STARTING POINTS FOR PLANNING & POLICY SETTING

CONTENTS

Overview

This chapter sets the stage for safety planning in science classrooms. It outlines the roles of key stakeholders, and offers an appendix of sample actions that are appropriate to these roles. It also summarizes some of the legislative requirements that impact science safety planning and provides general guidelines for promoting safety.

Due diligence: an approach to science safety

A good place to start in science safety planning is to become familiar with the potential hazards that may be common to science activities. Further steps include being able to ensure the fundamental Occupational Health and Safety (OHS), rights to know, to participate and to refuse are established within the workplace safety culture. Embedded within these OHS fundamentals is the concept of hazard identification, analysis and control. If these skills are refined, it makes the task of acting with due diligence easier.

In a legal context, due diligence means taking all reasonable steps to prevent incidents and injuries, thus avoiding the assumption of legal liability. Due diligence is not only a legal concept, it is a proactive approach to avoiding incidents and injuries by identifying possible hazards, planning precautionary actions, and fulfilling responsibilities.

Principals, administrators, teachers and other staff can demonstrate due diligence by taking action in the following three key areas:

1. Ensuring awareness of potential risks and the related safety regulations.
2. Ensuring staff competency by meeting regulations and avoiding unnecessary risk, and
3. Implementing monitoring and compliance strategies to ensure that regulations are met.

Awareness of legislated safety requirements

Principals, administrators, teachers and other personnel need to know about the legal requirements that apply to science programs offered in their schools. It is important to know about the related regulations not only because they are legal obligations, but also because they help educators better understand potential risks and the preventative measures that can be taken to control hazards. Relevant legislation is summarized in this chapter as it relates to safe practices in the science classroom.

Monitoring and compliance

Stemming from *The Occupational Health and Safety Act, 1993* (*OHS Act, 1993*) one of the legal responsibilities of administrators is to develop, implement and monitor plans to provide staff knowledge and training. This also relates to due diligence as it involves monitoring work environments and activities to ensure compliance with health and safety legislation. For principals and administrators, it means monitoring schools or work sites to make sure all staff have the knowledge and training to comply with legislation and work in a safe and healthy manner. For teachers and other staff, it means identifying and following safe procedures and reporting hazards, near misses, and incidents.

Monitoring and compliance can be supported by:

- Discussing safety regularly at staff meetings.
- Reviewing science safety plans, practices and responsibilities periodically.
- Developing communication plans for staff when legislation changes.
- Communicating regularly and sharing safety information.
    - For example, if staff encounters a problem with a piece of equipment, it is made known to the staff at the school and division level.
- Pre-evaluating activities and dealing with safety considerations before the activity begins.
- Reporting any violations of legislative requirements, or divisional policy using appropriate procedures, and
- Giving regular attention to the following areas in planning:
    - **Emergency preparedness.** Are plans updated as required to reflect changes? Are students' home telephone numbers current? Are drills conducted regularly?
    - **Hazard identification and control.** Are hazards identified, evaluated and dealt with appropriately? Are inspections conducted regularly? Are recommendations dealt with promptly?
    - **Incident reporting and investigation.** Are all incidents reported to appropriate authorities as required? Has a near-miss incident reporting system been set up and is it working effectively? Have incident statistics been analyzed and are appropriate actions being taken in response?
    - **Environmental protection.** Are all releases (leaks or spills) being reported? Are teachers familiar with *Transportation of Dangerous Goods Act, 1992*? Is hazardous waste being properly identified, stored and disposed of from the school?
    - **Safe work practices.** Are safe operating procedures in place or being developed for hazardous activities? Is staff trained in these procedures? Are Material Safety Data Sheets (MSDSs) accessible to staff in electronic or hard copy format?
    - **Training.** Are all new staff given safety orientation training? Are existing staff members trained as necessary? Are training records kept?

Working together: key roles and responsibilities

A set of principles called the Internal Responsibility System (IRS) were used in the original 1972 OHS legislation. In Saskatchewan, IRS is referred to as the Workplace Responsibility System (WRS) and is still the cornerstone of health and safety legislation. The WRS means that it is everyone's responsibility to work together to identify and control hazards in the workplace; and that the person with the most authority in the workplace has the greatest responsibility for health and safety.

Employers have a legal and moral responsibility to provide a safe and healthy workplace. Supervisors have a duty to ensure workers they supervise follow the rules in the OHS legislation and the employer's health and safety system. Workers must work safely by following the OHS legislative requirements and the employer's health and safety policies and procedures.

When you put all these responsibilities and requirements together along with the Occupational Health Committee (OHC) and OHS representatives you have the WRS.

For the WRS to be successful, worker participation is essential. Participation is implemented through the OHCs and OHS representatives selected by workers. Other very important ways workers participate in their health and safety is being able to talk to their supervisor.

For the WRS to function properly a workplace must have competent management, supervisors and workers who work safely. Competency refers to when someone has been properly trained, equipped and experienced to perform a task. Evidence of staff competency may be required by provincial inspectors or investigators. For example, if a teacher was burned while handling chemicals in a science preparation area, a provincial investigator would determine whether the teacher:

- Had received Workplace Hazardous Materials Information System (WHMIS) training.
- Knew where information on the chemicals was available, and
- Knew how to use the appropriate safety equipment.

If the investigator found that the teacher was not competent to handle the chemicals, the employer could be held liable and receive a notice of contravention or be charged under the Saskatchewan OHS legislation.

Effective OHCs and OHS representatives at certain workplaces are internal monitoring mechanisms that assist an employer and workers to ensure the WRS is running as the OHS legislation requires.

As such, responsibility for ensuring safety in the science classroom is shared by many members of the educational system, including but not limited to:

- Saskatchewan Education.
- Universities and colleges.
- School boards and directors.
- School administrators.
- Science teachers.
- Science technicians.
- Science students.
- Parents or guardians.
- Educational assistants, and
- Volunteers.

Although an employer has the highest degree of responsibility, the duty of safety is shared between everyone in the workplace.

Individuals in each of these groups plays a role in the WRS to promote safety in science classrooms. Roles and recommended actions to fulfill each role are described in **Appendix 1**. Roles frequently overlap, and need to be aligned with school specific circumstances. For example, some schools employ science technicians to help teachers prepare materials for laboratory activities whereas in other schools, teachers directly prepare their own laboratory materials. Whatever the staffing pattern may be, it is important for those involved to work together as a team to ensure that responsibilities are determined, understood and fulfilled.

Legislated requirements

As outlined in section 85 of *The Education Act, 1995*, boards of education have a duty to prescribe procedures for the purpose of maintaining safety and sanitation standards. Section 353 also states that all school divisions must conform to all applicable laws respecting various topics which include fire protection and safety, as well as provisions for laboratories.

It is important to note that many aspects of school safety are governed by more than one piece of legislation. For example:

> The use of chemicals is regulated under the *OHS Act, 1993* and *OHS Regulations, 1996*, WHMIS, the *Hazardous Products Act* and Regulations, the *Transportation of Dangerous Goods Act, 1992* and Regulations and the *Canadian Environmental Protection Act, 1999*. Additional aspects of chemical safety are regulated by the *Canada Water Act*, R.S.C. 1985, c. C-11, and may be further regulated by municipal sewer and solid waste bylaws.

The following sections highlight some elements of key legislation as it relates to science safety and outlines where teachers, administrators and other staff can obtain further information to meet these requirements.

Note: this information is not all inclusive and was current at the time of publication.

Fire and building codes

The Fire Prevention Act, 1992 and *The Saskatchewan Fire Code Regulations* identifies those whom bear power, responsibility and general duties and it outlines standards for fire investigations, compliance, appeals, taxes, offenses, punishments, licenses, notifications, cancellations, suspensions, certificates, approved laboratories, re-tests, installations, repairs, and transitional.

Saskatchewan adopted the *National Building Code of Canada 2010* (NBC) by regulation under provisions of *The Uniform Building and Accessibility Standards Act* with few amendments as the minimum standard for building and accessibility.

School divisions should consult with their local fire chief to ensure fire and building codes standards are upheld.

Occupational requirements

The Labour Standards Act and Regulations, 1995, Chapter L-1

Part VIII of this Act allows labour standards officers to inspect a workplace and examine books, payroll, and other records of wages or other conditions of employment. Moreover, section 72 of *The OHS Act, 1993* gives OHS officers the authority to enter workplaces for inspections, inspect books and records, question employees, and so on to ensure health and safety requirement compliance.

The Occupational Health and Safety Act, 1993 and Regulations, 1996

In Saskatchewan, one of the primary pieces of legislation for workplace health and safety is the *OHS Act, 1993* and *Regulations, 1996*. The *OHS Act, 1993* and OHS *Regulations, 1996* apply to employers, supervisors, workers, self-employed persons, contractors, suppliers and owners and echoes the WRS as it is built upon the philosophy that responsibility for occupational health and safety is shared amongst everyone involved.

The *OHS Act, 1993* and *OHS Regulations, 1996* were established to ensure standards are in place regarding health and safety in the workplace. The legislation speaks to many aspects that pertain to science safety such as, chemical hazards, emergency preparedness, harmful substances, first aid, fire and explosion hazards, hazard assessment, personal protective equipment and ventilation.

Within the scope of a school environment, students are not considered workers unless part of an apprenticeship or off-campus work experience programs. (Work experience is defined as the off-campus work requirement that is directly linked to curriculum requirements.) As such, teachers and other staff take on the worker-role while the school divisions and boards take on the employer-role.

In accordance to *OHS Act, 1993*, both workers and employers have safety duties and responsibilities and every worker has three fundamental rights. Below are highlights of those responsibilities and rights:

- Employers are responsible for the health, safety and welfare of workers on the job.
- Employers must provide any information necessary to identify and control hazards, and establish an occupational health and safety program.
- Workers must take steps to protect their own health and safety, and the health and safety of coworkers.
- Suppliers must provide MSDSs and ensure that the biological or chemical products being supplied are safe for workplace use when used according to the provided instructions, and
- Workers have three rights under *OHS Act, 1993*:
    1. To know how to identify and control workplace hazards.
    2. To participate in health and safety activities without reprisal, and
    3. To refuse what is perceived as unusually dangerous work.

The following table summarizes parts of *OHS Act, 1993* and *OHS Regulations, 1996* that are relevant for science classrooms:

Section in *OHS Act, 1993*	Section in *OHS Regulations, 1996*	What the section is about
Part I: Preliminary Matters	Part I: Preliminary Matters	Definitions to aid in clearer interpretation.
Part II: Duties	Part III: General Duties	Elaborates on some key player duties as well as duties such as supervising, training, safety programming, equipment and investigations.
Part III: Occupational Health Committees and Occupational Health and Safety Representative	Part IV: Committees and Representatives	Information pertaining to when a committee is necessary and what duties a committee has.
Part IV: Right to Refuse Dangerous Work; Discriminatory Action		How a worker may refuse work perceived to be unusually dangerous and that no worker will be discriminated against for refusing work.
Part VI: Workplace Hazardous Materials Information System	Part XXII: Controlled Products – Workplace Hazardous Materials Information System	http://www.worksafesask.ca/WHMIS-course. These sections outline a system designed to reduce the risk from hazardous products. In Saskatchewan, WHMIS requirements place the responsibility on employers to ensure the health and safety of their workers who may be exposed to WHMIS controlled products. Employers must ensure their workers know about the hazards posed by controlled products through a training program (see WHMIS Worker Training Requirements), product labelling, and readily accessible MSDS.
	Part II: Notice Requirements	Speaks to reporting bodily injuries, dangerous occurrences and incidents.
	Part V: First Aid	This section pertains to provision of first aid supplies and equipment, asphyxiation and poisoning. For more information about first aid in Saskatchewan workplaces see **Appendix 2**.
	Part VI: General Health Requirements	This section houses information about ventilation and air supply, cleaning, space, lighting, eating areas, drinking water, smoking and exposure control plan.

Section in *OHS Act, 1993*	Section in *OHS Regulations, 1996*	What the section is about
	Part VII: Personal Protective Equipment	This section outlines equipment requirements, responsibilities, bodily protection and exposure to hazardous products.
	Part XXI: Chemical and Biological Substances	This section provides details about duties of employers, chemical and biological substance lists, respiratory devices, spills, exposure reporting, emergency shower and eye wash stations. For more information on chemical and biological substances see **Appendix 3**. For more information on emergency showers and eyewashes see **Appendix 4**.
	Part XXV: Fire and Explosion Hazards	This section speaks to fire safety plans, extinguishers, fire hazards, procedures for flammable substances, receptacles for contaminated or flammable products, hazardous activities involving combustible or flammable products, and gas burning.

Environmental requirements

***Canadian Environmental Protection Act, 1999*, (Statutes of Canada, 1999, Chapter 33)**

The *Canadian Environmental Protection Act, 1999*, states that all polluters are expected to pay for the cost of their actions and describes procedures for storage, transport and disposal of hazardous wastes produced by industries as well as schools or school divisions, and outlines how to deal with spills.

***The Environmental Management and Protection Act, 2002*, (Chapter E-10.21 Statutes of Saskatchwan, 2002)**

The Environmental and Protection Act, 2002 is regarding the Minister's general responsibilities and powers, protections against unauthorized discharges and pollution, contamination sites, environmental emergencies, drinking water and waste water. It also speaks to offences, enforcement and administrative penalties.

***Canada Water Act, R.S.C. 1985*, (Chapter C-11)**

The *Canada Water Act, R.S.C. 1985* defines 'waste' as substances that alter water quality to the extent that its use would be detrimental to humans, animals, fish, or to plants that are useful to humans. It prohibits pollution of water in areas designated for restoring, maintaining or improving water quality, and specifies the penalties for doing so.

***Transportation of Dangerous Goods Act, 1992*,** (Statutes of Canada, 1992, Chapter 34)

The *Transportation of Dangerous Goods Act, 1992* and Regulations protects the general public and the environment during the transportation of hazardous goods, including regulated chemicals ordered or disposed of by schools. Saskatchewan has an agreement whereby the province works in tandem with the federal government under the *Dangerous Goods Transportation Act, ss.chapter D1.2*. This agreement generally provides that Saskatchewan administers all on-highway inspection and enforcement and that Canada administers all off-highway inspection and enforcement. For more information on Canada's or Saskatchewan's transportation of dangerous goods (TDG) roles and responsibilities, see http://www.tc.gc.ca/eng/tdg.

The *Transportation of Dangerous Goods Act, 1992* provides a complementary system to WHMIS: during transportation, these products are called dangerous goods and are governed by the regulations of *Transportation of Dangerous Goods Act, 1992*. The *Transportation of Dangerous Goods Act, 1992* states that during transport, dangerous goods must be identified by:

- Labels on containers
- Placards on trucks, and
- Shipping documents.

The *Transportation of Dangerous Goods Act, 1992* and Regulations terminate at the point of delivery with the reception of the regulated/hazardous chemicals by a receiver. For this reason, the receiver must be certified to receive chemicals at a school or school division site. This person must also undergo recertification every three years. Refer to **Chapter 8 Receiving chemicals** for more information on steps to follow when receiving chemicals. Once the regulated or hazardous goods have been unloaded from the transport vehicle and received, they become controlled products and fall under WHMIS regulations.

This information is important to staff and others in emergencies, as well as in routine activities. The transportation of dangerous goods chemical classifications used in these labels and documents are international in scope, and as a result they are rigidly specified.

If a school employee is receiving or transporting hazardous goods, TDG certification in addition to WHMIS training must be current.

Other legislation

***Hazardous Products Act, R.S.C., 1985,* c. H-3:**

Hazardous Products Act, R.S.C.,1985 defines what materials are designated as controlled products in Canada. Designation of controlled products has the following significance for schools:

- The WHMIS requirements apply to all materials designated as controlled products. Suppliers of controlled products are required to provide a MSDS for each product, and ensure the product or its container is labelled with required information and hazard symbols, and
- The advertising, sale and importation of controlled products for use in the workplace, including Canadian schools, is regulated under the *Hazardous Products Act, R.S.C.,1985.*

Bylaws

The Municipalities Act (as well as *The Cities Act*) section 6 broadly empowers Saskatchewan municipalities to pass bylaws to:

> "…govern the municipality in whatever manner the council considers appropriate, within the jurisdiction provided to the council by law."

It is important for science teachers to be aware of the bylaws in their school division. Teachers should be very mindful of bylaws pertaining to chemicals considered to be of an acceptable nature in addition to storage and disposal standards.

Implementing safety in the science classroom or laboratory

The following general procedures are recommended for use in day-to-day routines of planning, preparing, guiding and following-up of science activities. Two sets of guidelines are provided – a basic set of procedures for elementary classrooms, and a more extensive set of guidelines for middle years and secondary classrooms. The more extensive guidelines reflect the increased complexity of science activities in the upper grade levels.

Elementary classrooms

Elementary students thrive on hands-on activities. The opportunity to explore and investigate real materials is a powerful motivator for learning and provides starting points for concept and skill development. The benefits of hands-on activities are well-known to teachers who regularly incorporate them into their programs. Steps should regularly be taken to ensure student safety involving all stages of planning, preparation, supervision and activity follow-up. Example strategies for ensuring safety in elementary science activities are described below, beginning with the early stages of planning.

Selecting activities and materials

- Consult teacher guides and safety resources to become familiar with risks posed by the activities and materials under consideration.
- Access and review information on student allergies and health conditions that could limit science activity involvement.
- Select activities and materials taking into account:
    - Potential hazards.
    - Student allergies and health conditions.
    - Knowledge, skills, maturity and disabilities of students, and
    - Equipment and facilities available to safely carry out the activity.
- Avoid bringing poisonous plants or wild animals – dead or alive – into the classroom, and do not engage in direct investigations of human body tissues and fluids. See **Chapter 5 Animal and plant hazards** for more information.

Preparing activities

- Obtain and prepare safety supplies.
    - For example, obtain personal protective equipment, such as goggles and gloves.
- Prepare materials for safe use.
    - For example, organize materials to facilitate safe distribution.
- Prepare for clean-up and disposal of chemicals and other waste products.
    - For example, label waste containers.

Introducing and guiding activities

- Involve students in preparing the classroom for safe activity by clearing work surfaces and aisles.
- Introduce and explain how to safely use the equipment and supplies.
- Ensure that all students are aware of the inherent risks posed by the materials used.
- Ensure that students use appropriate personal protective equipment.
- Initiate short, simple tasks that provide opportunity for students to practice safe procedures before moving on to more complex tasks.
- Model safety at all times, and
- Consider having students sign a safety contract as a commitment to safety.
    - See **Appendix 5** for a sample contract.

Follow-up activities

- Have students clean up the workspace being used, following safe and environmentally responsible procedures, and
- Have students wash their hands after taking part in activities that involve chemical or biological materials regardless if gloves are worn.

Middle years and secondary classrooms

As in earlier grades, activities with real materials in middle years and secondary classes can be powerful motivators for learning and providing starting points for concept and skill development. At these levels, experience with materials also provides opportunities to learn about the nature of science investigation and to critically examine the link between evidence and theory. With the increasing complexity of concepts studied, investigations may involve more complex equipment and a broader range of materials than studied at the elementary level. This in turn will create new challenges for ensuring student safety.

Nevertheless, the general strategies for ensuring science safety are very similar to elementary levels, involving all stages of planning, preparation, supervision and activity follow-up. As such, the following general strategies are thus recommended. It is further recommended that secondary schools refine and extend these practices to reflect the program, student characteristics, facilities available and staff roles within the particular school.

Selecting activities and materials

- Consult teacher guides and safety resources to become familiar with risks posed by the activities and materials under consideration.
- Access and review information on student allergies and health conditions that could limit involvement in science activities.
- Select activities and materials taking into account:
    - Potential hazards.
    - Student allergies and health conditions.
    - Students' knowledge, skills and maturity, and
    - Equipment and facilities available to carry out the activity safely.
- Avoid bringing poisonous plants or wild animals – dead or alive – into the classroom, and do not engage in direct investigations of human body tissues and fluids.

Preparing activities

- Obtain and prepare safety supplies.
    - For example, obtain personal protective equipment, such as goggles, aprons and gloves, have hair ties for students with long hair.
- Prepare materials for safe use.
    - For example, prepare diluted solutions in advance and organize materials to facilitate safe distribution, and
- Prepare for clean-up and disposal of chemicals and other waste products.
    - For example, label waste containers.

Introducing and guiding activities

- Set standards for safety preparation and behavior in laboratories.
  - See **Appendix 6** for science safety rules and procedural examples.
- Introduce or refresh students on the need for and application of:
  - WHMIS,
  - MSDS, and
  - Safety procedures.
- Before starting work in the lab, provide general introduction to risks and safety procedures for:
  - Responding to medical emergencies, near misses and incidents.
  - Handling chemical wastes and spills, and
  - Reporting defective equipment and potential hazards.
- Familiarize students with the location and use of safety equipment.
  - For example, eyewash stations, fire extinguisher or blanket.
- Introduce and describe how to safely use equipment and supplies.
  - For example, use a do-don't list to emphasize proper usage.
- Ensure all students are aware of risks inherent to materials being used.
- Ensure that students use personal protective equipment as required.
- Provide opportunity for students to practice safety procedures.
- Model safety at all times, and
- Consider having students sign a safety contract as a commitment to safety; retain the contract, but recognize that this is not a legal document.
  - See **Appendix 7** for a sample contract.

Follow-up activities

- Have students clean up used workspace using safe and environmentally responsible methods and procedures, and
- Have students wash their hands after taking part in activities that involve chemical or biological materials regardless if gloves are worn.