidance on the safe handling practices and conditions necessary for the safe storage of the chemical. This includes precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment, and recommended general hygiene practices. This could mean eating, drinking, and smoking in work area.

Slide 41:

Section 8: Exposure controls/personal protection – This section provides the OSHA permissible exposure limits for the chemical(s), threshold limit values, suitable engineering controls (such as ventilation systems), and recommended personal protective equipment (PPE) for workers to help prevent exposure

Slide 42:

Section 9: Physical and chemical properties – This section lists the chemical's characteristics. It has technical information about the product, such as its flash point (temperature it gives off enough vapors to ignite and burn), vapor density (tells if vapors are lighter or heavier than air), and a whole lot more is provided in this section. It describes the physical state of appearance of the chemical, including the color and odor.

Slide 43:

Section 10: Stability and reactivity – This section discusses whether the chemical is stable or unstable under normal ambient temperature and conditions, either while in storage, or while being handled. It also contains information about possible hazardous reactions, conditions to be avoided, and incompatible products and agents.

Slide 44:

Section 11: Toxicological information – Here you can see the toxicological and health effects of over-exposure to the chemical. It also provides information about known or likely routes of exposure such as inhalation, ingestion, or skin and eye contact. In addition, it offers a description of overexposure symptoms, the acute and chronic effects; and numerical measures of toxicity.

Slide 45:

The next 4 sections we will discuss are not regulated by OSHA, but it is still important to know what information they contain. .

The first is **Section 12: Ecological information-** This section reviews the Ecological impact on a chemical spill near a river or lake.

This section is designed to assist environmental stewardship, prevent harmful effects to the health of local ecosystems, and help businesses evaluate one product against another. Scientists, chemists, biologists, and sustainability professionals should all familiarize themselves with the information in this section.

Slide 46:

Section 13: Disposal considerations- Simply stated this is the suggested disposal method(s) for laboratory quantities of chemicals.

Slide 47:

Section 14: Transport information- Section 14 of your GHS compliant SDS covers all relevant transportation information regarding classification information for hazardous substances and mixtures by road, rail, sea, or air. Note that not all substances and mixtures will have transportation information, and thus, information must be specifically stated as not available if it is not provided.

Slide 48:

Section 15: Regulatory information- This section provides safety, health, and environmental regulations or legislation specific for the chemical, or any component of, that presents a health or environmental hazard.

Slide 49:

Section 16: Other information – The last section of the SDS contains the date of preparation or, the last revision date for the SDS.

BREAK

Slide 50:

Since OSHA revised their HCS to align with the international GHS, manufacturers and distributors of hazards chemicals and products had to start standardizing their container labels to display certain information.

Labels, as defined in the HCS, are an appropriate group of written, printed, or graphic informational elements concerning a hazardous chemical that are affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to outside packaging.

Slide 51:

There are 5 types of labels we will be discussing. They are the HCS shipping label, the HCS workplace label, the National Fire protection association label, the Hazardous Materials Information Systems labels, and finally the Department of Transportation shipping labels, placarding, and marking.

Slide 52:

The Hazcom Standard requires that when a chemical manufacturer, importer, or distributor ships a chemical, they must ensure that the chemical is labeled with the following information:

- Product identifier
- Signal word
- Hazard statement
- Precautionary statement
- Pictogram
- Name, address, and telephone #

Slide 53:

OSHA has not changed the general requirements for workplace labeling. Employers may choose to label workplace containers either with the same label required for shipped containers of the chemical, or may instead use alternative labels, as long as those labels provide employees with general information about the hazards of the chemical, and the employer provides training so that employees exposed to the chemical understand the specific hazards it presents.

Workplace labels must be in English. Other languages may be added to the label if applicable.

Employers may use additional instructional symbols that are not included in OSHA's HCS pictograms on the workplace labels. An example of an instructional pictogram is a person with goggles, denoting that goggles must be worn while handling the given chemical. Including both types of pictograms on workplace labels is acceptable. The same is true if the employer wants to list environmental pictograms or PPE pictograms from the Hazardous Materials Identification System (HMIS) to identify protective measures for those handling the chemical. Whatever the case, an employer must make sure the employee is properly trained to ensure that the employee can identify the hazard.

Slide 54:

Employers may continue to use rating systems such as National Fire Protection Association (NFPA) diamonds (sometimes known as fire diamonds, or safety squares) as long as they are consistent with the requirements of the Hazard Communication Standard and the employees have immediate access to the specific hazard information as discussed. An employer using NFPA 704 must, through training, ensure that its employees are fully aware of the hazards of the chemicals used. If an employer transfers hazardous chemicals from a labeled container to a portable container that is only intended for immediate use by the employee who performs the transfer, no labels are required for the portable container.

The NFPA label has a diamond shape, with 4 smaller diamonds inside of it. The NFPA Diamond is typically located on the outside of a building, on doors, or on tanks, and is intended to provide visible information about hazards to emergency responders during incidents like a chemical spill, or a fire. Each of the smaller diamonds will have a numerical rating which will represent the severity of the hazard. It is important to understand that the numbers used in the NFPA rating system are not relative ratings to the OSHA classification system and, in fact, are inverse. The NFPA rating system ranges from 0 to 4, with 0 being the least hazardous and 4 being the most hazardous; whereas, OSHA's classification system ranges from 1 to 4, with 1 being the most severe hazard and 4 being the least severe hazard.

Let's take a deeper look into the NFPA label. The system uses a color-coded diamond with four quadrants in which numbers are used in the upper three quadrants to signal the degree of health hazard (blue), flammability hazard (red), and reactivity hazard (yellow). The bottom quadrant is used to indicate special hazards.

The blue section indicates health hazard. If a number is present, it indicates the level of the health hazard, ranging from 0 (no hazard) to 4 (fatal).

The red section indicates flammability hazard. If a number is present, it indicates the level of the fire hazard, ranging from 0 meaning it will not burn, to 4 which have a flashpoint less than 73 degrees.

Next is the yellow section. This section indicates an instability hazard meaning the chemical may present instability depending on the pressure and temperature it is exposed to. If a number is present, it indicates the level of instability, ranging from 0 which is normally stable to 4 which is deadly.

The last diamond is the white "other special hazard" diamond. This diamond will contain letters such as a crossed out W for reactivity to water, capital OX for Oxidizer, and SA for a simple asphyxiant.

Slide 55:

In this example you can see that:

2 = Moderate health hazard
4 = Highly flammable, flashpoint less than 73°F
0 = Normally stable
W = reactive to water; do not use water

Slide 56:

This is the HMIS label, or the Hazardous Materials Identification System label. Now remember, the NFPA label is intended for use by emergency response personnel, whereas the HMIS label is intended for use by employers and workers. The NFPA label is in a diamond shape, where the HMIS label is presented as colored bars.

Slide 57:

These labels are very similar to the NFPA labels.

Blue stands for health hazard. You will see two white squares in this section. The one on the right will list the health rating, 0 presenting no risk, or 4 being life threatening or fatal. If an asterix is present in the box on the left, this indicates that repeated exposure to the chemical can present chronic or long term health effects.

The red bar stands for flammability with 0 indicating that the chemical will not burn, and 4 indicating that the chemical has a flashpoint of less than 73 degrees,

The yellow or orange bar stands for a reactivity/physical hazard. Same as the NFPA label, 0 means the chemical is stable, and 4 means that it is readily explosive.

The biggest difference you will see in these labels is that the white bar represents the personal protection equipment that an employee must use when handling this chemical. The white square contains a letter that signifies the safety gear item(s) the worker should use. Each subsequent letter indicates a higher level of protective equipment. For instance, an "A" symbolizes safety glasses, a "B" represents safety glasses and gloves, and a "C" signifies safety glasses, gloves and an apron. An "X" means that the worker should consult with a supervisor or a safety specialist on the proper safety precautions.

Slide 58:

Example:
Product is "ammonium hydroxide"
•Health hazard
    * = chronic hazard
    2 = moderate hazard that may cause temporary or minor injury
•Flammability – minimal hazard; material will not burn
•Physical Hazard – minimal hazard; normally stable material
•Personal Protection – PPE needed includes splash goggles, gloves, apron, and dust/vapor respirator

Slide 59:

One of the systems that has long used pictograms is the international transport system. This system has been adopted by the U.S. Department of Transportation (DOT), and is very familiar to those who handle shipping containers in the United States.

The symbols are different from OSHA; however they have been harmonized as much as possible for the hazards covered both in transport and in the workplace. While both pictograms are diamond-shaped, DOT's pictograms have backgrounds of various colors. Where the shipping container is also the container used in the workplace, workers must be made aware of the DOT pictograms, as they may appear on the label in addition to, or instead of, the HazCom 2012 pictograms used to represent the same hazard."

Slide 60:

The Department of Transportation (D.O.T.) specifies labels must be used for hazardous materials when they are being transported. It requires that any person who offers a hazardous material for transportation must label the package or containment device.

The OSHA Hazard Communication Standard requires that GHS labels be applied on all hazardous material containers in a manner which does not conflict with the requirements of the Hazardous Materials Transportation Act and regulations issued under the Act by DOT.
Labels are standard hazmat identifiers, designed to meet regulations. Hazard class

Slide 61:

DOT Placards are larger, more durable versions of hazard labels that are usually placed on bulk packages or transport vehicles to communicate the hazards of chemicals inside.

Why are DOT placards important?

- They inform the public - Placards warn the people of the presence of hazards while they're driving or near large quantities of hazmat being transported.
- They inform emergency responders - if shipping papers aren't available at the scene of an accident, a placard may be the only way responders know what materials are involved in the accident.
- They are required - within the United States, certain quantities of hazardous materials within a transport vehicle or bulk packaging must be placarded, although there are several cases where placarding exceptions come into play.
- If you want to ship hazmat, you are responsible for providing the carrier with the appropriate placards unless they already have the correct placards on the vehicle or freight container. Otherwise, the motor or rail carrier cannot transport the shipment of hazardous materials.

Where are DOT placards placed?

- On transport vehicles or bulk packages - rather than being placed on a smaller individual package, placards are used for larger amounts of hazardous materials being transported. Often they are placed on the exterior of transport vehicles.
- They must be on all 4 sides - placards need to be displayed on all four sides of a transport vehicle or bulk packaging. They must always be displayed in the square-on-point configuration and be located at least 3 inches away from any other marking that may reduce its effectiveness.

Slide 62:

Markings are additional identifiers that further describe a package. They are added in addition to hazmat labels and placards. The requirements for marking of packages are contained in 49 CFR, Subpart D, Part 172. The basic marking requirement consists of the proper shipping name and identification number of the hazardous materials contained in the package. Markings should be durable, in English, and not obscured by other markings or labels. Depending on the material there may be additional marking requirements by DOT.

Slide 63:

For information and training to be effective, the workers in the training must comprehend the hazards in the workplace and must also understand how they can protect themselves. OSHA does not expect that workers will be able to recall and recite all data provided about each hazardous chemical in the workplace. What is most important is that workers understand that they are exposed to hazardous chemicals, know how to read labels and SDSs, and have a general understanding of what information is provided in these documents, and how to access these tools. Workers must also be aware of the protective measures available in their workplace, how to use or implement these measures, and who they should contact if an issue arises

Slide 64-65:

Review

Slide 66:

Post Test and Evaluation

Excuse class and collect all Post Tests and Evaluations. As you are collecting, make sure everyone wrote their name and date on Post Test.

ACTIVITY

Chemical Hazard Activity Guide

Create two teams. Each team will consist of 2-5 people depending on the size of the group. Hand each team a set of pictograms and descriptions, and then have them match the pictogram to the health hazards associated with that pictogram. The team to finish the fastest wins!

Answer Key:

HCS Pictograms and Hazards

Health Hazard  • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	**Flame**  • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	**Exclamation Mark**  • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  • Gases Under Pressure	**Corrosion**  • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals	**Exploding Bomb**  • Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle  • Oxidizers	**Environment** (Non-Mandatory)  • Aquatic Toxicity	**Skull and Crossbones**  • Acute Toxicity (fatal or toxic)

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity (harmful)
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (Non-Mandatory)

- Gases Under Pressure

- Skin Corrosion/ Burns
- Eye Damage
- Corrosive to Metals

- Explosives
- Self-Reactives
- Organic Peroxides

- Oxidizers

- Aquatic Toxicity

- Acute Toxicity (fatal or toxic)

TRAINING EVALUATION

Training Session Reaction Evaluation

Chemical Hazard Communication Training Evaluation Form

Please help us improve our training by providing your feedback below!

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The training met my expectations.	❍	❍	❍	❍	❍
2. I will be able to apply the knowledge learned.	❍	❍	❍	❍	❍
3. The content was organized and easy to follow.	❍	❍	❍	❍	❍
4. The materials distributed were useful.	❍	❍	❍	❍	❍
5. The trainers were knowledgeable.	❍	❍	❍	❍	❍
6. The quality of instruction was good.	❍	❍	❍	❍	❍
7. The trainer met the training objectives.	❍	❍	❍	❍	❍
8. Class participation and interaction were encouraged.	❍	❍	❍	❍	❍

10. How would you rate the training overall?

Excellent	Good	Average	Poor	Very Poor
❍	❍	❍	❍	❍

11. What aspects of the training could be improved?

10. Other comments?

TRAINEE ASSESSMENT

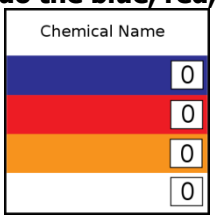
Learning Evaluations

Name:_____**Date:**_____

Chemical Hazard Communication Pre Test

1. **A hazardous chemical is any chemical that is a _____.**
   A. Health hazard
   B. Physical hazard
   C. Both A and B
   D. None of the above

2. **This is the HMIS or "Hazardous Material Identification System" label. What hazards do the blue, red, orange/yellow, and white bars refer to, respectively?**



   A. Flammability, health, reactivity, personal protection
   B. Reactivity, flammability, personal protection, and health
   C. Health, flammability, reactivity, and personal protection
   D. Personal protection, reactivity, health, and flammability

3. **What does SDS stand for?**
   A. Safety Data Statistics
   B. Safety Data Sheets
   C. Scientific Data Statistics
   D. None of the above

4. **A hazard communication program requires which of the following components?**
   A. Written program
   B. SDS/Labeling
   C. Training
   D. All of the above

5. **How many sections does a SDS have?**
   A. 11
   B. 16
   C. 4
   D. As many as necessary to convey understanding

6. **Employers can create their own workplace label if _____.**
   A. A safety consultant creates it
   B. They provide employees with the same general information about the hazards of the chemical
   C. They are made with bright colors
   D. Contain no words

7. **What does HCS stand for?**
   A. Hazard Communication Standard
   B. Harmonized Connection System
   C. Happy Cowboy Showdown
   D. Hazardous Carbohydrate Standard

Name:_____Date:_____
Chemical Hazard Communication Pre Test

8. **The Globally Harmonized System is a system for_____.**
    A. Creating chemical combinations
    B. Uniting friends and family in song.
    C. Making chemical hazard classification and communication more consistent.
    D. Providing PPE to employees.

9. **Who is ultimately responsible for your safety on a job site?**
    A. You
    B. Your employer
    C. OSHA
    D. The insurance carrier

10. **OSHA's HazCom Program requires that an employer keep and maintain an inventory list of _____.**
    A. Circular Saws
    B. Hammers and other hand tools
    C. Ladders
    D. Chemicals

11. **Pictograms are graphic symbols that_____.**
    A. Contain the logo of the manufacturer
    B. Are great to use as office decor
    C. Are included on the label and SDS
    D. All of the above

12. **Which pictogram is not regulated by OSHA but may be used to provide additional information?**
    A. Skull and Crossbones
    B. Exploding Bomb
    C. Environment
    D. Health Hazard

13. **TRUE or FALSE? SDSs are required to be in English.**
    A. True
    B. False

14. **TRUE or FALSE? A workplace label must always contain the name, address, and telephone number of the chemical manufacturer or supplier?**
    A. True
    B. False

15. **TRUE or FALSE? Only lethal chemicals must be labeled?**
    A. True
    B. False

Name:_____**Date:**_____

Chemical Hazard Communication Post Test

1. **What does SDS stand for?**
   A. Safety Data Statistics
   B. Safety Data Sheets
   C. Scientific Data Statistics
   D. None of the above

2. **Employers can create their own workplace label if _____.**
   A. A safety consultant creates it
   B. They provide employees with the same general information about the hazards of the chemical
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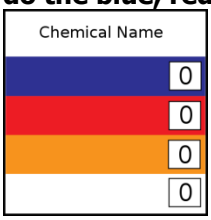

   A. Flammability, health, reactivity, personal protection
   B. Reactivity, flammability, personal protection, and health
   C. Health, flammability, reactivity, and personal protection
   D. Personal protection, reactivity, health, and flammability

Name:_____Date:_____
Chemical Hazard Communication Post Test

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15. **Pictograms are graphic symbols that_____.**
    A. Contain the logo of the manufacturer
    B. Are great to use as office decor
    C. Are included on the label and SDS
    D. All of the above

Chemical Hazard Communication Pre/Post Test Answer Key

Pre Test Answer Key

1. (C) Both A and B
2. (C) Health, flammability, reactivity, and personal protection
3. (B) Safety Data Sheets
4. (D) All of the above
5. (B) 16
6. (B) They provide employees with the same general information about the hazards of the chemical
7. (A) Hazard Communication Standard
8. (C) Making chemical hazard classification and communication more consistent
9. (A) You
10. (D) Chemicals
11. (C) Are included on the label and SDS
12. (C) Environment
13. (A) True
14. (A) True
15. (B) False

Post Test Answer Key

1. (B) Safety Data Sheets
2. (B) They provide employees with the same general information about the hazards of the chemical
3. (C) Making chemical hazard classification and communication more consistent
4. (A) True
5. (A) Hazard Communication Standard
6. (B) False
7. (A) You
8. (C) Health, flammability, reactivity, and personal protection
9. (B) 16
10. (C) Environment
11. (A) True
12. (C) Both A and B
13. (D) Chemicals
14. (D) All of the above
15. (C) Are included on the label and SDS