WHMIS – GLOBALLY HARMONIZED SYSTEM

1. INTRODUCTION TO WHMIS 2015 GHS

a) The Workplace Hazardous Materials Information System **(WHMIS)** helps you to know about the hazardous products that you use and store in your workplace. This information is provided by labels and safety data sheets (SDSs), and through education and training programs.

b) WHMIS has aligned with the Globally Harmonized System of Classification and Labelling of Chemicals **(GHS).** It's a worldwide system with a goal to have a common set of rules for the classification of hazardous products. There are common rules for labels and a standard format for **SDS's** that is adopted around the world.

c) **<u>Aligning WHMIS with GHS helps to:</u>**

i) Enhance the protection of health and safety by having improved and consistent hazard information.

ii) Encourage safe transport, handling and use of hazardous products.

iii) Promote better emergency response.

iv) Promote regulatory efficiency and compliance.

v) Facilitate international trade.

2. WHMIS 1988 LABELLING & AWARENESS

a) Developed jointly by **government, industry and labour**, WHMIS became law through complementary federal, provincial and territorial legislation in 1988. All Canadian workplaces are subject to the same specific legal requirements. WHMIS imposes clear and detailed responsibilities on manufacturers and suppliers of hazardous materials, as well as on employers and employees who purchase and use these controlled products. The first priority is to ensure that all of the controlled products in the workplace are identified. Then every worker who is likely to be exposed to a controlled product must be identified, informed and trained in the safe use of these substances.

b) Understanding WHMIS 1988 and the new WHMIS 2015 GHS system is crucial during the transition period. The following information will assist workers in the awareness of labels used in the WHMIS 1988 program which is still being practiced today. In WHMIS 1988, symbols are distributed in classes.

c) The employer is responsible to ensure that workers understand the hazards of the products they work with and that workplace hazardous products defined by WHMIS have proper labelling.

d) Employers are required to make a list of all hazardous chemicals that are present in the workplace.

3. CLASS A - COMPRESSED GAS

SYMBOL MEANS:

- explosion hazard, because gas is being held under pressure
- may cause its container to explode if heated in fire
- may cause its container to explode if dropped

SYMBOL TELLS YOU TO:

- handle with care, do not drop cylinder
- keep cylinder away from potential sources of ignition
- store the container in the area designated by the workplace supervisor

4. CLASS B - FLAMMABLE AND COMBUSTIBLE

SYMBOL MEANS:

- it will burn and is therefore a potential fire hazard
- may burn at relatively low temperatures; flammable materials rather than combustible materials
- may burst into flame spontaneously in air or release a flammable gas on contact with water

SYMBOL TELLS YOU TO:

- handle with care, keep away from ignition sources
- wear proper eye, face, and hand protection as well as appropriate protective clothing
- keep containers closed when not in use and store in a well-ventilated area

5. CLASS C - OXIDIZING MATERIAL

SYMBOL MEANS:
- fire and/or explosion risking the presence of flammable or combustible material
- may cause fire when it comes into contact with combustible materials such as wood
- may react violently or cause an explosion when it comes into contact with combustible materials such as fuels
- may burn eyes or skin if contact is made

SYMBOL TELLS YOU TO:
- keep it away from combustible materials and store in the area designated by the workplace supervisor
- keep the material away from ignition sources
- never smoke when working near the material
- wear proper protective equipment, including eye, face and hand protection and protective clothing

6. CLASS D - POISONOUS & INFECTIOUS MATERIAL—DIVISION 1:

immediate and serious toxic effects

SYMBOL MEANS:
- a potentially fatal poisonous substance
- may be fatal or cause permanent damage if it is inhaled or swallowed or if it enters the body through contact with skin
- may burn eyes or skin if contact is made

SYMBOL TELLS YOU TO:
- wear proper protective equipment to avoid contact with eyes and skin, including eye, face and hand protection and protective clothing
- avoid inhaling by working in well-ventilated areas and/or wearing respiratory equipment as designated by workplace supervisor
- store the material only in designated areas

7. CLASS D - POISONOUS & INFECTIOUS MATERIAL—DIVISION 2:

other toxic effects

SYMBOL MEANS:
- a poisonous substance that is not immediately dangerous to health
- may cause death or permanent damage if repeated exposure takes place over time
- may cause cancer
- may cause birth defects or sterility

SYMBOL TELLS YOU TO:
- wear proper protective equipment to avoid contact with eyes and skin, including eye, face and hand protection and protective clothing
- avoid inhaling by working in well-ventilated areas and/or wearing respiratory equipment as designated by workplace supervisor
- store the material only in designated areas

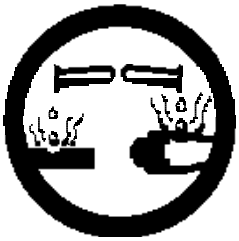
8. CLASS D - POISONOUS & INFECTIOUS MATERIAL—DIVISION 3:

biohazardous infectious material

SYMBOL MEANS:
- may cause a serious disease which can result in illness or death

SYMBOL TELLS YOU TO:
- take every precautionary measure to avoid contamination
- handle the material only when full protection is provided by the proper, designated equipment
- store the material only in designated areas

9. CLASS E – CORROSIVE MATERIAL



SYMBOL MEANS:
- causes severe eye and skin irritation when contact is made
- causes severe tissue damage if prolonged contact is made
- may be harmful if inhaled

SYMBOL TELLS YOU TO:
- keep containers tightly closed
- wear proper protective equipment to avoid contact with eyes and skin, including eye, face and hand protection and protective clothing
- avoid inhaling by using in well-ventilated areas only and/or wearing proper respiratory equipment as designated by workplace supervisor

10. CLASS F – DANGEROUSLY REACTIVE MATERIAL

SYMBOL MEANS:
- material very unstable
- may react with water to release a toxic or flammable gas
- may explode as a result of shock, friction or temperature increase
- may explode if heated while in a closed container
- can undergo vigorous polymerization

SYMBOL TELLS YOU TO:
- keep material away from heat
- open containers with extreme care, do not drop or shake
- store in a cool, flameproof area, as designated by workplace supervisor

11. WHERE HAZARDOUS MATERIALS ATTACK THE BODY

a) Hazardous materials are capable of causing disease in four areas of the human body:

i) Entry routes such as the **lungs, skin and digestive tract**
ii) The **bloodstream**
iii) The **liver, kidneys and bladder**, whose function is to concentrate toxins for removal from the body
iv) The central nervous system

12. HOW HAZARDOUS MATERIALS ENTER THE BODY

a) Inhalation:

This is the most common entry route, since dusts, fumes, smoke, mists, vapours and gases can all be inhaled into the body's respiratory system. The hazardous materials may damage the respiratory system itself or they may pass through the lungs to other parts of the body.

The respiratory system has two main lines of defence against foreign substances: hairs in the nose and mucus (or phlegm) in the windpipe and bronchial passages. Large dust particles are trapped in the mucus and either swallowed or spat out, while the tiniest particles remain airborne and are exhaled. But dust particles of a specific size range—around one fifty-thousandth of an inch—are capable of evading the defense system and reaching the lungs. Once in the lungs, these particles may cause extensive scarring of the thousands of tiny air sacs (or alveoli) inside each lung. This begins the disease process that produces emphysema. Most dust particles are too large to pass through the walls of the air sacs into the bloodstream, but gases, vapours, mists and fumes can all enter the blood through the lungs. Welding fumes, acid mists or truck exhaust can stimulate the lung's defenses to produce large amounts of mucus, causing chronic bronchitis. The air sacs can be destroyed by these same materials.

12. HOW HAZARDOUS MATERIALS ENTER THE BODY (CONTINUED)

b) Absorption:

The skin protects the internal organs of the body from the outside environment, but it has a large surface area that can come into contact with hazardous materials. Some chemicals can penetrate the skin, enter the bloodstream and reach other parts of the body. Mineral spirits and other solvents can also be absorbed through the skin.

Dermatitis is an inflammation of the skin that can be caused by hundreds of workplace materials. Symptoms are redness, itchiness or scaling of the skin. There are two types of dermatitis:

i) Primary irritation dermatitis is caused by friction, heat, cold, acids, alkalis, irritant gases and vapours. Exposure can be brief in high concentrations or prolonged in low concentrations.

ii) Sensitization dermatitis is the result of an allergic reaction to a substance. Sensitization may be the result of prolonged or repeated contact and usually becomes established within 10 to 30 days. Substances such as wood dust, paints and chromic acid can trigger either type of dermatitis.

c) Ingestion:

A third route of entry to the human body for hazardous materials is the digestive tract, a continuous tube that extends from the mouth to the anus. The purpose of the organs of the digestive system is to ingest, digest and absorb food. Hazardous materials may reach the stomach when food or drink is consumed in a dusty work area, when workers fail to wash their hands before eating or smoking, or when food is left unwrapped in a dusty place.

Once swallowed, the hazardous materials enter the digestive tract, from where they may enter the bloodstream and move on to the liver and kidneys. These organs try to remove the poisons and make the material less harmful to the body, but they don't always succeed.

13. EFFECTS OF EXPOSURE TO HAZARDOUS MATERIALS

a) Latent effects:

Some of the most serious diseases resulting from exposure to hazardous materials don't occur until after a latency period of as much as 30 years following the exposure. For example, exposure to ionizing radiation or asbestos causes few symptoms at the time of exposure, but the long-term effects can be deadly.

b) Acute effects:

Acute effects of exposure to hazardous materials occur immediately or soon after the exposure and are generally the result of high levels of exposure. Acute effects result from the direct action of the hazardous material on the cells of the body. They are sometimes fatal but often treatable if caught soon enough. An example of an acute effect is the sudden collapse of a worker who has been exposed to high levels of carbon monoxide.

c) Chronic effects:

Chronic effects are the long-term results of the body's attempts to repair itself or to compensate for the acute effects of exposure to hazardous materials. Cancer is a chronic effect, as are lung scarring caused by silica dust and hearing loss caused by exposure to excessive noise. Because chronic effects tend to become evident only after severe damage has occurred, most are not treatable.

14. THE GHS SYSTEM

Let's not get confused. The previous pages shows you the symbols of the WHMIS 1988 program which is still being practiced today. The following pages will demonstrate how to adapt to the WHMIS 2015 GHS program and how to incorporate its symbols, structure and apply its awareness to the workplace.

a) In this program, you will learn how to:
i) Understand the new labels
ii) Recognize the pictograms (new symbols) and understand the hazards that they represent.
iii) Identify the hazards represented by each hazard class.
iv) Find additional information about hazards and protective measures on safety data sheets (SDSs)

The information in this course is based on the federal Hazardous Products Act and the Hazardous Products Regulations, administered by Health Canada. This program complies with legislative requirements for WHMIS 2015 in contrast to our prior program following the requirements set out in WHIMIS 1988.

15. COMPONENTS OF WHMIS 2015

WHMIS involves:

a) Classification of hazardous products into hazard classes and categories according to specific rules.

b) Communication of hazard and precautionary information using labels and SDSs.

c) You likely had WHMIS training prior to this new program. With the alignment with GHS, you will notice that there are new pictograms and new requirements for labels and SDSs.

d) GHS does not replace WHMIS. GHS does, however, introduce some important changes to WHMIS. Learning about these changes to WHMIS is part of the knowledge that you need to protect yourself and your co-workers from hazardous products.

e) Education and training are still very important part of WHMIS.

f) Establishes rules for classifying hazardous products into hazard **classes** and **categories**.

g) Requires suppliers to attach labels to hazardous products that meet one or more of the classification criteria according to the Hazardous Products Act and regulations.

h) Requires suppliers to provide **SDSs** for these hazardous products to their customers.

16. HOW HAZARD CLASSIFICATION WORKS

a) Based on their properties, hazardous products are assigned to hazard **classes** such as **Corrosive to metals** or **Serious eye damage/eye irritation**.

b) The Hazard Class and Category are a guide to the:
- **i)** Type of Hazard
- **ii)** Degree of Hazard
- **iii)** **Precautions** to follow

For example, a Flammable liquid – **Category 2**, such as **gasoline**, can easily catch fire.

Important: Some products present more than one hazard, and therefore belong to more than one hazard class. For example, acetone falls into multiple hazard classes, including flammable liquids – Category 2, Eye irritation – Category 2A, Specific organ toxicity – Single Exposure – Category 3. Another example is **benzene**.

17. EXCLUSIONS

a) Like previous WHMIS legislation, the update excludes some types of products from labelling and SDS requirements because these products are regulated by other laws.

Three types of excluded products are:

i) Consumer products
ii) Explosives
iii) Pesticides such as insecticides, herbicides and fungicides, and other pest control products

18. PICTOGRAMS

Most hazard classes and categories are assigned a symbol reflecting the type or severity of the hazard. The symbol is called a pictogram when it is framed by a red square set on a point. The exception is the biohazard pictogram which is in a round black border.

The WHMIS pictograms and their names are shown here:

Health Hazard 	**Flame** 	**Exclamation Mark** 
• 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)
Gas Cylinder 	**Corrosion** 	**Exploding Bomb** 
• Gases under Pressure	• Skin Corrosion/ burns • Eye Damage • Corrosive to Metals	• Explosives • Self-Reactives • Organic Peroxides
Flame over Circle 	**Environment *(Non Mandatory)** 	**Skull and Crossbones** 
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

As you just seen above, each pictogram is an image that will help to immediately show you what type of hazard is present. These descriptions are examples of the classes and categories that each pictogram represents.

19. ORIGINS OF THE PICTOGRAM

Many of these pictograms may look familiar. Some are based on the placards and labels used when transporting dangerous goods. You may notice two new pictograms – the **Exclamation Mark** and the **Health Hazard**. You may also see the environment pictogram if a supplier has chosen to use it.

Explained in the following pages is how each pictogram is utilized.

20. HAZARD GROUPS

The pictograms are used to help identify the many classes of specific hazards.

There are two hazard groups used in WHMIS:

a) Physical
b) Health

Each group is made up of a number of classes and categories

21. PHYSICAL HAZARDS

Physical hazard classes defined by WHMIS include:

a) Flammable Gases
b) Flammable Aerosols
c) Oxidizing Gases
d) Gases under pressure
e) Flammable Liquids
f) Flammable Solids
g) Self-reactive substances and mixtures
h) Pyrophoric liquids
i) Pyrophoric solids

21. PHYSICAL HAZARDS (CONTINUED)

Physical hazard classes defined by WHMIS include:

a) Self-heating substances and mixtures
b) Substances and mixtures which, in contact with water, emit flammable gases.
c) Oxidizing liquids
d) Oxidizing solids
e) Organic peroxides
f) Corrosive to metals
g) Combustible dusts
h) Simple asphyxiates
i) Pyrophoric gases
j) Physical hazards not otherwise classified

22. HEALTH HAZARDS

Health hazard classes defined by WHMIS include:

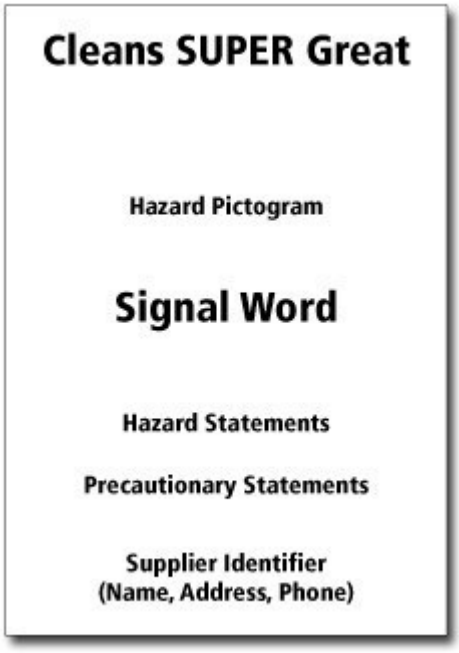
a) Acute toxicity
b) Skin corrosion/irritation
c) Serious eye damage/eye irritation
d) Respiratory or skin sensitization
e) Germ cell mutagenicity
f) Carcinogenicity
g) Reproductive toxicity
h) Specific target organ toxicity – Single / Repeated Exposure
i) Aspiration hazard
j) Biohazardous infectious material
k) Health hazards not otherwise classified

23. CATEGORIES

Hazard classes consist of categories or subcategories. The category identifies the degree of the hazard. Category 1 is always more hazardous than Category 2 or 3. Similarly, subcategory 1A is always more hazardous than subcategory 1B or 1C.

For example, Flammable liquids is a hazard class. Within this class, there are four divisions or categories, each with different flash point and/or initial boiling point cut-off values:
a) Category 1: Flash point <23°C and initial boiling point ≤35°C (most flammable)
b) Category 2: Flash point <23°C and initial boiling point >35°C
c) Category 3: Flash point ≥23°C and ≤60°C
d) Category 4: Flash point >60°C and ≤93°C

24. LABELS



a) Every product that falls into a hazard class **must** have a label and an SDS. It will be demonstrated in the next section.

Listing the hazardous ingredients on a label is not required by WHMIS. However, some suppliers may choose to list the ingredients. This additional information is acceptable under WHMIS.

Labels are important because they alert the worker that a product is Potentially hazardous. **They tell you:**

i) The major hazards of the product
ii) Basic precautions (safety steps) that you should take

25. SIGNAL WORDS

Most labels will show a **signal word** that indicates the severity of the hazard, if assigned.

There are two signal words: **Danger** and **Warning.**

a) Danger is used for the more severe hazards
b) Warning is used for the less severe hazards

c) Only one signal word will appear on the label the word Danger will be used if both Danger and Warning are assigned. The regulations specify which of these words is to be used for each hazard class and category.

d) Some low hazard categories do not have a signal word assigned.

26. HAZARD STATEMENTS

The label will also have hazard statements. **Hazard statements** are brief, standardized sentences that describe the hazards of the product. The wording of the hazard statement helps to describe the **Degree Of Hazard.**

The following are examples of hazard statements:

a) Extremely flammable gas
b) Contains gas under pressure; may explode if heated
c) Fatal if inhaled
d) Causes eye irritation
e) May cause cancer

27. PRECAUTIONARY STATEMENTS

Precautionary statements provide standardized advice on how to minimize or prevent harmful effects from the product. These statements can include instructions about storage, use, first aid, personal protective equipment, and emergency measures.

There are many precautionary statements, including:

a) Keep container tightly closed
b) Wear protective gloves/protective clothing/eye protection/face protection
c) If exposed or concerned: Get medical advice/attention.
d) Fight fire remotely due to the risk of explosion.
e) Protect from sunlight.

Precautionary statements on labels may not identify all of the control measures that are necessary. Check the SDS for more information.

28. LABEL ELEMENTS

a) Here is a sample of product K1.

The skull and the crossbones pictogram indicates that the product poses a health hazard of higher concern. While the exclamation mark pictogram indicates that the product poses another health hazard, in this case, skin irritation.

The signal word is **Danger**

The hazard statements are:

i) Fatal if swallowed and Causes skin irritation
ii) This label also shows precautionary statements.
iii) Labels must be both in English and French.

28. LABEL ELEMENTS (CONTINUED)

b) While labels may vary in the way they are laid out, they will be required on hazardous products intended for use in the workplace. The regulations require that the pictogram, signal word and hazard statements must be grouped together.

i) Product identifier
ii) Hazard pictogram
iii) Signal word
iv) Hazard statement
v) Precautionary statements
vi) Supplier identification

29. WORKER RESPONSIBILITIES UNDER WHMIS

a) Check to see if there is a label.
b) Read, understand, and follow the instructions on it.
c) Follow your workplace's safe work procedure
d) Ask for new label when the old one cannot be seen or read properly.
e) Make sure that a **workplace label** is attached when you transfer a chemical to a new container.

Tip: Used together, the pictogram, the signal word and the hazard statements indicate the nature and severity of the hazard(s) presented by the product.

30. PHYSICAL HAZARD CLASSES

In this section, we'll take a look at the physical classes.

Some of the classes represent materials with similar hazards (ex: flammable liquids or flammable gases), especially in terms of how we use, handle or store the products.

Examining classes with similar hazards will help your understanding.

31. FLAMMABLES

a) There are many classes of flammable materials. Some of the classes are for materials that we commonly encounter at work:

i) Flammable gases
ii) Flammable solids
iii) Flammable aerosols

b) All of these materials will burn if ignited by a spark, static discharge or a hot surface.

Other classes that are not common in the workplace and use this pictogram have similar safety concerns.

i) Pyrophoric liquids, solids, and gases
ii) Self-heating substances and mixtures
iii) Substances and mixtures which, in contact with water, emit flammable gases

c) Flammables Examples:

i) Propane; heating, car fuels; Butane, fuel and aerosol propellant.
ii) Acetylene; welding
iii) Acetone; nail polish removers, industrial cleaners
iv) Paint thinner; cleaner for paints, varnishes, and equipment
v) Kerosene; home heating fuel
vi) Gasoline; fuel and solvent

32. OXIDIZERS

a) There are 3 classes of oxidizing materials:

- **i)** Oxidizing Gases
- **ii)** Oxidizing Liquids
- **iii)** Oxidizing Solids

b) Oxygen is necessary for a fire to burn. Oxidizers do not usually burn by themselves, but they will:

i) Increase the intensity of a fire.

ii) Cause materials that do not burn to suddenly catch fire, sometimes even without an ignition source.

c) Example of an oxidizer:

i) Nitric Acid is an example of an oxidizer. It is used to manufacture explosives. (Can spontaneously ignite if spilled on cotton.)

d) Precautionary Statement example for Nitric Acid:

i) Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
ii) No Smoking
iii) Keep away from clothing and other combustible materials.
iv) Wear protective gloves, protective clothing, eye protection and face protection.
v) Wear fire resistant or flame retardant clothing.

33. GASES UNDER PRESSURE

a) These gases are stored under pressure in a container, liquefied, chilled, or dissolved in a carrier. **The main hazards are:**

- **i)** The cylinder or container may explode if heated.
- **ii)** Leaking gas can be very cold and may cause frostbite if it touches your skin.
- **iii)** In addition, a leaking cylinder can rapidly release extremely large amounts of gas into the workplace.

b) Example: When exposed to high temperatures and direct sunlight, cylinders can explode. In St. Louis, Missouri, a propylene cylinder valve vented gas which ignited and caused a domino effect fire.

The small fire from one propylene cylinder spread to others and then to propane and acetylene cylinders. Exploding cylinders flew 800 feet, damaged property, and started fires in the community.

34. CORROSIVE TO METALS

a) Materials that are **Corrosive To Metals** can damage or destroy metals (steel and aluminum).

b) When a corrosive material eats through a container, the contents may spill out into the workplace resulting in health effects, reactivity, or fire damage.

c) Common corrosives are nitric acid, hydrochloric acid, and sodium hydroxide solutions.

35. OTHER PHYSICAL HAZARDS

a) **Self-Reactive substances and mixtures**, **and** **Organic Peroxides** are two classes that may be explosive or flammable, or even both.

b) Self-reactive substances and mixtures are unstable materials that can cause or increase the intensity of a fire. Many organic peroxides are unstable, and may be highly reactive or explosive.

c) These materials require specific storage and handling.

d) WHMIS also includes these hazards:

- **i)** **Combustible Dusts** – A mixture or substance that is in the form of finely divided solid particles that, upon ignition, is liable to catch fire or explode when dispersed in air.
- **ii)** **Simple Asphyxiates** – Gases that may displace oxygen in air, and cause rapid suffocation.
- **iii)** **Physical Hazards not otherwise classified (PHNOC)** – Hazards that occur by chemical reaction and result in the serious injury or death of a person at the time the reaction occurs. For example, injury or death from a violent chemical reaction like hazardous polymerization. These hazards do not fall into another physical hazard class.

e) Combustible dusts and simply asphyxiates do not require a pictogram. PHNOC requires a pictogram that is applicable to the hazard.

36. HEALTH HAZARDS

WHMIS health hazard classes are the following:

a) Acute Toxicity
b) Skin Corrosion / irritation
c) Serious eye damage / eye irritation
d) Respiratory or skin sensitization
e) Germ cell mutagenicity
f) Carcinogenicity
g) Reproductive toxicity
h) Specific target organ toxicity – Single exposure
i) Specific target organ toxicity – Repeated Exposure
j) Aspiration Hazard
k) Biohazardous infectious materials
l) Health hazards not otherwise classified

37. THE HEALTH HAZARD PICTOGRAM

a) The Health Hazard Pictogram is used for a number of classes:

i) Respiratory or skin sensitization
ii) Germ cell mutagenicity
iii) Carcinogenicity
iv) Reproductive toxicity
v) Specific target organ toxicity – Single exposure and Repeated Exposure
vi) Aspiration hazard

b) Recall that products can belong to one or more classes, depending on their hazards. Benzene is an example that has many hazards and belongs to several classes.

37. (CONTINUED) THE EXCLAMATION MARK PICTOGRAM

c) Like the health hazard pictogram, the exclamation mark pictogram is used for a number of classes:

i) Acute Toxicity (Cat. 4)
ii) Skin Corrosion / Irritation (Cat.2)
iii) Serious Eye Damage / Irritation (Cat.2)
iv) Respiratory or skin sensitization (Cat. 1)
v) Specific target organ toxicity – Single exposure (Cat.3)

c) This pictogram indicates products that have health hazard, however, these hazards may not be as severe as other categories in that class.

38. A CLOSER LOOK AT SOME CLASSES

a) These products can cause severe health effects or even death if you breathe them in, if they come in contact with your skin, or if they are swallowed.
b) The **acute toxicity** hazard class uses the skull and crossbones or the exclamation mark pictogram to indicate products that can cause adverse effects following **brief exposure.**
c) The hazard statements for this class will help indicate the seriousness of the effects. Statements with **fatal** are more serious than **toxic**. **Toxic** is more serious than harmful.

39. USING THE LABEL

How do you know if the product is classified as fatal, toxic or harmful? Read the label for more information, including the hazard statements. For example:

a) Acute toxicity – Inhalation **(Categories 1 and 2)** is labelled with the skull and crossbones pictogram and the signal word Danger. In this case, you see the hazard statement **Fatal if inhaled.**

b) Acute toxicity – Inhalation **(Category 3)** is labelled with the skull and crossbones pictogram and the signal word Danger and the hazard statement **Toxic if inhaled.**

c) Acute toxicity – Inhalation **(Category 4)** is labelled with the exclamation mark and the signal word Warning. The hazard statement is **Harmful if inhaled.**

40. SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE

Specific Target Organ Toxicity Single Exposure is the hazard class for products that may cause significant, non-lethal damage to organs following a single exposure. In addition, products that may cause respiratory tract irritation and/or drowsiness or dizziness are covered in this class.

These products are labelled with either the health hazard or the exclamation mark pictogram.
For example, toluene may cause drowsiness or dizziness.

Like the Acute toxicity class, read the label and look for the pictogram, signal word, and hazard statement to determine the severity level of the hazard.

41. SKIN AND EYE

a) These products can cause effects ranging from severe skin burns and eye damage (corrosion) to skin irritation or eye irritation.

The corrosion and exclamation mark pictograms are used to indicate the following classes:

i) Skin corrosion/irritation
ii) Serious eye damage/eye irritation

b) Corrosive to metals class also uses the pictogram on the right.

42. COMBINING ELEMENTS

Here is a summary that shows how the combination of pictograms, signal words, and hazard statements work together to tell you the degree of the hazard.

Class/Category	Serious Eye Damage - Category 1	Eye Irritation - Category 2A	Eye Irritation - Category 2B
Pictogram			(no pictogram)
Signal word	Danger	Warning	Warning
Hazard statement	Causes serious eye damage.	Causes serious eye irritation.	Causes eye irritation.

43. SKIN SENSITIZATION

a) The exclamation mark is also used for products that can cause allergic skin reactions. This hazard class is known as **Skin sensitization.**

b) The signal word is Warning and the hazard statement is **May cause an allergic skin reaction**.

c) Methyl methacrylate is an example of a product that causes skin sensitization.

44. SAFETY DATA SHEETS (SDSs)

a) The safety data sheet is a document created or obtained by the supplier of the product. The SDS must be provided to the customer at the time of sale.

b) It provides more detailed information about the hazardous product than the label does.

c) Employers and workers use the information on the SDS to protect themselves from hazards, for safe handling, storage, use procedures, and for emergency measures.

45. WHY SDSs ARE NEEDED

Why do you need an SDS?

a) There are 4 basic questions that are answered by the SDS:

i) What are the identities of the product and the supplier?
ii) What are the hazards?
iii) What precautions should I take to work safely with this material?
iv) What do I do in the case of an emergency?

b) SDSs Have 16 sections

i) Have a variable number of pages.
ii) Are available for every hazardous product in your workplace that is covered by WHMIS.
iii) Your employer must obtain or prepare them, and show you how to access them.

c) There is a standardized format for the SDS. The information must always be in the same section, regardless of which supplier created the SDS.

d) If there are phrases or terms on the SDS that you don't understand, ask your supervisor, a member of your health and safety committee or your health and safety coordinator for help.

The 16 sections of the new SDS cover:

1. Identification;
2. Hazard(s) Identification;
3. Composition/Information on Ingredients;
4. First-Aid Measures;
5. Fire-Fighting Measures;
6. Accidental Release Measures;
7. Handling and Storage;
8. Exposure Controls/Personal Protection;
9. Physical and Chemical Properties;
10. Stability and Reactivity;
11. Toxicological Information;
12. Ecological Information;
13. Disposal Considerations;
14. Transport Information;
15. Regulatory Information; and
16. Other Information.

e) See image to the right for information that must be present on an SDS.

f) *Sections 12, 13, 14 and 15 require the headings to be present, but under WHMIS, the supplier has the option to not provide information in these sections.

➢ Please review the following pages to see what information is in each section of an SDS.

46. SECTIONS OF A SDS (PAGE 23-25)

Section and Heading		Specific Information Elements
1	Identification	• Product identifier (e.g. product Name) • Other means of identification (e.g. product family, synonyms, etc.) • Recommended use • Restrictions on use • Canadian supplier identifier - Name, full address and phone number(s) • Emergency telephone number and any restrictions on the use of that number, if applicable.
2	Hazard identification	• Hazard classification (class, category) of substance or mixture • Label elements: - Pictogram (image) or the name of the pictogram (e.g., flame, skull and crossbones) - Signal word(s) - Hazard statement(s) - Precautionary statement(s) • Other hazards which do not result in classification (e.g., molten metal hazard)
3	Composition/Information on ingredients	• When a hazardous product is a material or substance: - Chemical name - Common name and synonyms - Chemical Abstract Service (CAS) registry number and any unique identifiers - Chemical name of impurities, stabilizing solvents and/or additives* • For each material or substance in a mixture that is classified in a health hazard class**: - Chemical name - Common name and synonyms - CAS registry number and any unique identifiers - Concentration NOTE: Confidential business information rules can apply
4	First-aid measures	• First-aid measures by route of exposure: - Inhalation - Skin contact - Eye contact - Ingestion • Most important symptoms and effects (acute or delayed) • Medical attention and special treatment, if necessary
5	Fire-fighting measures	• Suitable extinguishing media • Unsuitable extinguishing media • Specific hazards arising from the hazardous product (e.g., hazardous combustion products) • Special protective equipment and precautions for firefighters

6	Accidental release measures	• Personal precautions, protective equipment and emergency procedures • Methods and materials for containment and cleaning up
7	Handling and storage	• Precautions for safe handling • Conditions for safe storage (including incompatible materials)
8	Exposure controls/ Personal protection	• Control parameters, including occupational exposure guidelines or biological exposure limits and the source of those values • Appropriate engineering controls • Individual protection measures (e.g. personal protective equipment): - Eye/face protection - Skin protection - Respiratory protection - General hygiene considerations
9	Physical and chemical properties	• Appearance (physical state, colour, etc.) • Odour • Odour threshold • pH • Melting point/Freezing point • Initial boiling point/boiling range • Flash point • Evaporation rate • Flammability (solid; gas) • Lower flammable/explosive limit • Upper flammable/explosive limit • Vapour pressure • Vapour density • Relative density • Solubility • Partition coefficient, n-octanol/water • Self-ignition temperature • Decomposition temperature • Viscosity
10	Stability and reactivity	• Reactivity • Chemical stability • Possibility of hazardous reactions • Conditions to avoid (e.g., static discharge, shock, or vibration) • Incompatible materials • Hazardous decomposition products
11	Toxicological information	Concise but complete description of the various toxic health effects and the data used to identify those effects, including: - Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact) - Symptoms related to the physical, chemical and toxicological characteristics - Delayed and immediate effects, and chronic effects from short-term and long-term exposure - Numerical measures of toxicity

12	Ecological information***	• Ecotoxicity • Persistence and degradability • Bioaccumulative potential • Mobility in soil • Other adverse effects
13	Disposal considerations***	Information on safe handling for disposal and methods of disposal, including any contaminated packaging
14	Transport information***	• UN number • UN proper shipping name • Transport hazard class(es) • Packing group • Environmental hazards • Transport in bulk, if applicable • Special precautions
15	Regulatory information***	Safety, health and environmental regulations specific to the product
16	Other information	Date of the latest revision of the SDS

47. SDS ADDITIONAL INFORMATION

a) The supplier that must be identified on an SDS is the initial supplier identifier (i.e., the name, address and telephone number of either the Canadian manufacturer or the Canadian importer). There are two exceptions to this requirement. In a situation where a hazardous product is being sold by a distributor, the distributor may replace the contact information of the initial supplier with their own. In a situation where an importer imports a hazardous product for use in their own workplace in Canada (i.e., the importer is not selling the hazardous product), the importer may retain the name, address and telephone number of the foreign supplier on the SDS instead of replacing it with their own contact information.

*These impurities and stabilizing products are those that are in a health hazard class and contribute to the classification of the material or substance. **Each ingredient in the mixture must be listed when it is classified in a health hazard class and is present above the concentration limit that is designated for the hazard class in which it is classified or is present in the mixture at a concentration that results in the mixture being classified in any health hazard class.

***Sections 12 to 15 require the headings to be present, but under Canadian regulations, the supplier has the option to not provide information in these sections.

48. REVIEW OF A SDS

Let's look at an SDS (*Ask for an example copy from Health and Safety Department)

a) Remember the **four basic questions** that the SDS should answer.

- **i)** **Identity** of the product and supplier?
- **ii)** **Hazards** of the product?
- **iii)** **Precautions** you should take?
- **iv)** What to do in an **emergency?**

49. HAZARD CONTROL

a) The information on the SDS should be used along with your knowledge of the specific ways the product is used in your workplace to know what controls you need.

Look for recommendations about precautions. These statements could include safe handling and use, or be about ventilation (general or local exhaust) and personal protective equipment that may be needed.

b) When hazards are present, the SDS should describe the hazard and provide safety precautions.

50. WHERE TO FIND SDSs

a) SDSs must be readily available to everyone in the workplace.
b) SDSs may be stored in a binder or they may be stored electronically on a computer.
c) You will be trained on how to understand them and where to find them in your workplace in the final exam.

d) For a product that is classified in **Skin corrosion – Category 1**, the label states **Danger. Causes severe skin burns and eye damage.**

e) **The SDS may also state:**

i) Skin: Contact can cause pain, redness, burns and blistering. Permanent scarring can result.
ii) Eyes: Contact causes severe burns with redness, swelling, pain and blurred vision. Permanent damage including blindness can result.

f) REMEMBER!: Before you start using a product, be sure to **read** the SDSs.

51. REVIEW AND SUMMARY

The image can prove useful as a reference guide when understand the differences between WHMIS 1988 & 2015

WHMIS

CLASS/ DIVISION	DESCRIPTION	SYMBOL
Class A	Compressed Gas	
Class B	Flammable and Combustible Material	
Division 1	Flammable Gases	
Division 2	Flammable Liquids	
Division 3	Combustible Liquids	
Division 4	Flammable Solids	
Division 5	Flammable Aerosols	
Division 6	Reactive Flammable Material	
Class C	Oxidizing Material	
Class D	Poisonous and Infectious Material	
Division 1	Materials Causing Immediate and Serious Toxic Effects	
Division 2 (a)	Materials Causing Other Toxic Effects	
Division 2 (b)	Materials Causing Other Toxic Effects	
Division 3	Biohazardous Infectious Material	
Class E	Corrosive Material	
Class F	Dangerously Reactive Material	

*WHMIS 2015 underlined items are new hazards
STOT SE/RE = Damage to organs (e.g. liver, kidneys, thyroid) through single and/or repeated exposure.

WHMIS 2015

CLASS/ DIVISION	DESCRIPTION	SYMBOL
Compressed Gas	Gases Under Pressure	
Flammable Material		
Flammable Gases	Cat. 1	
Flammable Liquids	Cat. 1, 2, & 3	
Note: *Flammable Liquids Cat. 4 (i.e., Combustible Liquid), has no symbol.*		
Flammable Solids		
Flammable Aerosols	Cat. 1 & 2	
Pyrophoric Gases, Liquids, & Solids		
Chemicals which, in Contact with Water Emit Flammable Gases		
Self-Heating Liquids/Solids *(Other than Pyrophoric)*		
Oxidizing Liquids, Solids, & Gases		
Organic Peroxide	Type A	
	Type B	
	Types C through F	
	Type G	No Labeling
Toxicity & Other Health Hazards		
Acute Toxicity *(Oral/Dermal/Inhalation)*	Fatal *(Cat. 1 & 2)* or Toxic *(Cat. 3)*	
	Harmful *(Cat. 4)*	
Note: Substances that react vigorously with water to release a toxic gas *(current WHMIS class F)* would be classified in the Acute Toxicity hazard class.		
Other Health Effects *(Severe and/or Chronic)*	Aspiration; Carcinogens, Mutagens, Reproductive Toxins; Respiratory Sensitizer; STOT SE/RE	
Notes: Reproductive Toxicity – Effects on or via lactation has no symbol.		
Other Health Effects *(Less Severe)*	Skin/Eye/Respiratory Irritant; Skin Sensitizer; Narcotic Effects	
Note: *Eye Irritant Cat. 2B has no symbol.*		
		
Corrosive Material		
Corrosive to Metals		
Skin Corrosion/Burns		
Eye Damage		
Note: *Materials causing eye damage only, were not previously labelled with a corrosive symbol.*		
Self-Reactive Chemicals	Type A	
	Type B	
	Types C through F	
Simple Asphyxiants & Combustible Dusts		No symbol
Health Hazards Not Otherwise Classified (HHNOC)		*Any applicable WHMIS 2015 symbol*

52. SUMMARY

- This program was created to assist all workers to learn how to:
  - Understand Labels
  - Recognize Pictograms
  - Identify the hazards linked to each class
  - Find additional information about hazards and protective measures from safety data sheets
  - Focuses on the requirements set out in the Hazardous Products Act and in the Hazardous Products Regulations.
- Please ask your trainer for a copy of the exam.
- If you are not sure about any questions. Review the program material or ask for assistance.
- You require a minimum of 80% on the exam to receive your card as proof of training completion.