

**SCIENCE****Course Expectations Regarding Occupational Health and Safety (OHS)****General Considerations for Program Planning: Health and Safety**

Teachers are responsible for ensuring the safety of students during classroom activities and for teaching students to assume responsibility for their own and others' safety. They must model safe practices and communicate safety expectations to students in accordance with school board and ministry policies. This concern for safety in science requires that students demonstrate:

- knowledge about the materials, tools, processes, and procedures used in science;
- skill in performing tasks in the laboratory;
- knowledge about health and safety concerns and about the care of living things (plants and animals) that are brought into the classroom; and
- concern for the health and safety of themselves and others.

Students demonstrate the knowledge, skills, and habits of mind required for safe involvement in science when, for example, they:

- maintain a well organized and uncluttered work space;
- carefully follow the instructions and example of the teacher;
- identify possible health and safety concerns;
- follow established safety procedures;
- suggest and implement appropriate safety procedures in new situations; and
- comply with Workplace Hazardous Materials Information System (WHMIS) legislation.

## SCIENCE (cont'd.)

## Course Expectations Regarding Occupational Health and Safety (OHS)

MINISTRY OF EDUCATION COURSE EXPECTATIONS	LIVE SAFE! WORK SMART!	
	CHAPTER	SECTION & PAGE
<b>Grade 11</b>		
<b>Biology (Grade 11, University) SBI3U</b>		
<i>Students will:</i> Demonstrate an understanding of safety practices consistent with Workplace Hazardous Materials Information System (WHMIS) legislation by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., use proper techniques in preparing, using, and disposing of bacterial cultures).	Biological and Chemical Hazards	Section I: pgs. 2-23, 29-38
<b>Plants: Anatomy, Growth, and Functions</b> <i>Relating Science to Technology, Society and the Environment</i> SE: Describe how a technology related to plants functions (e.g., long-term use of pesticides, including herbicides) and evaluate it on the basis of identified criteria such as safety, cost, availability, and impact on everyday life and the environment.	Biological and Chemical Hazards	Section I: pgs. 42-43

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## Course Expectations Regarding Occupational Health and Safety (OHS)

	MINISTRY OF EDUCATION COURSE EXPECTATIONS	LIVE SAFE! WORK SMART!	
		CHAPTER	SECTION & PAGE
<b>Biology (Grade 11, College) SBI3C</b>			
	<i>Students will:</i> Demonstrate an understanding of safety practices consistent with Workplace Hazardous Materials Information System (WHMIS) legislation by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., follow safety procedures in handling, storing and disposing of acids, bases, bacterial cultures, and bio-hazardous waste and use them effectively and accurately in collecting observations and data).	Biological and Chemical Hazards	Section I: pgs. 2-23, 29-38
	<b>Plant Structure and Physiology</b> <i>Relating Science to Technology, Society and the Environment</i> SE: Identify personal activities that may be influenced by their scientific study of plants (e.g., investigate the many issues involved in choosing to use chemical fertilizers and pesticides on the lawn).	Biological and Chemical Hazards	Section I: pgs. 42-43

## SCIENCE (cont'd.)

## Course Expectations Regarding Occupational Health and Safety (OHS)

	MINISTRY OF EDUCATION COURSE EXPECTATIONS	LIVE SAFE! WORK SMART!	
		CHAPTER	SECTION & PAGE
<b>Chemistry (Grade 11, University) SCH3U</b>			
	<i>Students will:</i> Demonstrate an understanding of safe laboratory practices by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., safely disposing of hazardous solutions; correctly interpreting Workplace Hazardous Materials Information System [WHMIS] symbols), and using appropriate personal protection (e.g., wearing safety goggles).	Biological and Chemical Hazards	Section I: pgs. 2-23
	<b>Matter and Chemical Bonding</b> <i>Relating Science to Technology, Society and the Environment</i> SE: Demonstrate an understanding of the need for the safe use of chemicals in everyday life (e.g., cleaners in the home, pesticides in the garden).	Biological and Chemical Hazards	<i>optional</i> Section I: pgs. 42-43
	<b>Gases and Atmospheric Chemistry</b> <i>Relating Science to Technology, Society and the Environment</i> SE: Identify technological products and safety concerns associated with compressed gases (e.g., propane tanks, medical oxygen tanks, welders' acetylene tanks).	Biological and Chemical Hazards	Section I: pgs. 24-28

## SCIENCE (cont'd.)

## Course Expectations Regarding Occupational Health and Safety (OHS)

MINISTRY OF EDUCATION COURSE EXPECTATIONS	LIVE SAFE! WORK SMART!	
	CHAPTER	SECTION & PAGE
<b>Physics (Grade 11, University) SPH3U</b>		
<i>Students will:</i> Demonstrate an understanding of safe practices by selecting, operating, and storing equipment appropriately, and by acting in accordance with the Workplace Hazardous Materials Information System (WHMIS) legislation in selecting and applying techniques for handling, storing, and disposing of laboratory materials (e.g., check all electrical equipment for damage prior to conducting an experiment).	Biological and Chemical Hazards	Section I: pgs. 2-23
	Physical Hazards	Section I: pgs 2-6
	Workplace Law	Section I: pgs. 27-28
<b>Science (Grade 11, University/College) SNC3M</b>		
<i>Students will:</i> Demonstrate an understanding of safety practices consistent with Workplace Hazardous Materials Information System (WHMIS) legislation by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., safely handle acids, bases, and other aqueous solutions). <b>Everyday Chemicals and Safe Practice</b> OE: Demonstrate an understanding of the properties, benefits, and hazards of everyday chemicals, and of the safe use of these products in the home, the workplace, and industry.	Biological and Chemical Hazards	Section I: pgs. 2-23

## SCIENCE (cont'd.)

## Course Expectations Regarding Occupational Health and Safety (OHS)

	MINISTRY OF EDUCATION COURSE EXPECTATIONS	LIVE SAFE! WORK SMART!	
		CHAPTER	SECTION & PAGE
<b>Science (Grade 11, University/College) SNC3M (cont'd.)</b>			
	<i>Understanding Basic Concepts</i> SE: Describe the effects of everyday chemicals (e.g., acid emissions, carbon emissions, CFCs, PCBs) on the well-being of organisms, including humans; explain the hazards and safe handling of everyday chemicals as outlined on Material Safety Data (MSD) Sheets (e.g., safe practices in the mixing, storage, and transportation of chemicals in an experimental investigation.)	Biological and Chemical Hazards	Section I: pgs. 2-23
	<i>Developing Skills of Inquiry and Communication</i> SE: Use laboratory equipment and handle everyday chemicals (e.g., mix, store, transport them) in accordance with accepted safety practices (e.g., practices in WHMIS legislation, the Fire Code, and the <i>Occupational Health and Safety Act</i> ).	Workplace Law	Section I: pgs. 27-28
<b>Science (Grade 11, Workplace) SNC3E</b>			
	<b>Materials and Safety</b> OE: Demonstrate an understanding of WHMIS legislation and general safety procedures as they apply to materials in the workplace and the home.	Biological and Chemical Hazards	Section I: pgs. 2-23

## SCIENCE (cont'd.)

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		CHAPTER	SECTION & PAGE
<b>Science (Grade 11, Workplace) SNC3E (cont'd.)</b>			
	<p>Demonstrate safe handling, storage and disposal procedures for a variety of materials, including some hazardous materials, in the school laboratory (e.g., safely handle solvents, oxidizing agents, acids, bases).</p> <p>Describe practices that promote fire safety as well as safety in the handling and disposal of materials, in everyday living in the home and workplace.</p>	<p>Biological and Chemical Hazards</p> <p>Workplace Law</p>	<p>Section I: pgs. 24-28</p> <p>Section I: pgs. 27-28</p>
	<p><b>Electrical Circuits</b> <i>Understanding Basic Concepts</i> SE: Describe common electrical components that regulate the flow of electricity or that are used as safety mechanisms in circuits (e.g., switches, bimetallic strips, resistors, fuses, ground fault interruptors [GFIs], surge protectors); describe proper safety procedures necessary for working with electrical systems at home and in the workplace, and identify situations in which electrical circuits can be fire hazards and dangerous to human life (e.g., describe the potential hazards related to the use of power tools and electric lawnmowers in the rain).</p>	<p>Physical Hazards</p>	<p>Section I: pgs. 2-6</p>

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		CHAPTER	SECTION & PAGE
<b>Science (Grade 11, Workplace) SNC3E (cont'd.)</b>			
	<b>Micro-organisms</b> <i>Understanding Basic Concepts</i> SE: Describe how bacteria, protists, viruses and fungi cause diseases in humans and how they are useful to humans.	Biological and Chemical Hazards	Section I: pgs. 29-38
<b>Grade 12</b>			
<b>Biology (Grade 12, University) SBI4U</b>			
	<i>Students will:</i> Demonstrate an understanding of safety practices consistent with Workplace Hazardous Materials Information System (WHMIS) legislation by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., use proper techniques in handling, storing, and disposing of bacteria, chemicals, and bio-hazardous waste).	Biological and Chemical Hazards	Section II: pgs. 52-74



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### Course Expectations Regarding Occupational Health and Safety (OHS)

	MINISTRY OF EDUCATION COURSE EXPECTATIONS	LIVE SAFE! WORK SMART!	
		CHAPTER	SECTION & PAGE
<b>Chemistry (Grade 12, University) SCH4U and Chemistry (Grade 12, College) SCH4C</b>			
	<i>Students will:</i> Demonstrate an understanding of safe laboratory practices by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., safely disposing of organic solutions; correctly interpreting Workplace Hazardous Materials Information System [WHMIS] symbols), and using appropriate personal protection (e.g., wearing safety goggles); demonstrate a knowledge of emergency laboratory procedures.	Biological and Chemical Hazards	Section II: pgs. 52-74
<b>Earth and Space Science (Grade 12, University) SES4U</b>			
	<i>Students will:</i> Demonstrate an understanding of Workplace Hazardous Materials Information System (WHMIS) legislation by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials; demonstrate an understanding of emergency laboratory procedures.	Biological and Chemical Hazards	Section II: pgs. 52-74

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### Course Expectations Regarding Occupational Health and Safety (OHS)

	MINISTRY OF EDUCATION COURSE EXPECTATIONS	LIVE SAFE! WORK SMART!	
		CHAPTER	SECTION & PAGE
<b>Physics (Grade 12, University) SPH4U</b>			
	<i>Students will:</i> Demonstrate an understanding of safety practices by selecting, operating, and storing equipment appropriately, and by acting in accordance with the Workplace Hazardous Materials Information System (WHMIS) legislation in selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., wear appropriate protective clothing when handling radioactive substances).	Biological and Chemical Hazards	Section II: pgs. 52-74
<b>Physics (Grade 12, College) SPH4C</b>			
	<i>Students will:</i> Demonstrate an understanding of appropriate safety practices by selecting, operating, and storing electrical equipment, components, and materials in accordance with the Ontario Electrical Code, and by acting in accordance with Workplace Hazardous Materials Information System (WHMIS) legislation in selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials.	Biological and Chemical Hazards	Section II: pgs. 52-74

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## Course Expectations Regarding Occupational Health and Safety (OHS)

	MINISTRY OF EDUCATION COURSE EXPECTATIONS	LIVE SAFE! WORK SMART!	
		CHAPTER	SECTION & PAGE
<b>Science (Grade 12, University/College) SNC4M</b>			
	<p><i>Students will:</i> Demonstrate an understanding of safety practices consistent with the Workplace Hazardous Materials Information System (WHMIS) legislation by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., safely handle organic compounds).</p> <p><b>Pathogens and Disease</b> <i>Understanding Basic Concepts</i> SE: Describe the modes of transmission of diseases, including those that are insect-borne (e.g., malaria, encephalitis), airborne (e.g., influenza, tuberculosis), water-borne (e.g., cholera, poliomyelitis), sexually transmitted (STDs; e.g., AIDS), and food-borne (e.g., mad cow disease, trichinosis, food poisoning).</p> <p>Describe non-medicinal ways to protect oneself from contracting pathogenic diseases (e.g., aseptic techniques, personal hygiene).</p>	Biological and Chemical Hazards	Section II: pgs. 52-74

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		CHAPTER	SECTION & PAGE
<b>Science (Grade 12, University/College) SNC4M (cont'd.)</b>			
	<p><b>Communications Systems</b> <i>Developing Skills of Inquiry and Communication</i> SE: Describe and follow procedures for the safe and accurate use of electrical equipment as outlined in the <i>Occupational Health and Safety Act</i> and the Fire Code (e.g., describe the safety measures followed in an experiment involving the use of electrical equipment).</p>	Physical Hazards	<i>optional</i> Section I: pgs. 2-6
<b>Science (Grade 12, Workplace) SNC4E</b>			
	<p><i>Students will:</i> Demonstrate an understanding of safety practices consistent with Workplace Hazardous Materials Information System (WHMIS) legislation by selecting and applying appropriate techniques for handling, storing, and disposing of laboratory materials (e.g., identify the appropriate procedures for storing and disposing of flammable solvents, and for handling acids, bases, and non-aqueous solutions of toxic substances).</p>	Biological and Chemical Hazards	Section II: pgs. 52-74

**NOTE: OE and SE:** *Overall Expectations and Specific Expectations*  
Where OEs are safety-specific, the list of related SEs has not been included. Please refer to *The Ontario Curriculum Grade 11 and 12* book for the full list of SEs.