



# WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM

WHMIS Training

# Introduction

Every day, workers across Canada are exposed to hazardous materials on the job. Many materials within DSBN workplaces have the potential to cause illness or injury, including:

- Cleaning Products
- Solvents
- Pesticides
- Paints
- Chemicals

WHMIS is designed to ensure employers and workers have up to date information about hazardous materials used in the workplace.

**Knowing about WHMIS can help keep you and your co-workers healthy and safe.**

**At the end of this course, you will know:**

- The basics of WHMIS (1988) and WHMIS (2015) and how it is intended to be applied within the DSBN.
- The procedures that are currently in place, where to find them, and what you have to do to apply them.
- Your role to ensure that all staff are fully informed, educated and trained to work with or near hazardous substances.

## What is WHMIS?

“An information System designed to advise you on the Hazardous Materials you may encounter in your Workplace”

**WHMIS** stands for:

**W**orkplace  
**H**azardous  
**M**aterials  
**I**nformation  
**S**ystem

**Why WHMIS?**

- WHMIS was created to prevent injuries, illness and death caused by hazardous materials known as “Controlled Products”
- As a worker of the District School Board of Niagara (DSBN), you have a responsibility to be aware of the types of materials used in schools which could pose a danger to yourself, coworkers, and students of the DSBN

## WHMIS (2015)

Many countries have systems for chemical classification and hazard communication. In Canada, this system is called **WHMIS**. Canada has aligned WHMIS with the “**Globally Harmonized System for the Classification and Labelling of Chemicals**”, or **GHS**.

### Benefits of Aligning WHMIS with GHS

- Improved, consistent hazard language worldwide
- Encourages safe transport, handling, and use of hazardous products
- Promotes better emergency response
- Better regulatory efficiency and compliance
- Easier trade between countries
- Reduced costs
- Reduced need for testing and evaluation



### Transition from WHMIS (1988) to WHMIS (2015)

**PHASE 1 (Feb 11, 2015 – May 31, 2017):** Suppliers may sell and employers may use hazardous products with the old WHMIS labels and safety data sheets or the new ones.

**PHASE 2 (June 1, 2017 – May 31, 2018):** Suppliers may continue to sell and employers may continue to use hazardous products with the old WHMIS labels and safety data sheets or the new ones. Chemical manufacturers and importers must sell hazardous products with the new WHMIS 2015 labels and safety data sheets.

**PHASE 3 (June 1, 2018 – Nov 30, 2018):** Distributors must sell hazardous products that comply with WHMIS 2015 requirements. Employers have these 6 months to transition their current inventory of hazardous products into compliance with WHMIS 2015.

Effective **December 1, 2018**, the transition to WHMIS 2015 must be complete for all parties.

Since suppliers have begun selling and employers have begun using hazardous products with the new WHMIS 2015 labels and SDSs, it is important that all workers understand how to read both WHMIS 1988 and WHMIS 2015 labels and data sheets.

## Differences Between WHMIS (1988) and WHMIS (2015)

- New classification rules and hazard classes
- Hazards are broken down into two main hazard classes in WHMIS 2015: physical hazards and health hazards
- New labelling requirements (WHMIS 2015), including **pictograms** instead of **symbols**, **signal words**, **hazard statements**, and **precautionary statements**
- New format for **Safety Data Sheets** (WHMIS 2015), previously **Material Safety Data Sheets** (WHMIS 1988)

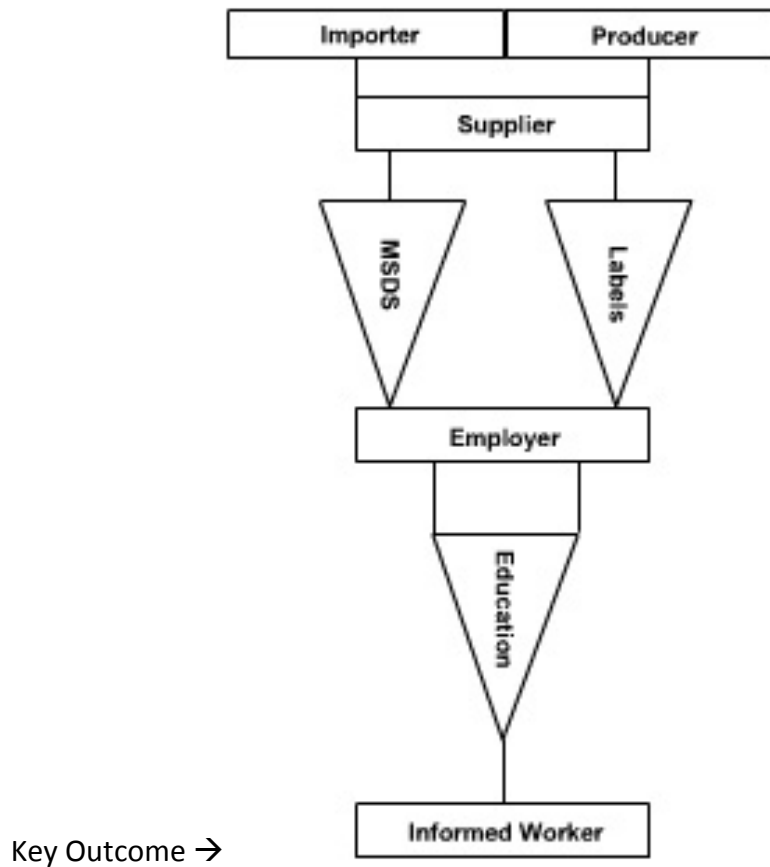
WHMIS (1988)	WHMIS (2015)
<b>6 Hazard Class</b> <ul style="list-style-type: none"><li>• 3 Divisions</li></ul>	<b>32 Hazard Classes</b> <ul style="list-style-type: none"><li>• Multiple hazard categories</li></ul>
<b>Materials Safety Data Sheet (MSDS)</b> <ul style="list-style-type: none"><li>• 9 Sections</li><li>• Updated required every 3 years or as needed</li></ul>	<b>Safety Data Sheet (SDS)</b> <ul style="list-style-type: none"><li>• 16 Sections</li><li>• Update required only as needed</li></ul>
<b>Symbols (8)</b> <ul style="list-style-type: none"><li>• Black circle</li></ul>	<b>Pictograms (10)</b> <ul style="list-style-type: none"><li>• Red square on one of its points</li></ul>

## WHMIS Key Elements

There are 3 key elements in this Information System called **WHMIS**:

1. Labels
2. Material Safety Data Sheets (WHMIS 1988) or Safety Data Sheets (WHMIS 2015)
3. Worker Training

## Information Flow



## WHMIS Legislation

Both Federal and Provincial legislation applies to WHMIS.

### **Federal Legislation – Hazardous Products Act**

- Controlled Products Regulations
- Ingredient Disclosure List

### **Provincial Legislation – Occupational Health and Safety Act**

- WHMIS Regulation
- Reference to Parts of the Controlled Products Regulations

The Ontario Occupational Health and Safety Act requires employers to obtain Labels and MSDS's or SDS's for all Controlled Products used in the workplace, and provide training on the following of these products to their workers:

- Hazard Identification
- Safe Handling
- Correct Storage
- Disposal of Hazardous Materials

## WHMIS Responsibilities

The roles and responsibilities are the **same** in both WHMIS 1988 and WHMIS 2015, which include:

### **Suppliers / Manufacturers:**

- Identify and classify controlled products
- Prepare supplier labels and MSDSs or SDSs
- Revise/update MSDSs or SDSs and labels, as required

### **Employers / Supervisors:**

- Create/apply workplace labels to ensure all hazardous products are labelled
- Obtain current MSDSs or SDSs
- Provide worker education and training and review the program annually
- Ensure appropriate control measures are in place to protect workers' health and safety
- Establish a **WHMIS** Program

### **Workers:**

- Use or wear the personal protective equipment and personal protective clothing as required by the employer
- Participate in the identification and control of hazards
- Participate in training
- Understand and use information provided in training, on product labels, and on product MSDS/SDS

# WHMIS (1988) Classifications

## 6 Classes of Chemicals and Divisions (8 Symbols)

A – Compressed Gas

D – Toxic (3 divisions)

B – Flammable

E – Corrosive

C – Oxidizing

F – Dangerously Reactive

### Class A: Compressed Gas

Cylinders are used to store **compressed gases** under pressure. WHMIS treats all compressed gases as controlled products because gas leaking from a cylinder, a valve, or a regulator can cause injury or damage.

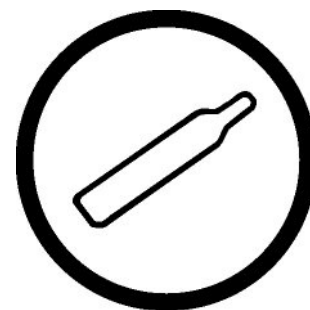
*Examples:* Oxygen, Helium, fire extinguishers

#### Risks:

- Poses an explosion hazard because contents of cylinder are under pressure
- Container may explode if heated in a fire
- Container may explode if dropped

#### Precautions:

- Ensure cylinder is always secured
- Store in appropriate designated areas
- Do not drop or allow to fall
- Never move a cylinder without a protective cap



### Class B: Flammables/Combustibles

A **flammable** is a substance that has a flash point below 37.8 C

A **combustible** is a substance which, when heated to 37.8 C or greater, gives off sufficient vapours to ignite in the presence of an ignition source such as a spark or flame

*Examples:* Flammable Gas – Butane, Propane  
Flammable Liquid – Gasoline  
Combustible Liquid – Diesel, Alcohol



Risks:

- Potential fire hazard
- May ignite spontaneously
- May be a material which will release flammable products if allowed to degrade or when exposed to water

Precautions:

- Use only in well ventilated areas
- Store in designated flammable storage areas
- Avoid excessive heat
- Avoid sparks and other sources of ignition

### **Class C: Oxidizing Materials**

**Oxidizers** are substances that can readily release oxygen from their chemical structure or react with other materials to produce oxygen. Oxidizers increase the likelihood of a fire or make it burn more intensely. Strong oxidizers can start fires with combustibles without the need for a flame. When mixed with an acid, an oxidizer may create chlorine gas.

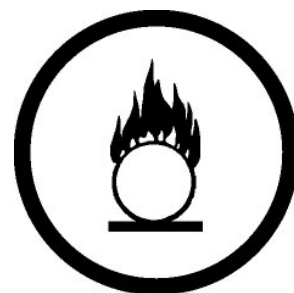
*Examples:* Chlorine, Bleach, Ammonium Nitrate, Peroxides

Risks:

- Can cause skin or eye burns
- Increased fire and explosion hazard
- Can cause other materials to react or break down
- May cause combustibles to explode or react violently

Precautions:

- Store in areas away from combustibles
- Wear body, hand, face and eye protection
- Store in proper containers which will not rust or oxidize





## Class D – Division 1: Toxic Immediate/Severe

Materials in this subdivision are generally those **highly toxic chemicals that cause death within a short period of time following exposure**. All materials in Division 1 are acute as opposed to chronic.

*Examples:* Cyanide, Arsenic, Sulphuric Acid

### Risks:

- Chemicals which could cause death following an exposure
- May be fatal if ingested or inhaled
- May be absorbed through the skin



### Precautions:

- Avoid breathing dust or vapours
- Avoid contact with skin or eyes
- Use personal protective equipment (PPE) or work in properly designed areas
- Store only in designated areas

## Class D – Division 2: Toxic Long-Term Effects

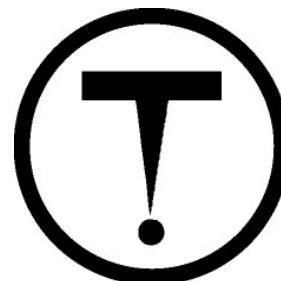
Chemicals can also have other long-term effects. **Prolonged exposure to chemicals even at levels that are below those which are immediate and severe can also be harmful to health.**

Effects of exposure occur over a period of time and are dependent on the type of chemical. Eye and skin irritants are included in this group.

*Examples:* Sensitizers, carcinogens

### Risks:

- May cause death or permanent injury
- May cause birth defects or sterility
- May cause cancer
- May be a sensitizer causing allergies



### Precautions:

- Avoid direct contact or inhalation
- Use personal protective equipment (PPE)
- Work in well ventilated areas
- Store only in designated areas

## Class D – Division 3: Bio-Hazardous Infectious

Biohazardous infectious materials are classified as those which, when they come into contact with the body, are organisms or toxins that may cause serious infectious disease or the effects of the disease. Biohazardous infectious materials enter the body through a puncture, cut or through contact with the mucous membrane. Possible diseases include: HIV, Hepatitis A/B/C, Tuberculosis, and Smallpox

*Examples:* Blood, urine, feces, vomit

### Risks:

- Biological materials which can cause a disease or have the same effects as the disease
- Materials which could contain organisms which are infectious
- Materials which could contain biological toxins or allergenic sensitizers

### Precautions:

- Use “routine practices” when handling biological material (e.g. hand hygiene, PPE)
- Special training required to work with these materials
- Avoid all direct contact
- Avoid breathing fumes
- Sterilize area after work
- Store only in designated areas



## Class E – Corrosive Materials

As the symbol indicates, **these are substances that corrode metal and destroy skin and other soft tissue.** Strong acids and strong alkalis are in this group.

*Examples:* Acids – Hydrochloric, Sulphuric  
Alkalis – Sodium Hydroxide (used in oven cleaner)

### Risks:

- Eye and skin irritation on exposure
- Severe burns/tissue damage possible
- Lung damage if inhaled
- May cause blindness if eyes contacted
- Environmental damage from vapours



Precautions:

- Wear body, face and eye protection
- Use breathing apparatus
- Use ventilation
- Avoid all body contact
- Use appropriate storage containers and proper non-vented closures

### **Class F – Dangerously Reactive Materials**

This class is usually only found in laboratories. It includes **chemicals that present a hazard as a result of their tendency to undergo unexpected and usually violent reactions**. Chemicals that react with water to produce a toxic gas are in this group also.

*Examples:* Picric acid, sodium, azides, magnesium

Risks:

- Chemically unstable
- May react violently in an unexpected manner
- May explode from heat or shock
- May react with water
- May violently polymerize





Precautions:

- Specific precautions will vary
- Avoid vibration, shocks and sudden temperature changes
- Read the MSDS for specific storage and packaging requirements

# WHMIS (2015) Classifications

## Hazard Groups, Classes, and Categories

<b>HAZARD GROUPS (2):</b>	<b>Physical</b> 	<b>Health</b> 
<b>HAZARD CLASSES:</b>	19 Physical Hazard Classes	12 Health Hazard Classes
<b>HAZARD CATEGORIES:</b>	<p>A category is a sub-division of a hazard class which identifies the degree of hazard within a hazard class. Category 1 is the highest level of hazard, followed by Category 2 and so on.</p>	

## Physical Hazard Classes

Physical Hazard Class	Main Concern
<ul style="list-style-type: none"> <li>• Flammable Gases</li> <li>• Flammable Aerosols</li> <li>• Flammable Liquids</li> <li>• Flammable Solids</li> </ul>	These products have the ability to ignite easily and explode.
<ul style="list-style-type: none"> <li>• Oxidizing Gases</li> <li>• Oxidizing Liquids</li> <li>• Oxidizing Solids</li> </ul>	These products may cause a fire or explosion, or intensify a fire.
<ul style="list-style-type: none"> <li>• Gases under Pressure</li> </ul>	The container or cylinder holding these products may explode if heated.
<ul style="list-style-type: none"> <li>• Self-reactive Substances and Mixtures</li> </ul>	These products may react on their own to cause an explosion or fire, or may cause an explosion or fire if heated.
<ul style="list-style-type: none"> <li>• Pyrophoric Liquids</li> <li>• Pyrophoric Solids</li> <li>• Pyrophoric Gases</li> </ul>	These products can ignite spontaneously if exposed to air.
<ul style="list-style-type: none"> <li>• Self-heating Substances and Mixtures</li> </ul>	These products may ignite if exposed to air after a longer period of time or when in large amounts.
<ul style="list-style-type: none"> <li>• Substances and</li> </ul>	These products react with water to release flammable gases

Mixtures that React with Water and Release Flammable Gas	which may ignite spontaneously.
• Organic Peroxides	These products may cause an explosion or fire if heated.
• Corrosive to Metals	These products may be corrosive to metals.
• Combustible Dust	These products are finely divided solid particles which may explode or catch fire if ignited while dispersed in the air.
• Simple Asphyxiants	These products are gases which may displace oxygen in the air and cause suffocation.
• Physical Hazards Not Otherwise Classified	These products are not covered in any other physical hazard class. The hazard statement on the label and SDS will describe the nature of the hazard for these products.
*WHMIS 2015 does not incorporate the GHS Explosives Class.	

### Health Hazard Classes

Health Hazard Class	Main Concern
Acute Toxicity	These products are fatal, toxic, or harmful if inhaled, in contact with skin, or swallowed. The acute toxic effects occurring following skin contact or ingestion exposure within 24 hours, or an inhalation exposure of 4 hours.
Skin Corrosion/Irritation	These products can cause severe skin burns or skin irritation.
Serious Eye Damage/Eye Irritation	These products can cause serious eye damage or eye irritation.
Respiratory or Skin Sensitization	These product may cause allergy or asthma symptoms, or breathing difficulties if inhaled. A skin sensitizer is a product which can cause an allergic skin reaction.
Germ Cell Mutagenicity	These products may cause or are suspected of causing genetic defects to body cells which can be passed on to future generations.
Carcinogenicity	These products may cause or are suspected of causing cancer.
Reproductive Toxicity	These products may damage or are suspected of damaging fertility or the unborn child.
Specific Target Organ Toxicity – Single Exposure	These products cause or may cause damage to organs following a single exposure. These products can also cause respiratory irritation, drowsiness or dizziness.

Specific Target Organ Toxicity – Repeated Exposure	These products cause or may cause damage to organ(s) following a prolonged or repeated exposure.
Aspiration Hazard	These products may be fatal if they are swallowed and enter the airways.
Biohazardous Infectious Materials	These products are microorganisms, nucleic acids or proteins which cause or may cause infection in humans or animals, with or without toxicity
Health Hazards Not Otherwise Classified	These products are not covered in any other health hazard class. These product hazards occur following acute or repeated exposure, and have an adverse effect on the user's health. The hazard statement on the label and SDS will describe the nature of the hazard for these products.

### Environmental Hazard Classes











- Hazardous to the aquatic environment\*
- Hazardous to the ozone layer\*

\*WHMIS 2015 does not incorporate the GHS Environmental Hazard Classes

### Pictograms

Each pictogram can represent a number of classes and categories. It is important to know what the pictogram means to understand what type of hazard is present. There are classes and categories without a required pictogram. The product label and Section 2 (Hazards Identification) in the SDS will have the signal word, hazard statement(s), and other required label requirements.

## Pictograms

	<b>Exploding bomb</b> (for explosion or reactivity hazards)		<b>Flame</b> (for fire hazards)		<b>Flame over circle</b> (for oxidizing hazards)
	<b>Gas cylinder</b> (for gases under pressure)		<b>Corrosion</b> (for corrosive damage to metals, as well as skin, eyes)		<b>Skull and Crossbones</b> (can cause death or toxicity with short exposure to small amounts)
	<b>Health hazard</b> (may cause or suspected of causing serious health effects)		<b>Exclamation mark</b> (may cause less serious health effects or damage the ozone layer*)		<b>Environment*</b> (may cause damage to the aquatic environment)
	<b>Biohazardous Infectious Materials</b> (for organisms or toxins that can cause diseases in people or animals)				

\* The GHS system also defines an Environmental hazards group. This group (and its classes) was not adopted in WHMIS 2015. However, you may see the environmental classes listed on labels and Safety Data Sheets (SDSs). Including information about environmental hazards is allowed by WHMIS 2015.

## Signal Words

There are two signal words: **“Danger”** and **“Warning”**, with Danger used for high hazards. Some of the lower ranking hazard classes/categories do not use a signal word.



## Hazard Statements

Hazard statements are brief, standardized sentences that help describe the degree of the hazard (e.g. Extremely flammable gas).

## Precautionary Statements

Precautionary statements provide information about how to minimize or prevent exposure including: storage, handling, first aid, personal protective equipment, and emergency measures (e.g. Keep container tightly closed).

## Putting the Elements Together

Class/Category	Skin corrosion/ irritation - Category 1	Skin corrosion/ irritation - Category 2
Pictogram		
Signal word	Danger	Warning
Hazard statement	Causes severe skin burns and eye damage.	Causes skin irritation.

## Consumer Products

### How do consumer products fit into the picture?







Any product that is packaged in a size typically available to retail consumers and available to the public is exempt from WHMIS.

The symbols for Consumer Products are different than those of **WHMIS**.

However, once a Consumer Product is brought onto the property of the DSBN, it becomes regulated by the Occupational Health and Safety Act and **WHMIS** Regulations. **All staff must follow WHMIS. MSDS and labelling is required.**



## Consumer Product Warning Labels

	Hazard	Precautions	Degrees of Hazard	Label Warning				
<b>TOXIC PRODUCTS</b>								
	<b>Poisonous</b> May be lethal. <i>or</i> May cause serious and irreversible effects.	Do not get in eyes or on skin. Do not breathe fumes. Wear protective clothing and safety equipment as indicated on the label.	<b>Very toxic</b>  <b>Toxic</b> <b>Harmful</b>	- Extreme Danger - Sales Restricted  - Danger - Caution				
<b>CORROSIVE PRODUCT</b>								
	<b>Causes Burns</b> Will cause chemical burns to the skin, eyes and lungs. May form dangerous fumes when mixed with other chemicals.	Do not mix with other chemicals. Do not get in eyes or on skin. Do not breathe fumes. Do not swallow. Wear protective clothing as indicated on the label.	<b>Very Corrosive</b>  <b>Corrosive</b> <b>Irritant</b>	- Extreme Danger - Danger - Caution				
<b>FLAMMABLE PRODUCT</b>								
	<b>Fire hazard</b> May ignite if exposed to a spark or flame <i>or</i> May spontaneously ignite	Read the specific instructions on the label. Use only in well ventilated areas. Keep away from flames and objects that spark. Store in a safe location.	<b>Very Flammable</b>  <b>Flammable</b>  <b>Spontaneously Combustible</b>	- Extreme danger - Danger - Caution				
<b>PRESSURIZED CONTAINER</b>								
	<b>Explosion Hazard</b> Under Pressure may explode if heated. If ruptured hazardous contents will be released	Do not puncture. Do not burn. Store away from heat.						
<b>QUICK SKIN BONDING ADHESIVES</b>								
	<b>Bonds Skin Instantly</b>	Do not get in mouth, eyes or on skin.						
<p><b>Example of Consumer Labelling</b></p> <p>The symbols and hazard warnings must be on the front or main display panel of the container.</p> <div style="text-align: center;">   </div> <p style="text-align: center;"> <b>DANGER</b>          POISON          CORROSIVE    CORROSIF     </p> <p>These warnings may be located in a border anywhere on the displayed part of the container.</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>English</td> <td>French</td> </tr> <tr> <td>Warnings, Precautions, First Aid and hazardous ingredients</td> <td>Mise en garde, précautions et premier soins et ingrédients dangereux</td> </tr> </table>					English	French	Warnings, Precautions, First Aid and hazardous ingredients	Mise en garde, précautions et premier soins et ingrédients dangereux
English	French							
Warnings, Precautions, First Aid and hazardous ingredients	Mise en garde, précautions et premier soins et ingrédients dangereux							

## Supplier Labels

Labels alert you to the major hazard and provide some precautions.

**Responsibility** - SUPPLIER must

- Classify product and develop the supplier label
- Develop label according to WHMIS criteria
- Attach labels to all containers

WHMIS (1988) Supplier Label Requirements	WHMIS (2015) Supplier Label Requirements
<ol style="list-style-type: none"> <li>1. Name of Product</li> <li>2. Name of Supplier</li> <li>3. Reference to MSDS</li> <li>4. WHMIS Symbols</li> <li>5. Risk Phrases</li> <li>6. Precautionary Measures</li> <li>7. First Aid Measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Name of Product</li> <li>2. Pictogram(s)</li> <li>3. Signal Word</li> <li>4. Hazard Statement(s)</li> <li>5. Precautionary Statements</li> <li>6. Initial Supplier Identifier</li> </ol>

**Additional Requirement:** Both official languages, English and French

## Workplace Labels

**Responsibility** - EMPLOYER must

- Maintain labels on all hazardous materials
- Create or obtain a workplace label according to **WHMIS** criteria (i.e. when a product is produced in an employer's workplace, or decanted)
- Create workplace label if supplier label is illegible

**3 Required Pieces of Information:**

1. Product name
2. Safe handling instructions and precautions
3. A statement making reference to the MSDS or SDS

**Other Information:**

- The information required on workplace labels is less than the requirements on supplier labels.
- Workplace labels give the basic identification and methods to use the product safely.
- They are to be affixed to the container of the product.
- NEVER use an unlabeled product. If you do not know what is in a container, treat it as a hazardous waste. Set it aside and send it along with the next hazardous waste pick-up.

# Material Safety Data Sheets (WHMIS 1988) and Safety Data Sheets (WHMIS 2015)

Material Safety Data Sheets (MSDS) are a component of WHMIS (1988) and Safety Data Sheets (SDS) are a component of WHMIS (2015).

## Why are Material Safety Data Sheets (MSDS) and Safety Data Sheets (SDS) important?

MSDS/SDS **allows** you to protect yourself. MSDS/SDS provide more detailed information than what is found on the label. The MSDS/SDS **tells** you what hazards are present, safe storage and use procedures of the hazardous product, and the appropriate responses in various situations (e.g. first aid).

If any one comes into contact with a product that requires first aid and medical attention:

- The MSDS must accompany the injured individual to the medical facility
- The medical facility must be informed about the treatment options. For instance, some products will state when a product is ingested to “induce vomiting”, while others will state “do not induce vomiting”

## MSDS/SDS – Who is Responsible?

### Supplier:

- Create MSDS with prescribed information
- Provide MSDS in both official languages
- Ensure MSDS are complete
- MSDS are required to be updated every 3 years or as needed
- SDS are required to be updated when significant data becomes available

### Employer:

- Carry out written inventory and assessment of all controlled products being used or produced in the workplace
- Obtain current MSDS or SDS and keep them updated
- Ensure MSDS or SDS are available to all workers

## Accessing MSDS

All MSDS or SDS for products within the workplaces have been provided for all staff by the DSBN. Please ask your associate teacher for the MSDS or SDS applicable to your workplace.

# Material Safety Data Sheets (WHMIS 1988)

## Reading the Material Safety Data Sheet

A MSDS can look intimidating and contains a lot of complex scientific information. The important sections to read are **Section 6, 7, and 8**. These will provide you with important information on:

- The ways this material could affect your health
- What PPE you need to wear to use the product safely
- What first aid is necessary should something go wrong

All the required information to safely work with the product will be listed.

**Section 1:** Product Identification and Use

**Section 2:** Hazardous Ingredients

**Section 3:** Physical Data

**Section 4:** Fire & Explosion Data

**Section 5:** Reactivity Data

**Section 6:** Toxicological Properties

**Section 7:** Preventative Measures

**Section 8:** First Aid Measures

**Section 9:** Preparation Information

# Safety Data Sheet (WHMIS 2015)

All the required information to safely work with the product will be listed.

The following is the standardized format for all Safety Data Sheets (SDS):

**Section 1:** Product Identification

**Section 2:** Hazards Identification

**Section 3:** Composition/Information on Ingredients

**Section 4:** First Aid Measures

**Section 5:** Fire-fighting Measures

**Section 6:** Accidental Release Measures

**Section 7:** Handling and Storage

**Section 8:** Exposure Controls/Personal Protection

**Section 9:** Physical and Chemical Properties

**Section 10:** Stability and Reactivity

**Section 11:** Toxicological Information

**Section 12:** Ecological Information\*

**Section 13:** Disposal Considerations\*

**Section 14:** Transport Information\*

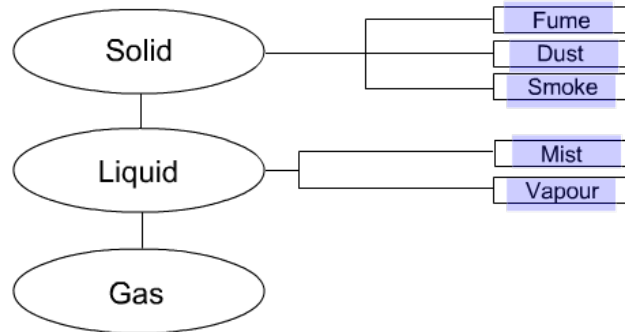
**Section 15:** Regulatory Information\*

**Section 16:** Other Information

\*Sections 12-15 are not mandatory in Canada but you may see these on SDS received from other countries

# Properties of Hazardous Materials

The state of the matter affects how the hazardous material is able to enter the body.



## Routes of Entry

### Inhalation

This is the most common route of entry for a hazardous material. Once a hazardous material becomes inhaled, it can either exert the effects directly on the respiratory system, or onto other organs, tissues or blood. Dust particles that reach the lungs can cause scarring of the lung. Smaller particles such as welding fumes can pass through the lungs into the bloodstream.



### Absorption

Some hazardous materials have the potential to be absorbed through the skin. The hazardous agent can either exert its effects directly on the skin (dermatitis), or be absorbed and travel to other target organs and systems. Usually these hazardous materials are identified on the MSDS's by the "skin notation", which indicates that there is a potential for exposure through the skin, mucous membranes or eyes, or that direct damage to the skin can result. This indicates that measures should be taken to prevent absorption such as the use of personal protective gowns, aprons, gloves, etc.



### Injection

This route of entry into the human body occurs when exposure is a result of hazardous material entering the body through an accidental penetration of the skin. Accidental injection is usually the result of an injury from a sharp object such as a needle or glass. However it can be a result of materials being forced



through the skin by the force of a gas such as compressed air. Some employees (e.g. educational assistant) may have concerns about being bitten and exposed to bodily fluids.

## Ingestion

Ingestion of toxic materials may occur as a result of poor hygiene practices such as eating in a contaminated work area, not washing your hands before a meal or smoking.

Once swallowed, toxic substances can enter the digestive tract where they may exert their effects or be carried to other target organs via the bloodstream. Some hazardous materials may accumulate in the liver and kidney. Others affect the central nervous system. Inhaled materials can be collected in the mucous and subsequently ingested.



## Target Organs

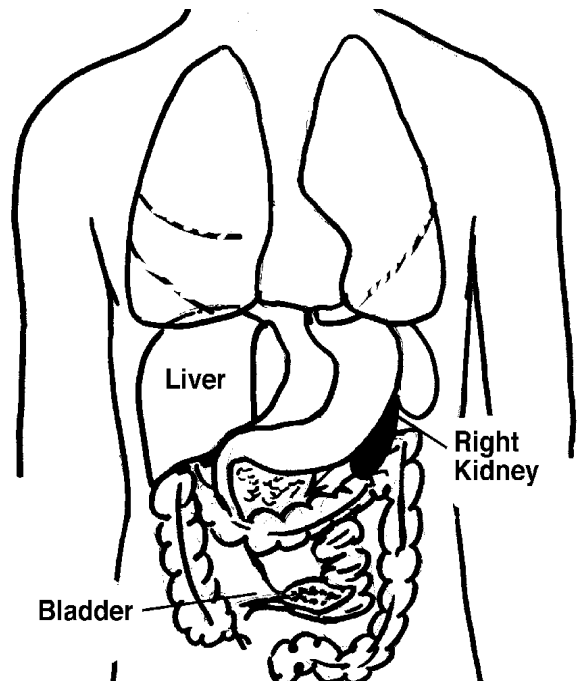
Two key body organs, the **liver** and **kidneys**, play a major role in detoxifying and balancing the body's systems by eliminating hazardous substances.

Complex chemical reactions occurring in the liver break down unwanted substances. Depending upon the concentration and the nature of the hazardous substance entering the body, it may harm the liver.

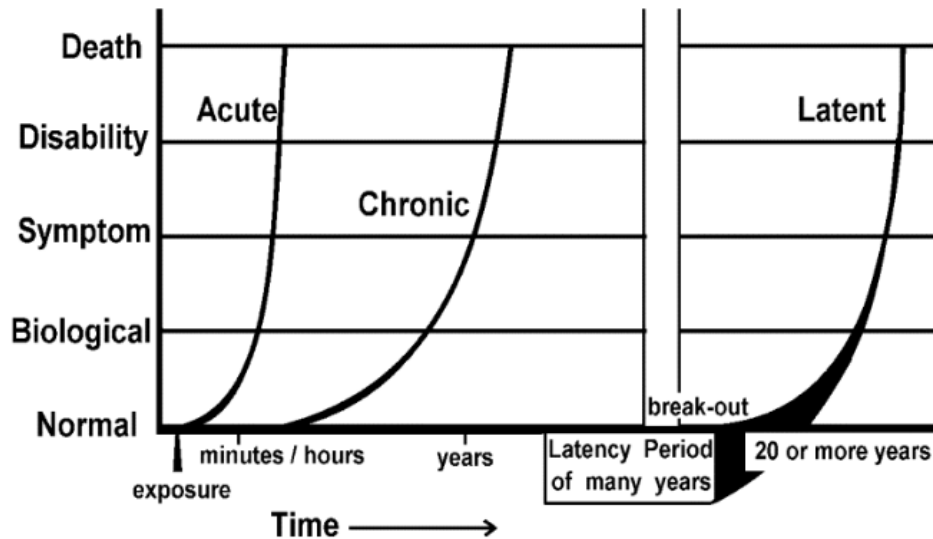
Prolonged exposure can cause irreparable damage.

The kidneys act as the blood "filter" removing substances from the blood, which in turn flow into the bladder and are excreted from the body.

The kidneys can also undergo severe damage from hazardous substances.



## The Body and Health Effects



### Acute Effect

An acute effect is produced by an exposure usually to a high concentration of a substance that produces immediate harmful effects, such as spilling acid on your body or breathing a high concentration of lethal gas.

### Chronic Effect

A chronic effect is produced by an exposure usually to a low concentration of a substance that results in harmful effects over a longer period of time, such as smoking tobacco or drinking alcohol.

### Latency Period

A latency period refers to the elapsed time between the first exposure and the onset of disease. For example, a single large exposure to asbestos dust can produce lung cancer 20 or more years later.

## Controlling Hazards

### Three Steps to Control Hazards:

- RECOGNITION – Identifying the hazard
- ASSESSMENT – Measuring against standards
- CONTROL – Eliminating or reducing the hazard

Once hazards have been identified and assessed, they can be controlled at the **source**, **along the path**, or **at the worker**.

1. The preferred method of control is at the **source**:
  - Elimination (e.g. eliminate the hazardous product completely)
  - Substitution (e.g. substitute a less toxic cleaning product for more toxic one)
  - Isolation (e.g. isolate a hazardous chemical process from the rest of the building)
  
2. The second preferred method of control is along the **path**:
  - Ventilation (e.g. general exhaust ventilation can keep the concentration of air-borne contaminants to acceptable levels)
  - Barriers (e.g. storing flammable compressed gases in an explosion-proof room or in a separate building)
  - Housekeeping (e.g. cleaning up spills promptly and putting lids back on solvent containers to prevent evaporation into the air)
  
3. The least desired method of control is at the **worker**:
  - Personal Protective Equipment (e.g. mask)
  - Work Practices (e.g. shift rotation)
  - Training

## Education

### **Know the product before using it.**

If you know the product before you use it, you will be informed of the hazards and what measures need to be taken to protect yourself.

Also, if for any reason first aid is required, you must be familiar with the product so that first aid can be rendered without wasting valuable time educating yourself about the measures to be taken after the accident has occurred.

**\* All products brought into the DSBN must have an MSDS. Everyone who purchases any product and brings it into the DSBN are responsible for ensuring an MSDS sheet is available for that product.\***

## Conclusion

Under **WHMIS**, you also have a number of rights and responsibilities.

You have the **right** to:

- Know about any hazards that you could be exposed to in the workplace
- Refuse work that is unsafe



- Consult with your Site Health and Safety Representative or a member of the Multi-Workplace Joint Health and Safety Committee

You have the **responsibility** to:

- Participate in WHMIS training
- Handle hazardous materials safely
- Comply with all health and safety laws and regulations, and with the health and safety training you receive

The key is to think before you act. Stop and consider:

- What materials you are working with
- Read the **WHMIS** labels on these products and their MSDSs or SDSs
- Know the potential dangers
- Understand how to use these materials to minimize risk
- How to clean up these products

Please complete the following quiz to conclude the Workplace Hazardous Materials Information System training.



**WHMIS QUIZ**  
**District School Board of Niagara**

<b>Trainee</b> Name:	Signature:	Date:
<b>Placement Supervisor</b> Name:	Signature:	Date:

Grade: \_\_\_\_\_

- 1. What was WHMIS created for?**
  - a. To protect the environment from toxic waste
  - b. To keep the cost of materials down
  - c. To prevent injuries caused by hazardous materials
  - d. To prevent lawsuits by injured workers
  
- 2. What does MSDS stand for?**
  - a. Material Safety Data Sheet
  - b. Material Supplier Data Safety
  - c. Material Supplier Data Sheet
  - d. Ministry Safety Data Sheet
  
- 3. Name, in order, the three steps to controlling hazards.**
  - a. Control – Assessment – Recognition
  - b. Recognition – Assessment – Control
  - c. Assessment – Control – Recognition
  - d. Recognition – Control – Assessment
  
- 4. Who is responsible for making sure MSDS labels are on all products that are brought on DSBN property?**
  - a. Everyone
  - b. Teachers
  - c. Students
  - d. Caretakers

- 5. What are the three preferred methods of control at the source?**
- a. Recycling – Substitution – Isolation
  - b. Substitution – Isolation – Elimination
  - c. Elimination – Substitution – Isolation
  - d. Elimination – Training – Recycling
- 6. An MSDS or SDS must accompany an injured work to the hospital \_\_\_\_\_.**
- a. To give information on what treatment to use
  - b. To make sure there are no spelling mistakes
  - c. Just in case the worker forgets the chemical name
  - d. To prevent liability
- 7. What should you do if you find a container with an unknown compound?**
- a. Test it and use it up
  - b. Set it aside for the next hazardous waste pick-up
  - c. Flush it down the sink
  - d. Throw it in the garbage
- 8. Once a hazard has been identified and assessed, they can be controlled by these 3 points:**
- a. At the worker, at the co-worker, at the supervisor
  - b. Along the path, at the point of removal, outsource
  - c. At the source, at the supervisor, at the worker
  - d. At the source, along the path, at the worker
- 9. Why is an MSDS or SDS so important to a worker?**
- a. It tells you what to do if you spill it
  - b. It makes you aware of possible health effects
  - c. It allows you to protect yourself
  - d. All of the above
- 10. What does WHMIS stand for?**
- a. Workplace Hazmat Materials Information System
  - b. Workplace Housing Materials Information System
  - c. Workplace Hazardous Materials Incorporating System
  - d. Workplace Hazardous Materials Information System

