

Team BIPS

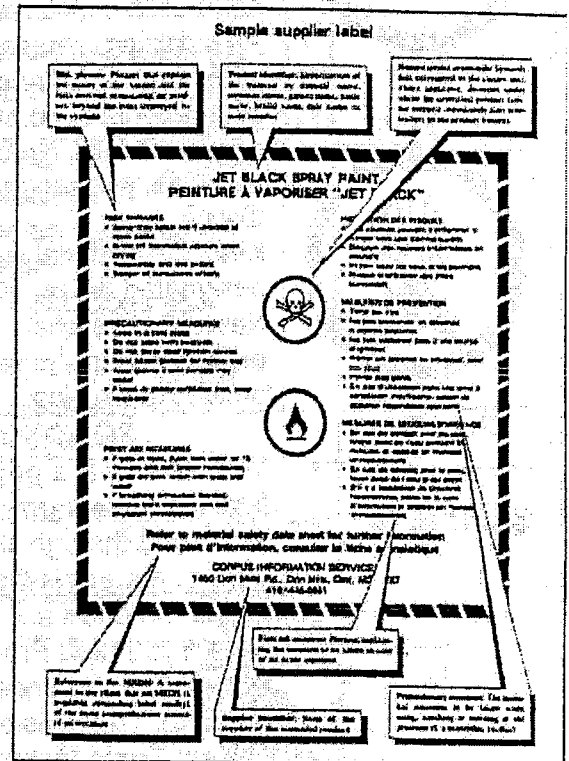
Lab
Safety
Booklet
#

What is this thing called "WHMIS"?

- WHMIS stands for **Workplace Hazardous Materials Information System**.
- It is an **information system** to help workers and students know more about safety and health hazards of material that they use in the workplace and in school.
- WHMIS gives people **key safety information** in the form of special **labels, symbols, and Material Safety Data Sheets (MSDS)**.
- You will come across **controlled products** that fall under the WHMIS legislation at **school** (for example, the chemicals used in your science and shop class), and at any **workplace** where chemicals are used.

WHMIS Labels

- All **controlled products** at school or the workplace **must have WHMIS labels**.
- The purpose of a WHMIS label is to **identify the product as controlled and alert workers or handlers to the hazards and how to handle the product**.
- The **MSDS provides more detailed information**.
- Read the whole label **before using a product for the first time**.
- The label will briefly tell you:
 - name of the chemical
 - the WHMIS hazard symbols
 - risks and precautions
 - first aid instructions
 - supplier's name and address
 - a reference to the matching MSDS stating that more information is available



The WHMIS Symbols

- The shapes of the symbols used on labels have been chosen to show the nature of the hazard they represent.

| | | |
|----------------|---|--|
| <p>Class A</p> | <p style="text-align: center;">COMPRESSED GAS</p> <ul style="list-style-type: none"> It is a gas kept under pressure. Heat may cause the container to explode. A drop or impact may cause the container to explode. e.g. steel cylinders of acetylene, oxygen, hydrogen, helium, chlorine, nitrogen, neon, argon etc. and fire extinguishers. Compressed gases can be hazardous simply because they are under high pressure, and the gas itself can also be hazardous (like chlorine gas). If the gas itself is hazardous, it will have other appropriate hazard symbols along with the compressed gas symbol. Handle with care, do not drop. Keep away from heat or potential sources of ignition. Store in a designated area. Large cylinders must be properly secured with a chain. | |
| <p>Class B</p> | <p style="text-align: center;">FLAMMABLE AND COMBUSTIBLE MATERIALS</p> <ul style="list-style-type: none"> The material is a potential fire hazard. It may burn at relatively low temperature. Sparks, flame or friction could ignite it. May burst into flame spontaneously in air or release a flammable gas on contact with water. <p>Division 1: Flammable Gases: e.g. hydrogen, methane, propane.</p> <p>Division 2: Flammable Liquids (Flashpoint less than 37°C). These liquids catch on fire easily and have highly flammable fumes. e.g. gasoline, ethanol, methanol, diethyl ether.</p> <p>Division 3: Combustible Liquids: (Flashpoint > 37°C) e.g. diesel fuel,</p> | |

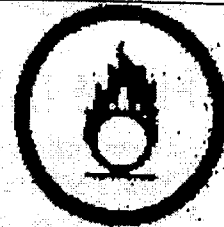
Division 4: Flammable Solids: e.g. magnesium, sodium, beryllium
Division 5: Flammable Aerosols: e.g. most aerosol cans contain flammable propellants, also butane, propane in aerosol containers.
Division 6: Flammable Reactive Materials: materials that could spontaneously ignite in air (e.g. celluloid, lithium aluminum hydride) or in water (e.g. sodium).

- Keep any of these materials **away from heat sources** and other combustible materials. Never smoke when working with or near the material. Store in a **cool, fire-proof area**.

Class C

OXIDIZING MATERIALS

- The material is a **fire or explosion risk** near flammable or combustible material. May **burn skin or eyes on contact**.
- An oxidizing material may or may not itself burn, but will **release oxygen** or another oxidizing substance, and thereby causes or helps a flammable or combustible material to burn, e.g. sulphuric acid, perchloric acid, hydrogen peroxide, sodium peroxide, benzoyl peroxide, permanganates, dichromates, perchlorates, chlorine and bleach.
- Keep the material **away from combustible materials** and store in designated areas. Keep the material away from sources of ignition.
- Never smoke when working near the material. Wear **proper protective equipment**, including eye, face and hand protection and protective clothing.



Class D

POISONOUS AND INFECTIOUS MATERIAL

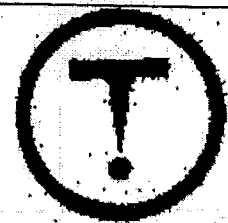
- The material is a **potentially fatal** poisonous substance. It may be fatal or cause **permanent damage** if it is **inhaled, swallowed or absorbed** through skin. May **burn skin or eyes on contact**.
- Division 1: Materials Causing Immediate and Serious Toxic Effects**
- These materials are **immediately dangerous** to life and health. They can kill you **fast!** Products which cause such effects have **low LD50 values** (the dose needed to kill 50% of a group of experimental animals). This division has *two subdivisions*:
A) Very Toxic Material- e.g. potassium cyanide, strychnine, hydrogen cyanide, hydrogen sulphide, carbon monoxide, bromine, phosgene.
B) Toxic Material - e.g. sodium fluoride, formaldehyde.
Handle the material with **extreme caution**. **Avoid contact with the skin or eyes**, use proper protective clothing. **Avoid inhaling** by working in **well-ventilated areas** and/or wearing respiratory equipment. Wash and shower thoroughly after using. Store in designated areas only.



Class D

Division 2: Materials Causing Other Toxic Effects

- The material is **poisonous but not immediately dangerous** to health. It may **cause death or permanent damage** as a result of **repeated exposure over time**.
- This includes materials that can cause **immediate irritation** (to the eyes, skin, or lungs, for example), and which can cause ill health effects that are not immediate; such as **allergies, asthma, cancer, organ damage, birth defects, sterility**, or other serious illness or disease. Usually the effects result from **repeated exposure** to the substance in the workplace over a long period of time. e.g. - repeated exposure to benzene, asbestos.
- Avoid skin and eye contact by wearing all protective equipment necessary including eye, face and hand protection and protective clothing. Avoid inhaling by working in well-ventilated area and/or using respiratory equipment. Store in designated areas.



| | | |
|---------|--|--|
| | <ul style="list-style-type: none"> This includes any organisms (like bacteria and viruses) and the toxins they may produce that are believed to cause disease. e.g. anthrax (in meat handling), salmonella, hepatitis B virus, AIDS virus, certain fungi and moulds etc., contaminated blood and pathogenic bacteria cultures. | |
| Class E | <p align="center">CORROSIVE MATERIAL</p> <ul style="list-style-type: none"> Caustic or acid materials that can eat through the skin or corrode metals like aluminum or steel. e.g.: chromic acid, sulphuric acid, nitric acid, sodium hydroxide, hydrofluoric acid, some household cleaners, water treatment chemicals, photographic chemicals, lye. This class also includes corrosive gases such as ammonia and the acids hydrogen fluoride, hydrogen chloride, hydrogen iodide and hydrogen bromide. | |
| Class F | <p align="center">DANGEROUSLY REACTIVE MATERIAL</p> <ul style="list-style-type: none"> Products which undergo dangerous reactions (such as polymerization, decomposition or condensation), when subjected to heat, pressure, shock or allowed to contact water. e.g. plastic monomers such as butadiene undergo hazardous self-polymerization unless inhibitors are added e.g. copper and mercury azides, acetylides, ether peroxides, benzoyl peroxide, picric acid and isopropyl nitrate can be explosive under shock, calcium carbide reacts with water to release acetylene gas. | |

- Not all products are controlled by the WHMIS legislation, and so they might not have these labels or use the exact same symbols as WHMIS.
- These products use the **International Safety Symbols** you see below.

| | Danger | Warning | Caution |
|-----------|--------|---------|---------|
| Poison | | | |
| Flammable | | | |
| Explosive | | | |
| Corrosive | | | |

- Note that the border that surrounds each symbol signifies how dangerous the hazard is.
- An **OCTAGON** (same shape as a stop sign) indicates "**DANGER**" and represents the most dangerous hazard.

diamond does not pose as extreme a risk as the danger octagon.

- The **upside-down triangle** ("**CAUTION**") represents the **slightest** or **least** hazard of the three borders (but of course, that does not make it hazardless! Use such products with caution).

Material Safety Data Sheets (MSDS)

- An **MSDS** is a sheet that gives **more detailed technical information** about the product. It is broken up into **nine** sections for the following information.
- Employers must keep **MSDS's on hand and up to date** (no older than 3 years).

Safety In The Science Classroom

1. **Never begin** an experiment or lab **without your teacher's permission.**
2. **Read and study the procedure** from start to finish **before** beginning any experiment. If you have any questions, *ask your teacher.* **Make sure you understand any safety symbols** on materials you will be using, and the hazards they represent. **Follow the procedure exactly** as specified.
3. **Always wear safety goggles** throughout a lab that requires chemicals. **Keep the goggles on** for as long as there are any chemicals being used by anyone in the lab. **Do not** take your goggles off or move them from your eyes (for example, to write down observations) **at any time** during the lab. Where other safety equipment, such as **aprons, gloves, lab coats**, as required.
4. **Never eat or drink** anything in the lab. **Do not chew gum** during labs.
5. **Never inhale chemicals.** Use the "**waffing**" technique if you need to smell a chemical. **Do not taste any substances** or draw any material into a tube with your mouth.
6. If you are taking chemicals from one container and putting them into smaller containers, make sure you **label all** the containers.
7. **Do not pour liquids** while holding the containers **close to your face.** Put **test tubes** in a test tube rack before pouring liquids into them.
8. Use only **Pyrex or Kimax** glass containers when heating. Never use chipped or cracked glasswear. **Never** allow a container to **boil dry.**
9. **Report all chemical spills** to your teacher. All chemical spills must be cleaned up **completely and immediately.** Wipe up any splashes or spills of water immediately.
10. Use test tube holder and always **slant test tubes** away from yourself and others when heating them. Keep materials **away from flames.** Follow all instructions for using Bunsen burners carefully.
11. Be very wary of **hotplates** -- you can't tell by looking if they are hot, but they **can remain hot for up to one hour** after being turned off. To see if one is still hot, **don't touch it!** Instead, **carefully put a drop of water on its surface.** If the water bubbles or boils, the hot plate is too hot to touch!
12. Make sure your **hands are dry** when using **electrical equipment.** Unplug electrical cords by pulling on the **plug**, not the cord. Don't use equipment with **frayed wires or cords.** Report any defective equipment or outlets to your teacher.
13. When **cutting materials**, follow the following guidelines:
 - **do not cut anything** with a scalpel or razor blade by holding it in one hand while cutting it with the other. Always put the item down (for example, into a dissecting tray) on a **flat surface.** **Hold it down with pins or clamps, not your fingers.**
 - **always cut away from yourself** and **away from others** when using a scalpel.
 - when walking with or handing over a scalpel or sharp or pointed object, **keep the sharp or pointed surface facing the floor** away from people.
14. **Tie back long hair** and loose clothing.
15. When holding a bottle from which you are going to pour chemicals, **keep the label against the palm of**

| MATERIAL SAFETY DATA SHEET | | | |
|--|-------------------------|-----------------------|-------------------------|
| SECTION 1 — PRODUCT IDENTIFICATION AND USE | | | |
| PRODUCT NAME | MANUFACTURER | MANUFACTURER ADDRESS | MANUFACTURER PHONE |
| PRODUCT NO. | SYNOPSIS | SYNOPSIS | SYNOPSIS |
| FORMULA | FORMULA | FORMULA | FORMULA |
| CITY | STATE | ZIP | PHONE |
| TRADE NAME | EMERGENCY TELEPHONE NO. | TRADE NAME | EMERGENCY TELEPHONE NO. |
| SECTION 2 — HAZARDOUS INGREDIENTS | | | |
| HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS |
| HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS |
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| HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS | HAZARDOUS INGREDIENTS |
| SECTION 3 — PHYSICAL DATA | | | |
| APPEARANCE | APPEARANCE | APPEARANCE | APPEARANCE |
| APPEARANCE | APPEARANCE | APPEARANCE | APPEARANCE |
| APPEARANCE | APPEARANCE | APPEARANCE | APPEARANCE |
| SECTION 4 — FIRE AND EXPLOSION DATA | | | |
| FLAMMABLE | FLAMMABLE | FLAMMABLE | FLAMMABLE |
| FLAMMABLE | FLAMMABLE | FLAMMABLE | FLAMMABLE |
| FLAMMABLE | FLAMMABLE | FLAMMABLE | FLAMMABLE |
| SECTION 5 — REACTIVITY DATA | | | |
| REACTIVITY | REACTIVITY | REACTIVITY | REACTIVITY |
| REACTIVITY | REACTIVITY | REACTIVITY | REACTIVITY |
| REACTIVITY | REACTIVITY | REACTIVITY | REACTIVITY |

16. When diluting acid, **always add small amounts of acid to large amounts of water**.
17. Know the **location** and **proper use** of the fire extinguisher, **safety shower**, **fire blanket**, **first aid kit**, and **fire alarm**.
18. If your clothing catches on fire, **smother it** with the fire blanket or a coat. **"Stop, Drop, and Roll" -- NEVER RUN.**
19. **Report any accident or injury, no matter how small**, to your teacher.
20. When cleaning up, be sure to:
 - turn off gas if it was used and disconnect electrical apparatus.
 - Return all materials to their proper places.
 - **Do not** return unused chemicals to the original containers. Your teacher will tell you what to do with unused chemicals and how to dispose of any other materials. Never pour unused chemicals down the drain without permission from your teacher.
 - Place any **broken glass** in the **container(s) reserved for broken glass**. Do not put broken glass in the regular garbage.
 - **Clean and dry** your work area. Do not leave water on the counter or floor.
 - The last thing you should do after a lab is **wash your hands** with soap and water.

What to do First if You or a Classmate is Injured

| Injury | What to Do First |
|------------------------------------|---|
| Burns | Immerse injury in cold water . inform your teacher . |
| Cuts and bruises | Stop any bleeding by applying direct pressure to the wound. Cover with a sterile or clean dressing. Apply cold compresses to bruises. Inform your teacher . |
| Fainting | Keep the person lying down . Loosen any tight clothing and keep others from crowding around. Inform your teacher . |
| Chemicals or Foreign matter in eye | Flush with running water for at least 15 minutes . Inform your teacher . |
| Poisoning | Identify the suspected poison and call your teacher immediately. |
| Spilling Chemicals on skin | Remove contaminated clothing . Flush with running water for at least 15 minutes . Inform your teacher . |

You and Your First Job! There are Risks. Did you know...

- **Young people like you are at the highest risk** for getting injured on the job. **Every 13 minutes** in an eight hour working day, one young worker is injured. In 1995, **13,000 injury claims** were made to WCB by people aged 15 to 24, and 12 people **died** of workplace injuries in B.C. Most of these injuries to young people **within two weeks of starting** their job!
- Often, the reason these young people get injured is because they **don't ask enough questions** about how to do their work safely.

5 Questions To Ask Your Employer Before You Start a New Job

1. Are there any **risks or hazards** I should be aware of in my job?
 2. Are there any **health and safety procedures** I should follow?
 3. What **safety gear** will I be expected to wear?
 4. **When** will I receive **job safety training**?
 5. If I get hurt, **who is the first aid person**?
- If you are given a chemical to use, at home, school, or work, you should **read the label** and understand the **risks before** you use it. You should also **ask your teacher or supervisor questions** about the material, such as the following:
 - Is it flammable?
 - Are the fumes dangerous?
 - What are the health hazards?
 - Do I need to wear gloves or eye protection?