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## **SCIENCE EDUCATION SAFETY GRADES 9 - 12**

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### **1) PURPOSE**

Hastings and Prince Edward District School Board is committed to ensuring the safety and well-being of students and employees. This administrative procedure has been developed to support administration, school teams, students and their families in understanding all the procedures and guidelines in place to support a safe learning environment, within all science course.

### **2) BACKGROUND**

The Hastings and Prince Edward District School Board System Plan is committed to student achievement and well-being. Board procedures regarding safety within science education classes and programs, are aligned with the Occupational Health and Safety Act (OHSA). Ensuring health and safety in schools is an essential part of overall board safety.

The techniques of science instruction have changed from lectures and demonstrations to those involving a significant amount of “hands on” activities. This is reflected in the science curriculum, which even mandates that certain experiments be carried out. Therefore, all risk must be anticipated and minimized.

In planning for safe learning environments in science classrooms/laboratories, safety is considered from the perspective of the employee present in the area, as a worker under the Occupational Health and Safety Act, from the perspective of students and visitors within the classrooms and facilities both morally and legally (as specified by the Education Act and board procedures), and from the perspective of the responsibilities of local site administration, central staff and the board with respect to ensuring safety of the facility and staff, students and visitors.

The Education Act sets out the specific duties and responsibilities of boards, supervisory officers, principals, teachers, parents and students. It is widely acknowledged that student safety and well-being is a shared responsibility. Hastings and Prince Edward District School Board has established a clear and accessible procedure to reduce the possibility of student injuries and promote safety mindedness in their schools.

There is an expectation (commonly referred to as the “Reasonably Prudent Parent Doctrine”) that a school board and its employees or volunteers, provide the same standard of care for students as would be provided by a reasonably careful or prudent parent. The duty of care is to protect students from all reasonably foreseeable risks of harm.

The Occupational Health and Safety Act (OHSA) sets out the duties and obligations employers, supervisors and workers for health and safety practices in the workplace. The OHSA also requires employers and supervisors to be knowledgeable of the requirements of the act and its regulations, as well as their responsibilities. The OHSA also outlines the fines and penalties for employers and supervisors that are found to be in breach of the OHSA.

While the OHSA is provincial legislation, the Criminal Code of Canada assigns criminal liability to organizations, including corporations, for the acts of their representatives. This creates a legal obligation for all persons directing work, to take reasonable steps to ensure safety of workers and the public.

Hastings and Prince Edward District School Board is committed to providing a safe science program that is composed of three inter-related elements:

- a) **People:** In order that science is taught safely, all persons in the jurisdiction must have or acquire a positive attitude about safety. Board members, employees, and students must become knowledgeable in areas of safety that affect their daily activities. Teachers must be role models and be committed to safety.
- b) **Places:** The facilities must comply with all existing legislation and must provide as safe a working environment as possible.
- c) **Practices:** Science is an experimental subject and must continue to be taught with the “hands on” approach. The techniques and procedures that expose students to various degrees of risk need not be eliminated, but modified so they can be carried out safely.

### 3) DELEGATION OF RESPONSIBILITIES

There are key areas of responsibility that must be clearly delegated for all areas and addressed for their individual school and facility. These delegations of responsibilities include administration, teachers, students, board facilities, custodian/maintenance and other local partners or board-defined roles. The fulfillment of these responsibilities provides the safest possible learning environments for both staff and students in science courses.

Responsibility for ensuring safety in the science classroom is shared by many members of the educational system. It is up to everyone involved, to work together as a team to ensure that responsibilities are determined, understood and fulfilled.

Ensuring health and safety in schools is an essential part of overall board safety responsibilities. To do this successfully, an effective health and safety management system needs to be in place.

In Ontario, school boards have safety obligations to:

- Students, under the Education Act (EA);
- Employees, under the Occupational Health and Safety Act (OHSA); and
- Everyone after the fact if a critical injury or death occurs.

The CODE Document, Student Safety: A Guide for Supervisory Officers, Principals and Vice-Principals primarily focuses on the responsibilities under the Education Act and Occupational Health and Safety Act but does not preclude additional safety requirements found in the Fire Protection and Prevention Act, Regulation 213/07, [http://www.e-laws.gov.on.ca/html/source/regs/english/2007/elaws\\_src\\_regs\\_r07213\\_](http://www.e-laws.gov.on.ca/html/source/regs/english/2007/elaws_src_regs_r07213_); Ontario Electrical Safety Code, Workplace Safety Insurance Act, 1977 [http://www.e-laws.gov.on.ca/html/statutes/english/elaws\\_statutes\\_97w16\\_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_97w16_e.htm) and other legislation.

The Education Act sets out the specific duties and responsibilities of boards, supervisory officers, principals, teachers, parents and students, but it is widely acknowledged that student safety and well-being is a shared responsibility. Boards establish clear and accessible policies to reduce the possibility of student injuries and promote “safety mindedness” in their schools.

Board policies are supported and reinforced by operational procedures and safety requirements and expectations at the school level. The Education Act states that in assigning or appointing a teacher to teach in a division or to teach a subject in a school, the principal of the school shall have due regard for the provision of the best possible program and the safety and well-being of the pupils. Principals

have a duty to give thorough attention to: the health and comfort of pupils; the cleanliness, temperature and ventilation of the school; the care of all teaching materials and other school property; and the condition and appearance of the school buildings and grounds.

It should also be noted that there is an expectation (commonly referred to as the “Reasonably Prudent Parent Doctrine”) that a school board and its employees or volunteers provide the same standard of care for students as would be provided by a reasonably careful or prudent parent. The duty of care is to protect students from all reasonably for-seeable risks of harm (Good Governance: A Guide for Trustees, School boards, Directors of Education and Communities, Chapter 6 Legal responsibilities and Liabilities Ontario School Boards’ Association)

Being the employer (as defined in the Occupational Health and Safety Act), the board is responsible for employee workplace health and safety. Generally, a board will designate the Director of Education (who may in turn designate supervisory officers) to have responsibility over the areas in which they control (note that principals and vice-principals are also considered supervisors as defined in the Occupational Health and Safety Act). The duties and responsibilities of the school board and its supervisors are found in Sec. 25, 26 and 27 of the Occupational Health and Safety Act.

When making regulations and guidelines under the authority of the Occupational Health and Safety Act, the Ministry of Labour may cite specific standards from different certifying or standard-setting organizations. One of these is CSA International, commonly known as the Canadian Safety Association. The First Aid Regulation 1101, under the Workplace Safety and Insurance Act, outlines the obligations of the employer to set up and maintain a first aid program in the workplace. The regulation outlines specific requirements for first aid kits and/or facilities, training, and the documentation of any first aid treatment provided ([visit http://www.wsib.on.ca](http://www.wsib.on.ca) and search for “first aid regulation 1101”).

There are key areas of responsibility that must be clearly delegated for all science subject areas and they must be addressed for their individual school and facility. These delegations of responsibilities include administration, department heads, science teachers, students, board facilities, custodian/maintenance and board-defined roles. The fulfillment of these responsibilities provides the safest possible learning environments for both staff and students in science courses. It is up to everyone involved to work as a team to ensure that responsibilities are determined, understood and fulfilled.

**a) School board**

The responsibility rests with the school board to provide leadership and resources to support science safety. In order to provide this leadership boards, need to:

- i) Prepare and review, at least annually, a written occupational health and safety procedure and develop and maintain a program to implement and assess that procedure;
- ii) Establish and maintain a written board safety procedure for science safety;
- iii) Establish an annual safety awareness program for new science staff, early in the beginning of each school year and second semester when required, which includes review of the science education safety procedure, supporting documents and forms; WHMIS training, etc. Maintain a record of these awareness sessions and provide records of attendance to school administrators;
- iv) Establish a review session for WHMIS training for all science staff each school year and second semester when required;
- v) Establish a system to monitor the effectiveness of safety procedures, guidelines and practices in their schools;

- vi) Ensure the measures and procedures prescribed are carried out in the workplace;
- vii) Ensure that the necessary safety equipment, materials and protective devices, as prescribed, are provided and maintained in good condition and used as indicated;
- viii) Establish a system to periodically assess the adequacy of the science facilities and safety equipment in each school and provide for their ongoing maintenance;
- ix) Provide information, instruction and supervision to a worker to protect the health and safety of the worker;
- x) When appointing a supervisor, appoint a qualified and trained individual;
- xi) Acquaint a worker (or a person with authority over a worker) with any hazards related to the handling, storage, use, disposal and transport of any article, device, equipment or biological chemical or physical agent;
- xii) Provide assistance and cooperation to the joint health and safety committee and a health and safety representative in the carrying out of any of their functions;
- xiii) Take every precaution reasonable in the circumstances for the protection of a worker;
- xiv) Prepare and post annually a written health and safety policy and a copy of the OHS Act;
- xv) Share with health and safety committee or safety representative copies of reports or the results of reports that pertain to worker safety;
- xvi) Meet the requirements of all regulations related to hazardous biological, chemical or biological materials including the limiting and monitoring of exposures, health services, training for workers and inventories; and
- xvii) Maintain records of the use, storage, and disposal of all hazardous biological, chemical or biological materials.

**b) Principal**

The responsibility rests with the principal or his or her designate to ensure safe procedures and practices are in place at the school level, and support teachers in providing a safe working environment.

**In order to achieve safety goals, the principal is responsible to:**

- i) Emphasize and implement the science education safety procedures;
- ii) Provide curriculum services with an updated list of teachers new to science at the start of each school year;
- iii) Hold staff accountable for safety practices in their respective area;
- iv) Inform workers of the existence of any potential or actual danger to health and safety of which he/she is aware; (e.g. scheduled power outage);
- v) Provide proper safety equipment in all science areas, ensure that any equipment, protective device or clothing required by the employer is used or worn by the worker and that expectations are clear for students regarding requirement to use or wear safety equipment as directed;
- vi) Complete Form 268: HPEDSB science facility checklist- principal, in consultation with the department head for science;

- vii) Develop and maintain the school's fire safety emergency response program as prescribed under the Fire Code;
- viii) Support teachers with implementation of procedures that reinforce science education safety for all students as outlined in board procedures;
- ix) Take every precaution reasonable in the circumstances, for the protection of workers and students;
- x) Follow Procedure 162: Treatment of Injured or Ill Students and Employees, completing Form 421-2: Supervisor Employee Accident Violent Incident Report as required;
- xi) Communicate accident records with the health and safety officer for assistance with the analysis in determining the most frequent causes of accidents and the more severe types of accidents;
- xii) Take corrective measures to change accident-causing conditions;
- xiii) Make safety literature, posters, audio visual aids and safety promotional material available to all persons associated with the science program;
- xiv) Make science teachers aware of any student medical condition that could result in a safety problem at the beginning of the year/semester;
- xv) Work with the lead custodian and facility services as follow up on reported deficiencies for the science department; and

**Principals are also responsible to emphasize that:**

- xvi) Teachers and substitute/supply teachers of science have the expertise and experience to teach the assigned curriculum safely;
- xvii) Teachers have completed safety awareness session on the use of any equipment within the classroom;
- xviii) Teachers obtain the required WHMIS training according to the provisions of the Occupational Health and Safety Act;
- xix) Employees use or wear any protective devices or safety equipment required by the Occupational Health and Safety Act and the board;
- xx) Facilities used for science activities are safe and appropriate for the activities carried out in them, and that necessary safety equipment is available;
- xxi) Schools have effective procedures and practices to follow in case of accidents and emergencies;
- xxii) All occasional teachers working in the science areas are informed about and understand the standard accident and emergency procedures;

**In addition, principals are to ensure that:**

- xxiii) Staff that handles hazardous materials and prepares laboratories have the expertise to do so safely;
- xxiv) Teachers work in a safe manner according to the provisions of the Occupational Health and Safety Act and the safety procedures developed by the board;
- xxv) Processes are in place for monitoring safety checklists and maintaining storage areas in the science department;

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- xxvi) Each science classroom has a posted a floor plan in a strategic place to show the location of items such as:
    - (1) Fire extinguishers
    - (2) Fire blankets
    - (3) Emergency power 'stop" buttons
    - (4) First aid kit
    - (5) Eyewash station(s)
    - (6) Emergency exits
    - (7) Special shut off valves (gas, etc.)
    - (8) Nearest fire pull station
  
  - xxvii) A First Aid kit is provided in each science area and have a process in place to see that it is maintained;
  
  - xxviii) An appropriate spill kit is in place and spill procedure present where applicable;
  
  - xxix) There is an eye wash station and procedure present where applicable;
  
  - xxx) There is a weekly eye wash flush and schedule posted as required;
  
  - xxxi) They assist science staff as needed with awareness around board reporting processes following board Procedure 162: Treatment of Injured or Ill Students and Employees for Reporting Accidents, and completion of Form 421-1: Employees accident violent incident report as required. Provide any further information, along with the health and safety representative that will assist in analysis of the incident as requested;
  
  - xxxii) Staff are supported with safety checks for every science and storage area at least once per semester and support the completion of Form 268-5: HPEDSB Science Facility and Safety Equipment Checklist-Classroom, and Form 268-6: HPEDSB Science Facility and Safety Equipment Checklist-Prep room;
  
  - xxxiii) Any unapproved or unsafe equipment or materials are monitored and removed from science areas and as part of ongoing processes, that all science staff are provided with ongoing reminders and updates regarding board science education safety procedures and science safety guidelines;
  
  - xxxiv) That every science laboratory, prep room and storage room, as part of review and completion of safety checklists:
    - (1) contains suitable safety equipment including firefighting apparatus, report any inadequacies to principal and health and safety officer
    - (2) that science staff are made aware of the requirement for these areas to be locked when not in use;
    - (3) has adequate ventilation, report any inadequacies to principal and health & safety officer;
    - (4) any evidence of defect in the electrical or natural gas system is reported to principal and health & safety officer and items are not connected to these until problem is evaluated by facility services; and
    - (5) has sufficient, sanitary protective equipment for use in the area by teachers, report any inadequacies to principal and health and safety officer

- xxxv) An up-to-date chemical inventory is maintained;
- xxxvi) Current (valid for 3 years from date on MSDS/SDS sheet) inventories of Material Safety Data Sheets/Safety Data Sheets (MSDS/SDS) are accessible in the area where chemicals are used and stored;
- xxxvii) Chemical storage area is set up according to science education safety guidelines to ensure that chemicals are stored properly; and
- xxxviii) Storage and disposal guidelines for waste chemicals are followed; if scheduled pickups are delayed, that enquiries are directed to the environmental technologist.

### c) Teachers

Teachers are responsible for the implementation of the instructional program and science education safety procedure and guidelines and are responsible to:

- i) Review all science education safety procedures and guidelines at the beginning of each semester;
- ii) As required under the OHSA, inform the principal, in writing, of any known or potential safety hazard or deficiencies in equipment;
- iii) Support ongoing monitoring for science education safety, informing the principal, in writing, of any known or potential safety hazard; (e.g., when the physical condition or other factors in the classroom may detrimentally affect safe instruction)

Teachers must be aware of board safety documents that outline safety procedures and participate in in-services provided. Use of board safety documents (see list in Appendix G) is required as a minimum basis for safety instruction. Teachers plan and prepare learning activities with a view to safety, and model and supervise safe practices in the science classroom/laboratory.

Students must receive instructions on the safe and proper operating procedures for specific equipment and materials by a science teacher before using them independently.

To carry out their responsibilities with regard to safety, it is important not only that teachers have concern for their own safety and that of their students, but also that they have:

- The knowledge necessary to use the materials, tools, and procedures in science classes safely; and
- The skills needed to perform tasks safely

#### iv) Safety preparation and delivery

Safety must be regarded as an integral part of the preparation and delivery of every science lesson involving hands on activities. Furthermore, the safety of teachers and students in a science classroom should never be compromised, regardless of the lesson or circumstance.

#### **In order to achieve safety goals teachers are responsible to:**

- (1) Implement safety routines as specified and recommended in board science education safety procedure and guidelines, and relevant legislation;
- (2) Participate in science education safety awareness session provided by the board at the beginning of each semester for staff teaching in the subject area for the first time during the current school year;

- (3) Complete WHMIS training provided by the Board, updating their certification annually;
- (4) Contribute to developing and implementing school laboratory safety procedure;
- (5) Familiarize themselves with the location and use of safety equipment within the science classroom, the location of main gas valves and electrical breakers;
- (6) Ensure that safety is discussed in all science classes early in each semester such that every student receives instruction in safety issues pertinent to the subject and room in which the class takes place;
- (7) Obtain written confirmation from students that their responsibilities for science education safety are understood and accepted; Form 268 -1: Student classroom/laboratory science safety agreement;
- (8) Maintain Form 268-2: HPEDSB science classroom/laboratory safety declaration classroom tracking sheet for the current course and current school year;
- (9) Administer a science safety screening (accommodate as necessary) to all students. Maintain a copy of the screening assessment and/or records which demonstrate successful completion of 100% awareness for safety skills for the current and previous year;
- (10) Promote a safe, positive working attitude in the science classroom or laboratory environment throughout any science course. Monitor students and correct behavior that jeopardizes safety;
- (11) Explain and model safety procedures prior to lab activity;
- (12) Instruct students on the safe and proper operating procedures for specific equipment before granting permission to use materials and equipment;
- (13) Ensure that all safety equipment and signs are clearly visible and identified within each classroom /laboratory area, some examples are:
  - (a) Fire extinguishers
  - (b) Fire blankets
  - (c) Emergency power 'stop" buttons
  - (d) First aid kit
  - (e) Eyewash station(s)
  - (f) Emergency exits
  - (g) Special shut off valves (gas, etc.)
  - (h) Nearest fire pull station
  - (i) Fire exit routes
- (14) Ensure that all equipment used is maintained in good working order and is without defect. Report any defects in or unsafe equipment to the science department head as soon as possible so that equipment can be removed, fixed or replaced, Label as out of use;
- (15) Instruct students to immediately report any equipment that they think may be unsafe or damaged, E.g. a cracked beaker or test tube;
- (16) Use or wear the equipment, safety devices or clothing as required by the Occupational Health & Safety Act and the board in the performance of science teaching responsibilities;



- (17) Report to the department head and principal any contravention of the Occupational Health & Safety Act or the existence of any hazard of which he/she is aware;
- (18) Perform all duties according to the science safety procedures provided, and in such a manner that does not endanger himself/herself, another worker or student;
- (19) Follow Procedure 162: Treatment of injured or ill students and employees, report all accidents and incidents to the department head involving teachers or students under their supervision. Complete board incident reports as required and report to the principal any incident involving the teacher or other personnel using Form 421-1 Employee accident violent incident report;
- (20) Follow board procedures for first aid treatment administration and reporting;
- (21) Follow WHMIS procedures and ensure that proper practices are followed for safe handling of all materials and proper disposal of hazardous chemicals and other water materials which are used in science;
- (22) Observe the safe handling and proper disposal of hazardous chemicals and other water materials which are used in science;
- (23) Remind students of safety parameters by reviewing safety measures for any assigned homework or independent activities;
- (24) Discuss the importance of science education safety awareness in industry and around the home as well as at school;
- (25) Discuss and use appropriate science education safety posters or pictures at strategic points around the room;
- (26) Report any defective lighting that may occur in the classroom or laboratory area;
- (27) Ensure all products have a current Materials Safety Data Sheet/Safety Data Sheet (Valid for 3 years from initial date on sheet) and that the MSDS/SDS sheet is reviewed for any chemical they are using;
- (28) Arrange that during a science teacher's absence that practice work activities that require minimal safety provisions are provided in case an occasional teacher is not familiar with the safety requirements for planned activity (e.g. Use of reactive chemicals within a laboratory setting);
- (29) Become aware of any special medical (anaphylaxis, asthma, epilepsy, diabetes) or learning needs that students may have at the beginning of each semester;
- (30) Arrange classroom to provide to maximize ease of movement and safety. Promote good housekeeping practices, keeping areas clean and uncluttered;
- (31) Ensure that chemicals and any other hazardous materials are stored in a designated and secure place;
- (32) Label chemicals dispensed into other containers for use for more than one class period. Write clearly the name of the chemical (not just the formula) on the label. Follow WHMIS labelling protocols.
- (33) Shut off all power, direct class to proper exit, lock classroom doors, accompany students outside to designated area and account for all students during school evacuations (i.e. fire drill);

- (34) Ensure that all appropriate documentation related to safety practices such as student attendance, student safety agreements, safety tests, etc. is readily available;
- (35) Science education teachers should carefully maintain records of student attendance and records of safety instruction given. Teachers are expected to be able to provide documentation:
- (a) That the student was present on the date that the safety portion of the science lesson was taught (dated lesson plans, attendance records clear and unambiguous);
  - (b) Of the safety lesson that was delivered (e.g. PowerPoint, note taking, signed safety pledge, preprinted sheets, successful passing on an announced written test that is dated and stored by the teacher, correction of errors completed.);
  - (c) That indicate student understanding of the safety component of science lessons (e.g. completed evaluation tool, student notes);
  - (d) Of how students are reminded of safe practice throughout the course (e.g. notation in teacher daybook);
  - (e) That the work and learning environments are kept safe, tidy, and in good condition (e.g., photos, safety inspections, cleanup procedures, student safety stewards, modeling of best practices), and that the Lead custodian is informed of any maintenance issues;
  - (f) That students' different learning styles and needs are taken into account, both during the delivery of safety lessons and during any follow up evaluation (e.g. use of visuals, opportunities to demonstrate understanding orally);
  - (g) Those safety procedures are explained using various strategies such as verbal explanation, demonstrations through modelling and accompanied by both written and pictorial explanations that are posted throughout the work and learning environments; and
  - (h) That each student was provided Form 268- 1: Student classroom/laboratory secondary science safety agreement and that it has been signed. (Form 268-1 will be kept in their notes for reference to the HPEDSB science classroom lab safety rules) and the student will sign Form 268-2 HPEDSB science classroom/laboratory safety declaration classroom tracking sheet as well, for the current course in the current school year.) In signing these forms, each student is stating that he/she has read and understands general safety rules and practices and agrees to follow them at all times.

(36) **Emergency Planning**

Teachers must be prepared to cope with emergencies should they arise. Emergency planning includes, but is not limited to any hazards associated with day to day curriculum requirements as well as classroom emergency evacuation and school fire safety plans.

**d) Science students**

Students support safety in the science classroom by acting responsibly and knowing how to respond to unsafe situations and emergencies. Students demonstrate that they have the knowledge, skills, and habits of mind required for safe participation in science activities when they:

- i) Follow all safety procedures and instructions, and act in a way that shows concern for everyone's safety;

- ii) Sign Form 268: Student classroom/laboratory secondary science safety agreement form, Form 268-2: HPEDSB Science classroom/laboratory safety declaration, class tracking sheet and complete Form 268-3: HPEDSB Contact lens declaration along with their parents unless over 18 years of age;
- iii) Come to the laboratory appropriately dressed for lab work, (i.e., closed shoes, long hair tied back, and secured clothing or jewelry);
- iv) Maintain a well-organized and uncluttered workspace;
- v) Wear goggles or use other safety equipment such as an apron;
- vi) Learn about the hazards posed by materials and equipment to be used in each activity, and about procedures to be used and/or avoided;
- vii) Learn about location and use of safety equipment;
- viii) Begin activities only with teacher's permission;
- ix) Carefully follow the instructions and example of the teacher;
- x) Identify possible safety concerns;
- xi) Report unsafe situations or accidents to teacher immediately;
- xii) Dispose of all chemicals, specimens and other materials as instructed by the teacher;
- xiii) Wash hands thoroughly after each experiment; and
- xiv) Consistently show care and concern for own safety and that of others.

**e) Parents**

Parents support safety in the classroom and laboratory by supporting the school's efforts to establish safety routines and expectations with students. To assist schools to achieve safety goals, parents should:

- i) Inform the school of health concerns and medical circumstances that could affect personal safety, e.g., allergies, medications as outlined in Procedure 320: Provision of health and/or medical support for students;
- ii) Complete Form 268-3: HPEDSB contact lens declaration along with their child.; and
- iii) Support the school and teacher in their endeavor to provide a safe learning classroom environment.

**f) Educational assistants**

Educational Assistants support the classroom teacher in maintaining safety. To assist schools to achieve safety goals, educational assistants should:

- i) Understand and model safe practices; and
- ii) Monitor student use of equipment and safety practices, and report any unsafe conditions to the teacher.

**g) Board facilities**

To assist schools to achieve safety goals, board facilities should:

- i) Inspect the science areas on at least an annual basis with respect to maintenance items such as: gas leaks, electrical outlets, safety indicators or signs, ventilation, and any other potential hazards;
- ii) Report the results of the inspection to the principal;
- iii) If work is planned in a science area, ensure the teachers are informed and check for special hazards which may be present;
- iv) Before working in a science classroom or laboratory, inform the teacher what will be done, and when the work will be starting and finishing. The classroom teacher is responsible for ensuring the work area within the room is free from physical and chemical hazards; and
- v) In situations where the hazard cannot be totally removed, specific work procedures must be developed in conjunction with the teacher and the health and safety officer.

**h) Custodian/maintenance**

To assist schools to achieve safety goals, custodians/maintenance should:

- i) Maintain daily removal of garbage, scraps, and waste which must be organized and coordinated with the custodial staff;
- ii) Be aware of the hazards in the science classroom and laboratory areas;
- iii) Know the hazard warning signs and symbols and proper safety precautions;
- iv) Do not handle unfamiliar materials. Do not handle or move chemicals in the classroom or laboratory;
- v) In the event of an emergency or concern, know the individuals who should be contacted and how to reach them;
- vi) Know the proper handling and disposal of materials before disposing;
- vii) If the contents of any containers are spilled, the school must adhere to the Spill Procedures. DO NOT TOUCH OR ATTEMPT TO CLEAN UP. Contact the principal or your supervisor, who will then contact the appropriate person/department; and
- viii) Ensure that the science classrooms are secure during non-class hours, after school, and at night. This is especially important when the school building is used after school by community user groups.

**4) SCIENCE EDUCATION SAFETY RESOURCE GUIDE GRADES 9 – 12**

Hastings and Prince Edward District School Board has developed a resource titled, Science Education Safety Resource Guide Grades 9 - 12 that will be available to all secondary science staff. It is expected that administrators and all secondary science staff will be familiar with this document and have an awareness of the sections pertinent to their role in providing a safe learning environment for our students.

The Science Education Safety Resource Guide document is divided into ten sections:

- a) Section 1: General safety management which contains an overview of safe learning environments, legislation and safety visits;
- b) Section 2: Outlines the roles and responsibilities of all involved in science education including legal responsibilities, also contained as part of this procedure;
- c) Section 3: Resources includes selections that will support administrators, department heads, and science teachers in the delivery of a safe science education program. This section includes information on safety topics for the classroom, student supervision, and discussion questions for staff to use to further a shared understanding of the building of safe learning environments;
- d) Section 4: In this section are assorted lists and checklists for science equipment and safety checklists. Form 268-4: Secondary school science safety manual audits/reviews, Form 268 -5: HPEDSB Science facility & safety equipment checklists – classroom, Form 268-6 HPEDSB Science facility & safety equipment checklists – prep room and Form 268-7: HPEDSB Science facility checklists - principal are found in this section. These are forms that are to be completed on an annual basis or by semester;
- e) Section 5: contains an assortment of Science safety checklists found in the provincial CODE document;
- f) Section 6: This section focuses on the emergency preparedness and precautions and responses that need to be in place to support a safe learning environment in science classrooms and laboratories;
- g) Section 7: This section focuses on Safety in the science classroom or laboratory. Safety experimental techniques are included. Also Form 268 -1: Student classroom/laboratory secondary science safety agreement, 268 -2: HPEDSB Science classroom/laboratory safety declaration class tracking sheet, 268-3 HPEDSB: Contact lens declaration, and 268-8: HPEDSB Lab risk assessment tool (LABRAT) are included in this section;
- h) Section 8: This section covers the topics of WHMIS, MSDS/SDS and Labelling requirements for substances used in science classrooms. Annual training of all secondary science teachers in WHMIS is required;
- i) Section 9: In this section of the guidelines there are is detailed information on risks and hazards and recommendations as to how to minimize these in secondary science classrooms. There is detailed information on chemical handling and storage as well as detailed information for both the handling of materials related to biology and physics courses;
- j) Section 10: Details information that is required regarding waste and chemical disposal; and
- k) At the end of the document is a reference list followed by Appendix A, an overview of the slideshow used annually for safety training for secondary science teachers new to the role and Appendix B, Science chemical list.

**Legal references**

- *Occupational Health and Safety Act, as amended by Bill 168*
- *Education Act, section 265 Duties of Principal: Care of Property; section 283 Chief Executive Officer: Maintain Effective Organization; section 286 Duties of Supervisory Officers: Supervise Property*
- *Ontario Regulation 298—Operation of Schools, section 11 Duties of Principals: Inspect School Premises*
- *Ontario Fire Code - The Fire Protection and Preventions Act, 1997 and O. Reg. 451/05, as amended*
- *Occupational Health and Safety Act, Ontario Regulation 851, Industrial Establishments*

**District references**

[Reference documents can be found online](#)

- Procedure 130: Environmentally Responsible Operations and Education
- Procedure 135: Equity and Inclusivity Education
- Procedure 145: Board Code of Conduct and School Codes of Conduct
- Procedure 147: Technology Use
- Procedure 149: Safety and Well-Being of Students and Staff
- Procedure 153: Emergency Response
- Procedure Form 268-1: Student Classroom/Laboratory Secondary Science Safety Agreement
- Procedure Form 268-2: Science Classroom/Laboratory Safety Declaration
- Procedure Form 268-3: Contact Lens Declaration
- Procedure Form 268-4: Secondary School Science Safety Manual Audits/Reviews
- Procedure Form 268-5: Science Facility & Safety Equipment Checklist (Classroom)
- Procedure Form 268-6: Science Facility & Safety Equipment Checklist (Prep Room)
- Procedure Form 268-7: Science Facility & Safety Checklist (Principal)
- Procedure Form 268-8: Lab Risk Assessment Tool (LABRAT)
- Administrative Procedure 162: Treatment of Injured or Ill Students and Employees
- Administrative Procedure 320: Provision of Health and/or Medical Support for Students
- Administrative Procedure 415: Asbestos Management Control Program
- Administrative Procedure 420: Occupational Health and Safety
- Administrative Procedure 420-A: Working Alone or in Isolation
- Administrative Procedure 420-D: Use of Ladders
- Administrative Procedure 420-E: Personal Protective Equipment
- Administrative Procedure 420-H: In-School Health and Safety Guidelines
- Administrative Procedure 421: Safe Workplace – Violence in the Workplace
- Form 421-1: Employee Accident/Violent Incident Report
- Form 421-2: Supervisor's Accident/Violent Incident Investigation Report
- Administrative Procedure 505: Purchasing
- Administrative Procedure 552: Maintenance of Buildings, Grounds and Equipment
- Administrative Procedure 562: Electrical System Service for Public Safety
- Administrative Procedure 568: Installation and Application of Building Materials Containing Volatile Organic Compounds

**Related Guidelines and administrative resources**

- Occupational Health and Safety Compliance Checklist
- September Health and Safety Checklists
- Workplace Inspections
- First Aid Kit Requirements
- Reporting Hazardous Conditions Guidelines
- HPEDSB Weekly Eye Wash Flush Schedule
- Hastings and Prince Edward District School Board Secondary Science Guidelines 2016
- Hastings and Prince Edward District School Board Elementary Science Guidelines 2016 (still in development)



**Hastings and Prince Edward  
District School Board**

Appendix B

# **Science Chemical List**

Distribution: Elementary & Secondary  
Science Departments

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Revised 11/16

## Science Chemical List

### Chemical Designations

A	Acceptable	Acceptable for general student and teacher use
B	Banned	Chemicals whose risk outweighs their educational value
RT	Restricted Teacher	Teacher Use Only- see MSDS/SDS <b>For secondary schools only - See specific restrictions for each chemical</b>
RS	Restricted Senior Science	For use by students in senior science courses permitted only under direct teacher supervision <b>For secondary schools only - See specific restrictions for each chemical</b>

### Chemical Storage Codes

Refer to HPEDSB Science Education Safety Guidelines (Section 9) and STAO Safe On Science: a Health and Safety Reference for Secondary School Science (pp. 37-38) for further details.

<b>Green</b>	Suitable for general storage area
<b>Red</b>	Store in flammables cabinet
<b>White</b>	Store in corrosion-proof area
<b>Yellow</b>	Oxidizers - Store away from flammables and combustibles
<b>Blue</b>	Store in secure poisons area
<b>BANNED</b>	Banned Substance

### Chemical Disposal

Refer to Section 10 (pp. 13-18) HPEDSB Science Education Safety Guidelines and STAO Safe on Science: A Health and Safety Reference for Secondary School Science (pp. 39-40) for further details for proper disposal of chemicals and their by-products.



acacia gum (arabic gum)	A				green
acetaldehyde (ethanal)		B		suspected carcinogen; flammable; peroxides in storage	BANNED
acetamide		B		mutagen; possible carcinogen; ignited by static charge	BANNED
acetaminophen	A				green
acetic acid (ethanoic acid)	A			use solutions of less than 6.0 mol/L	white
acetic acid, glacial 17 M (ethanoic acid, 17 M)			RS	do not store with nitric acid	white
acetic anhydride (ethanoic anhydride)			RS	in fumehood only	red
aceto-carmine stain		B			BANNED
acetone (propanone)	A			explosive mixture with air; permanent eye damage; 500 mL max. in school.	red
aceto-orcein biological stain 2% solution			RT	slightly corrosive to eyes & skin; moderately toxic by ingestion	blue
acetyl chloride		B		reacts violently with water (produces phosgene); explosive mixture with air; low flashpoint	BANNED
acetylcholine bromide	A			stable; eye & skin irritant; do not heat	green
acetylcholine chloride	A			stable; eye & skin irritant; do not heat	green
acetylsalicylic acid (o-acetylsalicylic acid)	A				green
acridine orange		B		health affects: acute, chronic, mutagenic effects	BANNED
acrylic acid		B		carcinogen; prone to hazardous polymerization	BANNED
acrylonitrile (vinyl cyanide)		B		designated substance; carcinogen, mutagen	BANNED
activated charcoal	A				green
adenosine triphosphate (ATP)			RS	used in biotechnology	green
adrenaline		B		highly toxic; precursor to illicit drugs	BANNED
agar	A				green
agarose, LE (low EEO)			RS	used in biotechnology	green
alanine (D,L-alpha)	A				green
alizarin red	A				green
alizarin yellow	A				green
alum (sodium or potassium aluminum sulfate)	A				green
aluminum - mesh, strip, shot, foil	A				green
aluminum - powder			RT	poses explosion hazard; inhalation hazard	green
aluminum acetate	A			mild skin irritation	green
aluminum ammonium sulfate (hydrated), (alum)	A				green

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
aluminum chloride anhydrous	B	corrosive; poisonous; reacts violently with water; teratogen; old containers may explode on opening	BANNED
aluminum chloride hexahydrate	A		white
aluminum dichromate	B	extremely toxic; carcinogen	BANNED
aluminum fluoride	B	toxic by inhalation or if swallowed	BANNED
aluminum hydroxide	A		green
aluminum nitrate nonahydrate		RT can react violently with skin - use in dilute teacher prepared solutions only	yellow
aluminum oxide	A		green
aluminum potassium sulfate (hydrated) (potassium aluminum sulfate, potassium alum)	A		green
aluminum sodium fluoride	B	extremely toxic by inhalation or absorption through skin	BANNED
aluminum sodium sulfate anhydrous (alum)	A		green
aluminum sulfate (aluminium sulfate)	A		green
aminobenzene (aniline, phenylamine)	B	poison, absorbed through skin	BANNED
ammonia aqueous (ammonium hydroxide)	A	use solutions of less than 6.0 mol/L	white
ammonia (conc) 14.8 mol/L (ammonium hydroxide 14.8 mol/L)		RT vapour irritating to the eyes - use in fume hood only	white
ammonium acetate	A		green
ammonium bromide	A		green
ammonium carbonate	A		green
ammonium chloride (sal ammoniac)	A	irritant	green
ammonium chromate	B	Carcinogen, irritation to eyes	BANNED
ammonium dichromate	B	carcinogen; closed container may explode	BANNED
ammonium dihydrogen phosphate	B	not needed use sodium version	BANNED
ammonium fluoride	B	toxic; sensitive to mechanical shock	BANNED
ammonium hydrogen carbonate	A	incompatible with strong acids	green
ammonium hydrogen phosphate	A		green
ammonium iron (II) sulfate		RT avoid heat, light, moisture; extreme health hazard	green
ammonium molybdate tetrahydrate	B	highly toxic	BANNED
ammonium nitrate		RT extreme explosive hazard; stock in small amounts.	yellow
ammonium oxalate monohydrate	B	corrosive; use alternate sources of oxalate	BANNED
ammonium perchlorate	B	highly toxic; may explode with friction	BANNED
ammonium persulfate	B	unstable; harmful if swallowed	BANNED

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
(ammonium peroxydisulfate)		B	unstable, harmful if swallowed	BANNED
ammonium phosphate	A			green
ammonium sulfate	A			green
ammonium thiocyanate			RT liberates toxic cyanide gas if mixed with acids	green
amyl alcohol (1-pentanol)	A			red
amylase (diastase of malt)	A			green
amylopectin	A			green
amylose	A			green
aniline (aminobenzene), (phenylamine)		B	poison, absorbed through skin	BANNED
aniline hydrochloride		B		BANNED
antimony compounds (ALL)		B	emits toxic fumes on heating or with acid; may be fatal if inhaled; all powdered/dust metals banned	BANNED
antimony pentachloride		B	corrosive; exceptional health hazard	BANNED
antimony pentasulfide		B	powdered metals banned	BANNED
antimony pentoxide		B	harmful if swallowed or inhaled; long term affects on kidneys possible	BANNED
antimony potassium tartrate		B	poison; fatal if swallowed; corrosive	BANNED
antimony trichloride		B	reacts with moisture; irritant; burns skin	BANNED
antimony trioxide		B	exceptional health hazard	BANNED
antimony(III) sulfide		B	harmful with skin & by inhalation; chronic exposure may lead to kidney damage	BANNED
arabic gum (acacia gum)	A			green
arsenic compounds (ALL)		B	designated substances	BANNED
asbestos compounds (ALL)		B	designated substance	BANNED
ascarite (sodium coated asbestos)		B	designated substance	BANNED
ascorbic acid	A			green
atropine sulfate		B	poisonous	BANNED
azides		B	toxic	BANNED
azo violet	A		irritant	green
azure A	A		irritant	green
barium acetate		B		BANNED
barium bromide		B		BANNED
barium carbonate		B	acute toxicity	BANNED
barium chlorate		B	strong oxidizing agent	BANNED
barium chloride			RS toxic if ingested; use in dilute solution only - do not heat	blue
barium chromate		B	toxic	BANNED

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
barium cyanide	B	extremely toxic	BANNED
barium fluoride	B		BANNED
barium hydroxide octahydrate	RT	corrosive, toxic	blue
barium metal	B	highly flammable; metal difficult to cut	BANNED
barium nitrate	B		BANNED
barium oxide	B		BANNED
barium perchlorate	B	highly reactive	BANNED
barium peroxide	B	shock sensitive; toxic	BANNED
barium sulfate	A		green
barium sulfide	B		BANNED
barium sulfite	B		BANNED
Benedict's solution/ reagent	A	safer alternative to Fehling's solution	green
benzene	B	designated substance; known carcinogen	BANNED
benzoic acid	A		green
benzoyl peroxide	B	high toxicity	BANNED
beryllium compounds (ALL)	B	poison; extremely toxic	BANNED
BHT (butylated hydroxy toluene), (2,6-di-t-butyl-4-methylphenol)	RT	Use in fumehood only	blue
Bial's reagent	RT	very strong skin irritant	white
bile salts	A		green
bismuth (granular)	A		green
bismuth nitrate pentahydrate	B	strong oxidizer; hygroscopic; incompatible with many substances	BANNED
bismuth powder/dust	B	poses explosion hazard; inhalation hazard	BANNED
Biuret's reagent	A	corrosive & irritant; contains dilute NaOH	white
bluestone (copper(II) sulfate pentahydrate)	A		green
B-Mercaptoethanol (BME)	B		BANNED
boiling chips (marble chips)	A		green
borealine 2	RT	teacher use only	green
boric acid	A		green
brass (pieces)	A		green
Bouin's solution	B	contains highly toxic formaldehyde & trinitrophenol	BANNED
brilliant green	A		green
borax (sodium tetraborate decahydrate)	A		green
bromine	B	could be fatal; highly toxic; corrosive	BANNED

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
bromine water (aq)		B	use potassium permanganate as an alternative	BANNED
bromocresol blue	A			green
bromocresol green	A			green
bromocresol purple	A		flammable	red
bromoethane (ethyl bromide)		B	highly flammable	BANNED
bromophenol blue	A			green
bromthymol blue	A			green
bromthymol yellow	A			green
buffer solutions	A			green
butane			RS small amounts of butane from lighters permitted for molar volume experiments	red
butanedioic acid (succinic acid)	A			green
butanoic acid (butyric acid, n-butyric acid)			RS corrosive; irritant; strong stench; use in fumehood	red
butanol (1-butanol, 2-butanol, t-butanol)	A			red
1-butanol, 3-methyl- (isopentyl alcohol)	A			red
2-butene-1, 4-diol	A		safer substitute for cyclohexene	red
butylated hydroxy toluene, (2,6 di-t-butyl-4-methylphenol), (BHT)			RT see BHT - use in fumehood only	blue
butyric acid (n-butyric acid, butanoic acid)			RS corrosive; irritant; strong stench - use in fumehood only	red
cadmium compounds (ALL)		B	carcinogen	BANNED
calcium (metal, turnings)			RT use lumps less than 1/10th gram	red
calcium acetate monohydrate	A			green
calcium carbide			RS use with caution	red
calcium carbonate	A			green
calcium chloride	A			green
calcium chloride solution, sterile	A		used in biotechnology	green
calcium fluoride (fluor spar)	A		retain only as mineral sample, do not react	green
calcium hydroxide (slaked lime)	A		irritant	green
calcium hypochlorite (bleaching powder)		B	toxic - chlorine gas generator - use chlorine water instead	BANNED
calcium nitrate tetrahydrate			RT use in solution only, solid is explosive	yellow
calcium oxide (quicklime)	A		corrosive	white
calcium phosphate (mono, di, tri, -basic)	A			green

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
calcium sulfate dihydrate (gypsum)	A		green
Canada balsam	B		BANNED
carbon dioxide, solid (dry ice)		RS use with caution	white
carbon dioxide gas cylinder		RT lecture size cylinder recommended	green
carbon disulfide	B	carcinogen; highly flammable	BANNED
carbon tetrachloride (tetrachloromethane)	B	carcinogen; severe liver & kidney damage	BANNED
carborundum powder (silicon carbide)	A	display lumps only, no powders	green
carmine stain	A		green
carnauba wax	A		green
Carnoy's Solution	B	contains chloroform; carcinogen	BANNED
Casein	A		green
catalase	A		green
cellulose powder	A		green
Charcoal – lab grade		RT	green
China Clay (Kaolin)	A		green
chloral hydrate (2,2,2 - trichloroethanediol)	B	toxic; narcotic	BANNED
chloramphenicol	B	carcinogen	BANNED
chlorine gas cylinder	B	highly toxic	BANNED
chlorine water (aq)		RT limited quantities; do not store	white
chloroethane (ethyl chloride)	B	rapidly absorbed; fatal	BANNED
chloroform (trichloromethane)	B	carcinogen	BANNED
chromates of lead or zinc	B	carcinogen	BANNED
chromatography solvent	A		green
chromic acid (chromium trioxide)	B	carcinogen	BANNED
chromium (II) & (III) ALL COMPOUNDS	B	carcinogen	BANNED
chromium metal, fused pieces or chunks	A		green
chromium powder/dust	B	poses explosion hazard; inhalation hazard	BANNED
chromium(VI) cation compounds	B	carcinogen	BANNED
citric acid	A		green
Clinitest (tablets & strips)	A		green
cobalt(II) acetate	B	highly reactive & toxic	BANNED
cobalt(II) chloride hexahydrate	B	potential carcinogen	BANNED

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
cobalt(II) oxide		B	affects thyroid, heart, lungs & kidneys	BANNED
cobalt pellets			RT carcinogen – sealed container	blue
cobalt powder		B	poses explosion hazard; inhalation hazard	BANNED
cobalt(II) chloride test strips	A			green
cobalt(II) nitrate hexahydrate		B	highly reactive & toxic	BANNED
cobalt(II) sulfate heptahydrate		B	carcinogenic	BANNED
cobalt(III) oxide		B	toxic fumes upon decomposition; experimental carcinogen	BANNED
colchicine		B	toxic; mutagen	BANNED
collodian		B	highly flammable; hazardous	BANNED
congo red		B	mutagen; carcinogenic	BANNED
copper metal - sheet, foil, strip, shot	A			green
copper - powder,dust		B	poses explosion hazard; inhalation hazard	BANNED
copper(I) chloride			RS toxic - severe eye irritant	green
copper(I) oxide			RS toxic - severe eye & skin irritant	green
copper(II) acetate monohydrate	A			green
copper(II) bromide	A			green
copper(II) carbonate hydroxide (basic)			RT use in fumehood only - acrid toxic fume generator when heated	blue
copper(II) chloride dihydrate	A			green
copper(II) nitrate trihydrate	A			yellow
copper(II) oxide	A			green
copper(II) sulfate anhydrous	A			green
copper(II) sulfate pentahydrate (bluestone)	A			green
copper(II) sulfide		B	generates hydrogen sulfide	BANNED
cresol red (o-cresolsulfonphthalein)	A			green
o-cresol		B	severe health hazard	BANNED
Cryolite (sodium aluminum fluoride)			RT toxic; corrosive; sealed container	blue
crystal violet (Gentian violet, violet aniline)	A		use only in solution	green
cyanides (not ferro or ferri)		B	highly toxic	BANNED
cyclohexane			RT highly flammable	red
cyclohexene			RT use 2-butene-1,4-diol instead for saturated/unsaturated test (Sigma-Aldrich)	red
DDT		B	flammable, toxic, affects CNS	BANNED
decane		B		BANNED

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
Detain (Quieting solution)	A			green
dextrose (glucose)	A			green
D-galactose	A			green
diacetic ether (diethyl ether)		B		BANNED
1,6-diaminohexane (hexamethylenediamine, 1,6-hexanediamine)			RT corrosive; absorbs through the skin; lachrymator, use in fume hood only	white
diatomaceous earth	A			green
dibasic sodium phosphate (disodium phosphate, sodium monohydrogen phosphate, sodium phosphate dibasic)	A			green
dibromoethane (ethylene dibromide)		B	carcinogen	BANNED
dichlorobenzene		B	experimental carcinogen; causes CNS depression	BANNED
dichlorobenzidine		B	carcinogen	BANNED
dichloroethane		B	carcinogen; mutagen	BANNED
dichloroethane (ethylene dichloride)		B	carcinogen; teratogen	BANNED
dichloroindophenol (indophenol indicator, 2,6-dichloroindophenol (sodium salt))	A		use only in solution, 1 year shelf life	green
dichloromethane (methylene chloride)		B	carcinogen; teratogen; mutagen	BANNED
diethyl ether		B		BANNED
diethyl phthalate		B	teratogenic	BANNED
diethylene glycol monobutyl ether		B	contact severe eyes	BANNED
dimethyl glyoxine		B	very toxic	BANNED
dimethyl sulfate		B	suspected carcinogen	BANNED
dimethyl sulfoxide		B	severe irritant	BANNED
dinitrophenol		B	very toxic explosive	BANNED
dinitrophenyl hydrazine 6		B	very toxic; dangerously explosive	BANNED
dioxane		B	very toxic	BANNED
diphenylamine		B	very toxic; explosive; need self contained breathing apparatus	BANNED
dithiothreitol (DTT)			RS biotechnology use only - will absorb through the skin; avoid use around live animals such as frogs, reffridgerate	blue
D-mannose	A			green
DNA			RS used in biotechnology	green
dodecanoic acid (lauric acid)	A			green
dodecyl sodium sulfate			RS Used in biotechnology	Green



CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
(SDS)(sodium lauryl sulphate)		RS Used in biotechnology	green
Drierite (calcium sulfate dihydrate)	A		green
D-sorbitol (xylitol)	A		green
D-xylose	A		green
Eosin		RT teacher use, in solution only	green
Eriochrome Black	A		green
ethanal (acetaldehyde)	B	suspected carcinogen; flammable; peroxides in storage	BANNED
ethanediol, 2,2,2-trichloro- (chloral hydrate)	B	toxic; narcotic	BANNED
ethanoic anhydride (acetic anhydride)		RS use in fumehood	red
ethanol denatured (ethyl alcohol)		RS highly flammable; toxic, teacher or senior student use only DO NOT USE WITH FLAME	red
ether (all)	B		BANNED
ethidium bromide	B	extremely toxic	BANNED
ethidium bromide solution, 5 mg/mL	B	specialized biotechnology	BANNED
ethyl acetate	B	highly flammable; vapours hazardous	BANNED
ethyl bromide (bromoethane)	B	highly flammable	BANNED
ethyl carbonate	B	carcinogen	BANNED
ethyl chloride (chloroethane)	B	rapidly absorbed; fatal	BANNED
ethyl ether	B	severely toxic, highly flammable & explosive, mutagenic	BANNED
ethyl iodide (iodoethane)	B	highly flammable, explosive & light sensitive	BANNED
ethyl methyl ketone	B	extremely flammable & explosive, affects CNS	BANNED
ethylbenzene	B	severe fire hazard	BANNED
ethylene dibromide (dibromoethane)	B	carcinogen	BANNED
ethylene dichloride	B	carcinogen	BANNED
ethylene glycol	A		green
ethyleneimine	B	toxic, carcinogenic, teratogenic	BANNED
ethylenediaminetetraacetate (EDTA)	A		green
FAA solution	B	contains formaldehyde a suspected carcinogen	BANNED
Fast Green		RS use in solution only	green
Fehling's solution A, B	B	corrosive; Benedict's solution is safer	BANNED
fluoroglycinol	B		BANNED
fluorescein, disodium salt		RT teacher use only in solution; inhalation hazard	green

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
fluor spar (calcium fluoride)	A		green
formaldehyde (methanal)	B		BANNED
formalin	B	carcinogen	BANNED
formalin acetone	B	dangerously corrosive to skin	BANNED
formic acid (methanoic acid)		RS very irritating; explosive; supervised senior student use	red
fructose	A		green
Fuchsin	A	used as a bacterial stain	green
D-galactose (guar gum)	A		green
gallic acid	B	overexposure reproductive toxicity	BANNED
gasoline	B	highly flammable	BANNED
Gentian violet (crystal violet)	A	use only in solution	green
gibberellic acid		RS use caution - strong growth hormone	green
glass wool		RT silica dust inhalation hazard	green
gluconic acid	B	inhalation may be fatal	BANNED
glucose (dextrose)	A		green
glucose phosphate	A		green
glucose-tris-EDTA (GTE) solution	A	used in biotechnology	green
gluten	A		green
glycerol	A		green
graphite powder	A		green
guar gum (D-galactose)	A		green
gypsum (calcium sulfate dihydrate)	A		green
helium gas cylinders		RT lecture size is recommended	green
hematoxylin (Natural Black 1, Ehrlich's stain)	A	use in solution only	green
heptane		RS flammable	red
hexamethylenediamine (1,6-diaminohexane, 1,6-hexanediamine)		RT corrosive; absorbed through skin; lachrymator	white
hexane	B	flammable; health hazard; use heptane as an alternative	BANNED
Hydrazine	B	carcinogen	BANNED
hydrochloric acid	A	use solutions of less than 6.0 mol/L	white
hydrochloric acid (12 M) concentrated		RS use in fumehood only	white
hydrofluoric acid	B	inhalation hazard; highly corrosive	BANNED
hydrogen gas cylinders	B	significant Fire Code restrictions on indoor storage of flammable compressed gases	BANNED

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
hydrogen peroxide (3% & 6%)	A	recommended storage in refrigerator to extend shelf life	green
hydrogen peroxide (30%)		RT strong oxidizer; not needed in program (Biology & Chemistry)	yellow
hydrogen sulphide gas cylinder	B	extremely toxic	BANNED
hydroquinone (quinhydrone)	B	probable carcinogen	BANNED
hydroxylamine HCl	B	possible mutagen; possibly fatal if inhaled	BANNED
indigo carmine	A	use in solution only	green
Indoleacetic-3 acid	A		green
Indolebutyric-3 acid	A		green
indophenol indicator	A		green
indophenol (2,6-dichloroindophenol (sodium salt))	A	nonhazardous; 1 year shelf life	green
iodine solution (tincture)	A	use solutions of less than 6.0 mol/L	green
iodine solution (Lugol's I <sub>2</sub> /KI)	A		green
iodine, crystals		RT toxic	white
iodoethane (ethyl iodide)	B	see ethyl iodide	BANNED
iodoform (triiodomethane)	B	harmful by skin contact	BANNED
iron (metal) - filings, shot, mesh, granular	A		green
iron (metal) - powder, dust	B	poses explosion hazard; inhalation hazard	BANNED
iron(II) sulfide	B	releases hydrogen sulphide when moist	BANNED
iron(II) ammonium sulfate hexahydrate	A		green
iron(II) chloride tetrahydrate	A		white
iron(II) oxide	A		green
iron(II) sulfate heptahydrate	A		green
iron(III) chloride hexahydrate	A		white
iron(III) nitrate nonahydrate	A		yellow
iron(III) oxide	A		green
iron(III) sulfate	A		green
isoamyl alcohol (isopentyl alcohol, 3-methyl-1-butanol)		RS strong odour, teacher or senior student use in fume hood only	red
isopropyl alcohol		RS avoid ingestion; should be tightly controlled access - teacher or senior student use only	red
Kaolin (China Clay)	A		green
kerosene, deodourized		RS flammable	red
lactic acid	A		green
lactose monohydrate	A		green

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
lanolin	A		green
lead (II) acetate	B	carcinogenic; organic lead compounds easily absorbed through the skin	BANNED
lead (metal) - sheet, foil, strips, shot		RT lead compounds are toxic; ensure proper disposal	green
lead (metal) - powder	B	poses explosion hazard; inhalation hazard	BANNED
lead(II) oxide	B	toxic	BANNED
lead(II) chloride	B	lead compounds are probable carcinogen	BANNED
lead(II) chromate	B	extremely toxic; suspected carcinogen	BANNED
lead(II) nitrate	B	lead compounds are probable carcinogen	BANNED
lead(IV) oxide (lead peroxide, lead superoxide)	B	Lead compounds are probable carcinogen	BANNED
lead(II) sulfate	B	Lead compounds are probable carcinogen	BANNED
ligation buffer/ATP, 2X		RS used in biotechnology	green
lipase	A		green
lithium		RS highly flammable; corrosive	red
lithium carbonate	B	teratogen & mutagen	BANNED
lithium chloride	A	use in solution only	green
lithium hydroxide	B		BANNED
lithium nitrate		RS very strong oxidizing agent, use in solution only	yellow
lithium sulfate	A	use in solution only	green
litmus (paper & solution)	A		green
loading dye		RS used in biotechnology - stains; not harmful	green
Lugol's iodine solution (I <sub>2</sub> /KI)	A		white
luminol	A		green
lycopodium powder	A		red
magnesium - ribbon	A	highly flammable; if this material is burned, ensure that students do not look directly at flame	red
magnesium acetate	A		green
magnesium aluminum silicate	A		green
magnesium carbonate	A		green
magnesium chloride hexahydrate	A		green
magnesium hydroxide	A		green
magnesium nitrate hexahydrate	A		yellow
magnesium oxide	A		green
magnesium silicate	A		green
magnesium stearate	A		green
magnesium sulfate heptahydrate	A		green

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
malachite green			RS toxic	white
maleic acid	A			white
malonic acid	A			green
maltose nonohydrate	A			green
manganese (pieces, not powder)			RS water-reactive	green
manganese carbonate	A			green
manganese dioxide (manganese(IV) oxide)	A		use caution in combination with potassium chlorate	green
manganese nitrate	A			yellow
manganese(II) chloride		B	gives off toxic fumes when heated	BANNED
manganese(II) sulfate monohydrate	A			green
manganese(IV) oxide (manganese dioxide)	A		use caution in combination with potassium chlorate.	green
D-mannose	A			green
marble chips (boiling chips)	A			green
menthol	A			green
mercury (liquid)		B	toxic	BANNED
mercury compounds (ALL)		B	extremely toxic	BANNED
methanal (formaldehyde)		B	carcinogen	BANNED
methanol (methyl alcohol)			RS toxic	red
methyl blue powder	A			green
methyl blue solution	A		stains; not harmful	red
methyl orange	A			green
methyl red	A			green
methyl violet	A			green
methylamine (40%)		B	aqueous solution is corrosive; flammable & dangerous to the eyes; possible mutagen	BANNED
methylbenzene (toluene)		B	teratogenic	BANNED
methylene blue solution	A			green
methylene chloride (dichloromethane)		B	carcinogenic; tetragen; mutagen	BANNED
mineral oil	A			green
moth balls (naphthalene)	A			red
muriatic acid (10 M HCl)			RS use in fumehood	white
naphthalene (moth balls)	A			red
n-butyl chloride		B		BANNED

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
neutral red stain	A		green
nichrome, wire	A		green
nickel (metal) - powder, dust	B	poses explosion hazard; inhalation hazard	BANNED
nickel (metal)- shot, mesh, granular	A		green
nickel (II) ammonium sulphate	B		BANNED
nickel (II) acetate	B		BANNED
nickel (II) chloride	B		BANNED
nickel(II) nitrate hexahydrate	B	carcinogenic	BANNED
nickel(II) oxide	B	known carcinogen	BANNED
nickel (II) sulphate	B		BANNED
nicotine (pure)	B	toxic	BANNED
ninhydrin monohydrate powder	A		green
ninhydrin monohydrate solution	A		red
ninhydrin reagent spray	A	use aqueous instead of alcohol solution.	red
nitric acid		RT use solutions of 6.0 mol/L or less	white
nitric acid concentrated 15 M		RT teacher use only, extremely corrosive	white
nitrocellulose		RT explosive – teacher use only	red
nitrogen dioxide tubes		RT teacher use only	blue
nitrogen gas cylinder		RT lecture size only	green
o-cresol	B	severe health hazard	BANNED
octanol (n-octanol)	A		red
Oil of Wintergreen (methyl salicylate)	B	teratogen – reproductive hazard	BANNED
oleic acid	A		green
orange(III)	A	use in solution only	green
orange(IV)	A	use in solution only	green
oxalic acid dihydrate	B	extreme health hazard	BANNED
oxygen gas cylinder		RT lecture size only	Segregate in dedicated cabinet
pancreatin	A		green
paradichlorobenzene	B	possible carcinogen, use stearic acid instead	BANNED
paraffin oil	A		green
paraffin wax	A		green
pentane (n-pentane)	B		BANNED
pepsin	A		green
peptone	A		green

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
perchloric acid (potassium perchlorate)		B	fire & explosion risk; strong oxidizer; sensitive to mechanical impact	BANNED
petroleum ether (petroleum spirit)		B	highly flammable; keep away from open flames	BANNED
phenanthroline, ortho			RT	blue
phenol		B	teratogen; mutagen	BANNED
phenol red powder	A			white
phenol red solution	A			red
phenolphthalein	A			red
phenylamine (aminobenzene), (aniline)		B	poison, absorbed through skin	BANNED
phenylarsine oxide		B		BANNED
phenyl salicylate (salol)	A			green
phenylthiocarbamide (P.T.C. paper)		B	highly toxic by ingestion	BANNED
phosphoric acid	A		use solutions of 6.0 mol/L or less	white
phosphoric acid concentrated 15 M			RT highly corrosive	white
phosphorus (red)		B		BANNED
phosphorus (V) oxide		B	corrosive	BANNED
phosphorus (White, Yellow)		B	highly flammable; low ignition point	BANNED
phthalic acid	A			green
phthalic anhydride		B	highly corrosive; not needed in program	BANNED
picric acid		B	class "A" explosive	BANNED
platinum, wire (no powders)	A			green
polyvinyl alcohol	A			green
potassium			RT Regulated under the Canadian Explosives Act – unable to restock; formation of peroxides is a concern	red
potassium acetate	A		used in biotechnology	green
potassium acetate-acetic acid solution	A		used in biotechnology	green
Potassium bisulfite			RS may cause allergic reaction; reactive with oxidizers	green
potassium bitartrate (Cream of Tartar)	A			green
potassium bromate		B	carcinogen	BANNED
potassium bromide	A			green
potassium carbonate	A			green
potassium chlorate		B	strong oxidizing agent, highly reactive; unpredictable	BANNED
potassium chloride	A			green
potassium chromate		B	carcinogen	BANNED

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
potassium chromate (solution)		B	carcinogen	BANNED
potassium cyanide		B	highly toxic	BANNED
potassium dichromate		B	carcinogen	BANNED
potassium dichromate (solution)		B	carcinogen	BANNED
potassium dihydrogen phosphate	A			green
potassium ferricyanide	A			green
potassium ferrocyanide trihydrate	A			green
potassium fluoride		B	toxic	BANNED
potassium hydrogen carbonate	A			green
potassium hydrogen oxalate		B	toxic; fire & explosion risk; strong oxidizer	BANNED
potassium hydrogen oxalate monohydrate		B	toxic; fire & explosion risk; strong oxidizer	BANNED
potassium hydrogen phthalate	A			green
potassium hydrogen sulfate	A			white
potassium hydrogen tartrate / cream of tartar	A			green
potassium hydroxide solid			RT corrosive	white
potassium hydroxide solution	A		corrosive; use under 6.0 M	white
potassium iodate			RS strong oxidizer; dispose after 5 years; use with senior students in dilute solutions	yellow
potassium iodide	A			green
potassium metabisulphite	A		can trigger allergic reaction	green
potassium monohydrogen phosphate	A			green
potassium nitrate			RS strong oxidizer; use with senior students in dilute solutions	yellow
potassium nitrite			RT toxic; strong oxidizer	yellow
potassium oxalate monohydrate		B	toxic; oxidizer; not needed in program	BANNED
potassium permanganate	A		avoid contact with combustible materials	yellow
potassium persulphate			RT severe health hazard	yellow
potassium phosphate (tribasic)	A			green
potassium sulfate	A			green
potassium thiocyanate	A			green
potassium thiosulfate	A			green
potato starch	A			green
propanoic acid	A		corrosive	white
1-propanol (n-propyl alcohol)	A			red
propophenone		B		BANNED



CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
propylene glycol	A			green
protease	A			green
pyridine		B		BANNED
pyrogallol		B	highly toxic	BANNED
quinhydrone (hydroquinone)		B	probable carcinogen	BANNED
Rennilase (Rennet, Rennin, Rennase)	A			green
Restriction buffer, 10X compromise			RS used in biotechnology	green
Ringer's Solution #1, #2 (A, B)	A			green
Rochelle salts (potassium sodium tartrate tetrahydrate)	A			green
safranin O (safranine, Basic Red)	A		use in solution	green
salicylic acid	A			green
sand (silicon dioxide)	A		use coarse instead of fine	green
Schiff reagent		B	formaldehyde carcinogenic	BANNED
SDS (dodecyl sodium sulfate)	A			green
sebacoyl chloride		B	corrosive vapour; reacts violently with water to produce toxic gas	BANNED
semicarbazide hydrochloride		B	poison; readily absorbed through skin; may be fatal if swallowed.	BANNED
silica		B	designated substance under OHSA	BANNED
silica gel	A			green
silicon (pieces, not powder)	A			green
silver (pieces, not powdered)	A			green
silver acetate	A			green
silver chloride	A			green
silver nitrate - solid			RT	yellow
silver nitrate (aq) <0.5 mol/L	A		purchase small quantities; store in brown bottles	green
silver oxide		B	highly irritating; oxidizing agent	BANNED
silver sulphate	A		purchase small quantities; store in brown bottles	green
sodium (pieces, not powdered)			RT purchase small quantity	red
sodium acetate anhydrous	A			green
sodium acetate trihydrate	A			green
sodium azide		B	highly toxic; causes blindness	BANNED
sodium benzoate	A			green
sodium benzoate test paper	A			green

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
sodium bicarbonate (baking soda, sodium hydrogen carbonate)	A		green
sodium binoxalate (sodium hydrogen oxalate)	A		green
sodium bisulphate (sodium hydrogen sulphate)	A	avoid anhydrous form	white
sodium bisulphite (sodium hydrogensulphite)	A		green
sodium borate (borax)	A	toxic if absorbed through skin	green
sodium bromate		B oxidizer; irritant; not needed in program	BANNED
sodium bromide	A		green
sodium carbonate anhydrous	A		green
sodium chlorate		B strong oxidizer; may produce toxic gas	BANNED
sodium chloride	A		green
sodium chromate		B mutagen; carcinogen; teratogen	BANNED
sodium chromate (solution)		B	BANNED
sodium citrate dihydrate	A		green
sodium cyanide		B highly toxic	BANNED
sodium dichromate		B mutagen; carcinogen; teratogen	BANNED
sodium dichromate (solution)		B	BANNED
sodium dihydrogen phosphate (monobasic)	A		green
sodium dodecyl sulfate (SDS) 10%(sodium lauryl sulphate)		RS used in biotechnology	green
sodium ferrocyanide decahydrate		B highly toxic	BANNED
sodium fluoride		B highly toxic	BANNED
sodium formate (sodium methanoate)	A		green
sodium hydroxide solid		RS corrosive	white
sodium hydroxide solution	A	corrosive; use under 6.0 M	white
sodium hypochlorite (bleach)		B	BANNED
sodium iodate		RS strong oxidizer	yellow
sodium iodide	A		green
sodium metabisulfite	A		green
sodium nitrate		RT strong oxidizer	yellow
sodium nitrite		B animal tumours; poison; lethal dose <1g	BANNED
sodium oxalate		B highly toxic	BANNED
sodium perborate		B	BANNED

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
sodium perchlorate		B		BANNED
sodium peroxide		B	strong oxidizer	BANNED
sodium phosphate tribasic			RT corrosive; reacts violently with water	green
sodium polyacrylate	A			green
sodium propanoate	A			green
sodium pyrophosphate		B		BANNED
sodium salicylate	A			green
sodium silicate (water glass)	A			green
sodium stearate	A			green
sodium succinate (succinic acid disodium salt, sodium butanedioate)			RS dust; skin hazard	green
sodium sulfate decahydrate	A			green
sodium sulfide nonahydrate		B	corrosive; affects CNS; contact with acid causes release of toxic H <sub>2</sub> S gas	BANNED
sodium sulfite	A			green
sodium tartrate	A			green
sodium thiocyanate	A			green
sodium thionite		B	highly flammable;self-ignition by: friction, moisture, & spontaneous chemical change	BANNED
sodium thiosulfate pentahydrate	A			green
sodium trinitride (sodium azide)		B		BANNED
sorbitol, D- (xylitol)	A			green
starch, soluble	A			green
stearic acid	A			green
strontium chloride hexahydrate	A			green
strontium nitrate	A			yellow
styrene		B	CNS depressant; toxic; suspected carcinogen	BANNED
succinamic acid		B		BANNED
succinic acid (butanedioic acid)	A			green
succinic anhydride		B	water-reactive	BANNED
sucrose	A			green
sudan (IV) powder		B	suspected carcinogen; use sudan(III) instead	BANNED
sudan(IV) solution		B	suspected carcinogen; use sudan(III) instead	BANNED
sudan(III) powder	A			green
sudan(III) solution	A			red
sulphur	A			red

CHEMICAL NAME	DESIGNATION	COMMENTS	STORAGE
sulphurated potash	B	highly reactive & flammable; many incompatible substances	BANNED
sulphur dioxide cylinders	B	highly irritating; not needed in curriculum	BANNED
sulphuric acid	A	use solutions of less than 6.0 mol/L	white
sulphuric acid concentrated 18 M	RS		white
sulphurous acid	B	toxic; corrosive	BANNED
tannic acid	B	possible teratogen; suspected carcinogen	BANNED
tartaric acid	A		green
t-butyl alcohol (2-methyl-2-propanol)	A		red
testosterone propionate	B	steroid; not needed in program	BANNED
tetrachloroethylene	B	suspected carcinogen	BANNED
tetrachloromethane (carbon tetrachloride)	B	carcinogen; severe liver & kidney damage	BANNED
thermite	B	flammable solid; toxic by products	BANNED
thiazine	B	highly toxic	BANNED
thioacetamide	B	carcinogen	BANNED
thionyl chloride	B	highly toxic	BANNED
thiourea	B	possible mutagen; carcinogen	BANNED
thorium hydroxide	B	radioactive	BANNED
thorium nitrate	B	radioactive	BANNED
trichlorophenoxyacetic acid	B	possible mutagen; carcinogen	BANNED
thymol	B		BANNED
thymol blue solution	A	use in solution only	green
thymolphthalein	A	alcohol solution is flammable	green
tin (metal) - powder, dust	B	poses explosion hazard; inhalation hazard	BANNED
tin (metal) - shot, mesh	A		green
tin(II) chloride dihydrate	RT	reacts to form corrosive hydrochloric acid – teacher use only	white
tin(IV) chloride pentahydrate	RT	reacts to form corrosive hydrochloric acid – teacher use only	white
tin(IV) nitrate	B	very strong oxidizer	BANNED
tin(IV) oxide	A		green
titanium (pieces, no powder)	RT	teacher use only, display as mineral sample	green
titanium dioxide	B		BANNED
toluene (methylbenzene)	B	volatile; explosive; dense vapours	BANNED
tricaine methane sulfonate	B	toxic by-products	BANNED
trichlorethylene (ethylene trichloride)	B	suspected carcinogen; vapour harmful	BANNED
trichloroacetic acid (TCA)	B	highly corrosive	BANNED

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
trichloromethane (chloroform)		B	carcinogen	BANNED
trichloromethyl propanol		B	chlorinated hydrocarbon	BANNED
trifluoroacetic acid		B	highly corrosive	BANNED
triiodomethane (iodoform)		B	harmful by skin contact	BANNED
triiodothyronine		B		BANNED
Tris base, pH 8.0			RS used in biotechnology	green
Tris/borate/EDTA (TBE) buffer 10X			RS used in biotechnology	green
Tris-/EDTA (TE) buffer			RS used biotechnology	green
Tris(hydroxymethyl)aminomethane (Tris Buffer)			RS incompatible with bases; strong oxidizing agents; protect from water	green
trypsin	A			green
tungsten (pieces, no powder)	A			green
turpentine			RS harmful by inhalation; adequate ventilation necessary	red
universal indicator solution	A			red
uranine			RS use in solution only	green
uranyl acetate		B	highly toxic; radioactive	BANNED
urea	A		reactive with nitrates, chromate, chlorides	green
uric acid	A			green
vanadium pentoxide		B	highly toxic	BANNED
vinyl chloride monomer		B	designated substance under OHSA	BANNED
vinyl cyanide (acrylonitrile)		B	designated substance; carcinogen, mutagen	BANNED
Wood's metal alloy			RT contains lead, cadmium, bismuth, tin – sealed container; teacher use only	blue
Wright's Stain	A			green
xylene (dimethyl benzene)		B	highly flammable	BANNED
xylene cyanol			RT used in biotechnology only	red
xylidene		B	carcinogen	BANNED
xylitol (D-sorbitol)	A			green
D-xylose	A			green
zeolite (water softener)	A		dust poses inhalation hazard	green
zinc (metal) - powder, dust		B	poses explosion hazard; inhalation hazard	BANNED
zinc (metal) - mossy, mesh, granular	A			green
zinc acetate	A			green
zinc carbonate	A			green
zinc chloride		B	toxic; causes skin ulcers	BANNED
zinc chromate		B	carcinogen	BANNED

CHEMICAL NAME	DESIGNATION		COMMENTS	STORAGE
zinc nitrate hexahydrate	A			yellow
zinc oxide	A			green
zinc stearate	A			green
zinc sulfide		B	releases toxic gas	BANNED
zinc sulfate	A			green