Science 9 – Safety in the classroom

It is important to be safe at all times in school (in fact, everywhere). One place where safe behaviour really pays off is in the science room. Often there are chemicals, glassware, and biohazards about which may lead to personal or group injury if care is not taken. The rule is simple; be safe. The greatest number of injuries occurs in young people between the age of 15 to 24 in the work place. They are often injured within the first two weeks because they have not learned proper safety procedures.

Safety comes not only from paying attention to your surroundings, it also comes from being proactive. What is proactive? It means to be alert for possible dangers. If a beaker is close to the edge of a table, moving it would be a proactive thing to do; you want to prevent an accident. If someone is horsing around with their lab equipment, you can help prevent an accident by talking to them or telling a teacher.

Common sense goes a long way. If you don’t know about a chemical or substance, ask. Don’t touch, certainly don’t taste, and if you are going to smell it, use the wafting technique of moving air from the substance towards your nose with your hand.

What about you? Is there something about you which could be a hazard. Are you allergic to certain things? Maybe you have latex allergies or have skin problems and are sensitive to harsh chemicals. Do your wear contacts? Contacts will exacerbate the damage done if a chemical gets into your eyes. If you have long hair, tie it back when doing a lab. Pay attention to containers with chemicals in them, make sure you know what they are and that they are placed in a location where they won’t fall or break.

Using heating equipment requires special attention. In the lab there are gas burners, heating devices, and there may be flammable chemicals. Heating a substance directly generally isn’t done; there usually is a container around it. To test if a hot plate is ready, put a drop of water on it. The water should bounce and evaporate quickly. Hot plates and burners remain hot for up to 15 minutes after they are turned off. Do not handle hot surfaces for at least this length of time. If you receive a burn, you should put the burnt body part under cold water immediately. Contact the teacher as soon as possible, and keep the water running. If there is a fire, the best thing to do is to show the teacher immediately. Different kinds of fires require different treatments. Water on burning wood works well, on oil it causes the fire to spread. If part of your clothing catches on fire, drop and roll. If you use your hands to put it out, you will likely burn them too.

Chemicals require respect. Acids and bases, common in the lab, can burn skin and if they get into your eyes can cause blindness. Chemical burns should be treated with large amounts of running water. If you get something in your eyes, use the eye flush center immediately. flushing your eyes for five or more minutes will help; inform the teacher right away. Do not rub your eyes as that will likely cause more damage. At the end of a lab, wash your hands. That way if you got some chemical on them you wont get it into your eyes by mistake. To prevent eye problems, wear goggles during an experiment. Goggles should be worn at all times and not removed until the dangerous materials are put safely away.
Science 9 Safety Information Package

Safety First!

1. Read and study the **procedure** from start to finish **before** beginning any experiment. If you have any questions, ask about them. **Make sure you understand** any **safety symbols** on materials you will be using, and the hazards they represent.

2. **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. Wear other safety equipment, such as **aprons, gloves, lab coats**, as required.

3. **Never eat or drink** anything in the lab, there could be chemical residues on the surfaces. **Do not chew gum during labs. Put all foods and drinks away**

4. **Never inhale chemicals.** Use the “wafting” technique if you need to smell a chemical. **Do not taste any substances** or draw any material into a tube with your mouth.

5. If you are taking chemicals from one container and putting them into smaller containers, make sure you **label all** the containers. Masking tape and a pen or marker is sufficient.

6. **When pouring liquids** hold the containers **away from your face**. Put **test tubes in a test tube rack** before pouring liquids into them.

7. Report all chemical spills to the instructor. Do not attempt to clean these up yourself! Wipe up and splash or spill of water immediately.

8. **Take caution with 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 is 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!

9. **Tie back long hair and loose clothing**

10. When diluting acid, always add small amounts of acid to large amounts of water.

11. Know the **location and proper use of the fire extinguisher, eye wash station**, and any other important safety equipment.

12. If your clothing catches on fire, **smother** it with the **fire blanket** or a coat.

   **“Stop, Drop and Roll”** NEVER RUN

13. Certain chemicals, such as the mercury found in thermometers, are toxic substances and need to be treated with extreme caution. If you are aware of a toxic substance being spilled, get the instructor’s attention immediately. **DO NOT TOUCH** any of the spilled substance.

14. If you spill acid or some other caustic chemical on your hand, clothes, or other body part, rinse the area with cold water for 15 minutes. **Be sure an instructor is aware of the incident right away.**
Workplace Hazardous Materials Information System (WHMIS)

WHMIS is an international system for labelling materials which may be hazardous. You will even find these labels on household products.

WHMIS covers six broad types, or classes, of hazardous materials which are lettered A through F. Divisions are provided in some classes to separate different groups of hazardous materials within a class. Symbols are used for these different types of hazardous materials as follows:

**Class A: Compressed Gas**
This class includes compressed gases, dissolved gases and gases liquefied by compression or refrigeration. Examples: gas cylinders for oxyacetylene welding or water disinfection.

**Class B: Flammable and Combustible Material**
This class includes substances which will ignite easily through flame or heating. Examples include: white phosphorus, acetone and butane. Flammable liquids such as acetone are more easily ignited than combustible liquids such as kerosene.

**Class C: Oxidizing Material**
Materials which provide oxygen or similar substance and which increase the risk of fire if they come in contact with flammable or combustible materials. Examples: sodium hypochlorite, perchloric acid, inorganic peroxides.

**Class D: POISONOUS AND INFECTIOUS MATERIALS**
**CLASS D, DIVISION 1: Materials Causing Immediate and Serious Toxic Effects.** This division covers materials which can cause the death of a person exposed to small amounts. Examples: sodium cyanide, hydrogen sulphide.

**Division 2: Materials Causing Other Toxic Effects**
This division covers materials which cause immediate skin or eye irritation as well as those which can cause long-term effects in a person repeatedly exposed to small amounts. Examples: acetone (irritant), asbestos (cancer causing), toluene diisocyanate (a sensitizing agent).

**Division 3: Biohazardous Infectious Material**
This division applies to materials which contain harmful micro-organisms. Examples: cultures or diagnostic specimens containing salmonella bacteria or the hepatitis B virus.

**Class E: Corrosive Material**
Caustic or acid materials which can destroy the skin or eat through metals. Example: muriatic acid, lye.

**Class F: Dangerously Reactive Material**
Products which can undergo dangerous reaction if subjected to heat, pressure, shock or allowed to contact water. Examples: plastic monomers such as butadiene and some cyanides.

**EXEMPTIONS**
Some products, such as pesticides, certain consumer products and explosives do not require the distinctive WHMIS hazard symbols and labels because they are already covered by other labelling legislation. WHMIS will require that employers provide instruction to workers for these products based on available information and the various kinds of workplace labelling be used when contents are transferred to new containers.

These symbols are found on home (domestic) products such as bleach, toilet bowl cleaner, and aerosols. They convey important information to warn users of potential risks.
Other Labels

Not all products are controlled by the WHMIS legislation, and so they may not have WHMIS labels or use the exact same symbols as WHMIS. You’ll see these other symbols on products you commonly find around the house and garden, including cosmetics (like hairsprays), pesticides, and some consumer and household products (like oven cleaners).

These products use the International Hazard Symbols you see below.

- The following warning symbols used on labels are not controlled by WHMIS legislation:

  Poison  Flammable  Explosive  Corrosive

The border that surrounds each symbol signifies the danger level of the hazard.

- An octagon (same shape as a stop sign) indicates “DANGER” and represents the most dangerous hazard.

- A four-sided diamond, indicates “WARNING” and represents a moderate or medium hazard level. A warning diamond does not pose as extreme a risk as the danger octagon.

- The upside-down triangle indicates “CAUTION” and represents the slightest or least hazard of the three borders. This does not make it hazardless! Use these products with caution.

These are all the combinations you may see of these domestic warning labels.
1. Used to measure liquid volumes: **graduated cylinder**
2. Used to measure temperature: **thermometer**
3. Used to pick up small solid samples: **tweezers**
4. Used to pick up or hold larger solids: **tongs**
5. Used to transfer solids or powders from one container to another: **scoopula**
6. Used to help pour liquids into another container: **funnel**
7. Used to transfer small amounts of liquid, usually drop by drop: **eyedropper**
8. Glassware to hold reacting substances (Usually liquids)
   - **beaker**
   - **erlenmeyer flask**
   - **florence flask**
   - **test tube**
9. Used to hold test tubes: **test tube holder**
10. Used to hold several test tubes during an experiment: **test tube rack**
11. Used to clean the inside of test tubes: **test tube brush**
12. Used to seal glassware (partly or completely): **rubber stoppers**
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
<td>8.</td>
</tr>
<tr>
<td>9.</td>
<td>10.</td>
</tr>
<tr>
<td>11.</td>
<td>12.</td>
</tr>
<tr>
<td>15.</td>
<td>16.</td>
</tr>
<tr>
<td>17.</td>
<td>18.</td>
</tr>
<tr>
<td>19.</td>
<td>20.</td>
</tr>
<tr>
<td>21.</td>
<td>22.</td>
</tr>
<tr>
<td>23.</td>
<td>24.</td>
</tr>
<tr>
<td>27.</td>
<td>28.</td>
</tr>
<tr>
<td>29.</td>
<td>30.</td>
</tr>
<tr>
<td>31.</td>
<td>32.</td>
</tr>
<tr>
<td>33.</td>
<td>34.</td>
</tr>
<tr>
<td>35.</td>
<td>36.</td>
</tr>
</tbody>
</table>
In the space below write a story of someone NOT practicing safety in the science classroom and what happened. Draw a picture in the space provided. If you need more room, attach another sheet of paper.

Draw picture below.
Safety Package – Answer these questions.

Write full sentences (FS) when requested or no mark. Page numbers are given.

Page 1

1. In the work place, what is the age range where the greatest number of injuries occurs? __________________________

2. These injuries usually occur within the first __________________________.

3. Think: What is horseplay? FS. __________________________

4. How can contact lenses make a lab accident worse? FS. __________________________

5. If you get a burn, how long should you wait before immersing the area in cold water? FS.

6. Is putting water on a fire always a good idea? _____. Give an example where it is not. FS.

7. After you are finished a lab and have cleaned up, what should you do? __________________________
   Give two reasons (1 is given): __________________________

Page 2

8. Before starting a lab, what should you do? FS. __________________________

9. There are four different kinds of safety equipment mentioned that you wear. Name them.

10. Think: Why is no food or drink allowed in the area during a lab? FS. __________________________

11. What is wafting? FS. __________________________

12. How can you tell if a hot plate is too hot to touch? FS. __________________________

13. Where is the fire extinguisher in the classroom? __________________________

14. Where is the eye wash station in the room? __________________________

15. If your clothing is on fire, what should you do? Be specific. FS. __________________________
16. What does WHMIS stand for? ____________________________________________

17. Write out the classification for each question. You may use the letter for each Class.

<table>
<thead>
<tr>
<th>Class</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Compressed Gas</td>
</tr>
<tr>
<td>C</td>
<td>Oxidizing Material</td>
</tr>
<tr>
<td>D2</td>
<td>Materials Causing Other Toxic Effects</td>
</tr>
<tr>
<td>E</td>
<td>Corrosive Material</td>
</tr>
<tr>
<td>B</td>
<td>Flammable and Combustable Material</td>
</tr>
<tr>
<td>D1</td>
<td>Poisonous and Infectious Materials</td>
</tr>
<tr>
<td>D3</td>
<td>Biohazardous Infectious Material</td>
</tr>
<tr>
<td>F</td>
<td>Dangerously Reactive Material</td>
</tr>
</tbody>
</table>

a) increase the risk of fire if contact is made with flammable materials: ______
b) materials which can eat through metals: ______
c) can cause immediate skin or eye irritation: ______
d) can cause death if exposure to small amounts occurs: ______
e) gases liquefied by compression or refrigeration: ______
f) contains harmful microorganisms: ______
g) may catch fire easily: ______
h) products may undergo dangerous reaction if subjected to heat: ______
i) includes muriatic acid and lye: ______
j) includes butadiene: ______
k) includes perchloric acid and sodium hypochlorite: ______
l) includes sodium cyanide and hydrogen sulphide: ______
m) includes gas cylinders for welding: ______
n) includes asbestos and acetone: ______
o) includes kerosene and butane: ______
p) includes salmonella and hepatitis: ______

18. What is the difference between flammable and combustible? FS. ____________________________

19. Draw each of the 8 WHMIS symbols below and label each one; include Class and Title.