

# INDEX

## A

### **acetic acid**

neutralization for waste management, 115

### **acids**

about handling of, 88–89

how to dilute concentrated acids, 161-162

neutralization of, 41, 115

reactive nature of mineral and water sensitive acids, 123

spill management of, 41, 91-93

storage of, 99-103, 128-129

waste management of, 109-110, 115

See *also* corrosive and toxic substances

### **aerosols**

waste management categories of, 109-110

### **aides, laboratory**

See science technicians

### **alcohol burners**

See burners

### **allergies and allergens**

animal and plant, 60, 63

student medical information on, 135, 137

student safety contract on, 145, 149

See *also* medical emergencies and treatments

### **aluminum**

precipitation for waste management, 115-116

See *also* metals

### **ammonia, household**

storage of, 103–104

### **ammonium nitrate**

special storage of, 101, 104

### **animals, live**

as field trip hazard, 63 (See *also* field trips)

infections from, 55

not to use wild animals, 14, 15

use in classrooms, 60-63

### **animal organs and tissues**

collection of fresh specimens, 63

use of fresh and preserved specimens, 57-58, 63

See *also* dissection

### **aprons, use of, 38**

See *also* personal protective equipment

### **asbestos**

avoidance of, in protective equipment, 37, 38

### **assistants, laboratory**

See science technicians

### **autoclaves**

cleaning and maintenance of, 63

how to use, 164

## B

### **bacteria**

See micro-organisms

### **baking soda**

for chemical spills, 41

storage of, 103-104

### **ballistic pendulum experiments**

safety measures for, 68

### **bases**

about, 88

how to dilute concentrated bases, 161-162

neutralization of, 115

reactive nature of water sensitive bases, 123

spill management of, 40-42, 91-93

storage of, 99-104, 128

waste management of, 115

See also corrosive and toxic substances; spills of toxic and corrosive substances

### **batteries**

short circuit hazards, 70

See also electricity and electrical hazards

### **beaker tongs**

use of, 38

### **bentonite**

for chemical spills, 42

### **biological hazards, 55-63**

about biological and chemical hazards, 55

about cleanliness guidelines, 63

legislation on, 10-11

on field trips, 63

use of human tissues and fluids, 55

TDG hazard classes for, 129-130

use of centrifuge, 59

use of fresh and preserved specimens, 57-58, 63

use of inoculating loops, 59

use of micro-organism cultures, 56-57

use of mouth in science activities, 55, 58, 59

use of owl pellets, 57

use of scalpels, 57, 164

use of syringes, 59

waste disposal, 41 (See also waste management and disposal)

waste disposal of sharps, 41

WHMIS hazard classes, 128

WHMIS hazard symbol for, 106

See also edible substances; housekeeping

### **biological hazard waste brokers**

See licensed consignee

### **bleach**

labels for, 109

See *also* oxidizing materials  
**bleeding and cuts**  
accidental infections from, 55-58  
emergency treatment for, 25  
use of cutting tools, 67  
See *also* infectious material; medical emergencies and treatments  
**blood, human**  
use of human fluids, 14, 15, 55  
**bottles**  
how to remove glass stoppers, 163  
**bovine tissues**  
cautions on use of, 58  
**brokers, waste**  
See licensed consignee  
**bromine**  
chemical treatment for waste management, 118  
**burners**  
about use of, 71-72  
how to light Bunsen burners, 161  
use on glass tubing, 162  
**burns**  
emergency treatment of, 25-26  
heat hazards and, 71-73  
from non-ionizing radiation, 75-77  
See *also* heat; medical emergencies and treatments  
**bylaws, municipal**  
on rocketry, 73  
on waste management and disposal, 13, 50, 111-112  
staff training on waste disposal under, 49-50

## C

**Canada Water Act 1985**  
requirements under, 11  
**Canadian Association of Rocketry, 73**  
**Canadian Environmental Protection Act, 1999**  
requirements under, 11  
**Canadian Radiation Emitting Devices Regulation, 76**  
**candles**  
use of, 73  
**carbon**  
storage of, 103-104  
See *also* flammable and combustible materials  
**carbon dioxide, solid (dry ice)**  
chemical hazards of, 89-90  
**carbon paper**  
hazards from use of spark timers, 70  
**carcinogens**  
avoidance of, 84-85, 87-88  
information on, in MSDSs, 171

**cardiopulmonary resuscitation (CPR)**

staff training in, 23, 26

*See also* first aid

**cartridge burners**

use of Primus and butane, 72

*See also* burners

**cathode ray tubes (CRTs)**

hazards of, 74

**cells, cheek**

use of human tissues, 55-57

**centrifuging**

use of, 59

**charcoal**

storage of, 102-104

*See also* flammable and combustible materials

**chemicals and chemical hazards, 81-91**

about chemical hazards, 84-91

about safe use of, 81, 88-91

about specific chemical hazards (*See* chemical hazard information table link)

carcinogens, 87-88

cryogenic substances, 89-90, 103

instructional strategies to reduce risks, 46-48, 113-118

inventory of (*See* chemical inventories)

labelling of (*See* labels)

legislation on use of, 8-13

material safety data sheets (MSDSs) on, 82-83 (*See also* material safety data sheets)

NFPA hazard ratings, 126-128

OHS requirements, 10-11, 82

reactive nature of, 122-123

spill management of (*See* spills of toxic and corrosive substances)

storage of (*See* chemical storage)

training in use of (*See* training in science safety)

transportation of (*See* Transportation of Dangerous Goods)

treatment for injuries by, 23-27

unknown chemicals, treatment of, 109-112

waste management of (*See* waste management and disposal)

WHMIS hazard classes for, 128 (*See also* Workplace Hazardous Materials Information System (WHMIS))

*See also* acids; bases; corrosive and toxic substances

**chemical hazard information table**

about the table, 124-131

**chemical inventories**

about setting up an inventory, 103-105,

sample template for, 173

science technicians' roles in conducting, 136

updating after receiving chemicals, 99

updating of MSDSs during, 83

waste inventory, 109-111

**chemical storage**  
about chemical storage, 99–104  
about reactive nature of chemicals, 122-123  
about storage of specific chemicals (See chemical hazard information table link)  
fire code requirements, 8  
fire extinguisher requirements for, 38-39  
how and what to order, 97-99  
how to dispense, 113  
how to receive orders of, 99  
how to weigh, 163-164  
inventories of (See chemical inventories)  
labels, 105-108 (See *also* labels)  
safety inspection of, 42, 2151  
safety standards for facilities, 34  
separation of edibles from chemicals, 99  
shelf life of chemicals, 98, 111  
storage schemes in, 99-104  
waste storage, 109–110 (See *also* waste management and disposal)

**chemical waste brokers**

See licensed consignee

**city bylaws**

See bylaws, municipal

**classroom teachers**

See teachers, science

**classrooms, science**

See elementary school science programs; science laboratories; secondary school science programs

**clean-ups after procedures**

See hand washing; housekeeping

**coal**

use as boiling chips, 162-163

**coats, lab, 38**

See *also* personal protective equipment

**cobalt**

precipitation for waste management, 116

See *also* metals

**combustible materials**

See flammable and combustible materials

**compressed gases**

about emergency response to leaks, 22-23

as controlled products, 131

cryogenic substances, 89-90, 103

storage and handling of, 91, 103-104

WHMIS hazard class, 128

WHMIS hazard symbol for, 106

See *also* controlled products

**consumer products**

hazards of consumer restricted products, 109

how to store, 99, 103-104

not under WHMIS system, 106

**contact lenses**

use of, in student safety contract, 149

*See also* eyes, care of

**controlled products**

about, 106, 131

consumer products as, 99

under *Hazardous Products Act*, 13

labelling of, 105-108

training in management of, 48-49

WHMIS requirements for, 10, 13, 106

*See also* Workplace Hazardous Materials Information System (WHMIS)

**copper**

precipitation for waste management, 116

*See also* metals

**copper sulfate**

reuse of, 114

storage of, 103-104

**corrosive and toxic substances**

about hazards of, 84, 88-90

NFPA hazard ratings, 126-128

poisonous substances (*See* poisonous materials)

reactive nature of, 122-123

spill management of, 40-41, 91-93

(*See also* spills of toxic and corrosive substances)

storage of, 99-104, 122-123

TDG hazard classes for, 129-130

waste management of, 109-110 (*See also* waste management and disposal)

WHMIS hazard classes for, 128

WHMIS symbol for, 106

WHMIS label for, 107

*See also* chemicals and chemical hazards; controlled products

**cryogenic substances**

chemical hazards of, 89-90

storage of, 103-104

**cultures of micro-organisms**

hazards of, 56-57

use of human tissues and fluids, 55

*See also* biological hazards

**cuts and bleeding**

*See* bleeding and cuts

**cutting tools**

about safe use of, 67

how to use scalpels, 164

sharps disposal, 41

**D**

**dehydrating agents**

use of, 88

See *also* corrosive and toxic substances  
**departments, science**  
See secondary school science programs  
**diatomaceous earth**  
for chemical spills, 41  
**disaster planning**  
assistance with emergency response plans, 21  
**disposal of hazardous waste**, 110-112  
See waste management and disposal; licensed consignee  
**disposal sites**  
See landfills and sewers  
**dissection**  
about use of fresh and preserved specimens, 57-58, 63  
how to use scalpels, 164  
not for elementary school programs, 13-14  
use of human tissues, 55-57  
sharps disposal, 41  
**distillation**  
for recycling used solvents, 114  
**drain cleaners**  
labelling of, 109  
**drains, municipal**  
See landfills and sewers  
**drinks and food**  
See edible substances  
**dry ice (solid carbon dioxide)**  
chemical hazards of, 89-90  
**due diligence**  
requirement for staff to use, 5-6  
training of staff in, 49  
See *also* liability, legal  
**dumps**  
See landfills and sewers

**E**

**ears and hearing**  
sound hazards for, 73  
**ecostations**  
not for school waste disposal, 112  
**edible substances**  
about use and storage of, 52, 63, 99  
legislation on, 99  
storage of, as separate from chemicals, 99, 102-104  
storage of, in lab safety inspection checklist, 151  
student safety contract on, 145, 149  
student safety rules on, 147  
use of mouth in science activities, 59  
***The Education Act, 1995***  
duties, 8  
**education students**  
See students, education

**educational assistants**  
 roles and responsibilities of, 137

**electric hot plates**  
 use of, 72

**electricity and electrical hazards**  
 about electrical hazards, 69-71  
 Canadian Electrical Code Regulations, 34  
 fire extinguishers' use on electrical fires, 38-39  
 hazards of flammable materials, 91  
 radiation hazards from electronics, 74 (*See also* radioactive materials)  
 student safety rules on, 147  
 use of batteries, 70  
 use of electromagnets, 68  
 use of electrostatic generators, 70-71, 163  
 use of high voltage equipment, 70-71  
 use of spark timers, 70

**elementary school science programs**  
 about general safety procedures for, 13-14  
 categories of chemicals for (in chemical hazard information table), 125  
 instructional strategies, 46-48, 113-114  
 storage schemes and systems for, 101-102  
 student safety contract, 14, 145

**emergency preparedness and response plans, 19-28**  
 about, 19-22  
 due diligence requirements, 5-6  
 for fires, spills and gas leaks, 22-23, 26 (*See also* spills of toxic and corrosive substances)  
 required under OHS, 10-11, 19  
 safety inspections, 19, 42  
 safety inspections (checklist), 151  
 Web sites on, 21  
*See also* accidents and accident reports; medical emergencies and treatments

**environmental protection**  
 about requirements, 11, 50, 112  
 about responsibilities for, 112  
 due diligence requirements, 5-9  
*See also* recycling and recovering of substances; waste management and disposal

***Environmental Management and Protection Act, 2002***  
 11, 50, 110-111

**environmental sites for field trips**  
 risk management strategies for, 47-48  
*See also* field trips

**Epsom salts**  
 storage of, 103-104

**ethanol**  
 recycling of used, 114  
 storage of, 101-104, 105

**explosive substances**

- about hazards of, 91
- cryogenic hazards, 89-90
- emergency response to gas or propane leaks, 23
- handling and storage of, 122-123
- legislation on, 106, 109
- NFPA hazard codes for, 126-128
- reactive nature of special-case organic substances, 123
- TDG hazard classes, 129-130
- See *also* compressed gases

**eyes, care of**

- about treatment for injuries to, 24
- eyewash stations, 32-33, 34, 36,
- goggles for, 37, 68-69
- student safety contract on, 149
- UV filtering sunglasses for, 38, 76
- visible light and laser hazards, 76-77
- See *also* light; personal protective equipment

**F**

**face shields**

- use of, 37
- See *also* personal protective equipment

**fainting and shock**

- emergency response to, 26
- See *also* medical emergencies and treatments

**field trips**

- about risk reduction for, 39, 47-48
- biological hazards of, 63
- first aid kits for, 39-40, 47, 63

***The Fire Prevention Act, 1992***

- about requirements of, 8
- on fire extinguisher requirements, 35, 38-39,
- on storage of flammable liquids, 102, 104

**fires and fire prevention**

- about emergency response to fires, 22, 25-26
- about use of fire extinguishers, 38-39, 167
- burning clothing, 26
- in chemical laboratory safety inspection checklist, 151
- chemical storage schemes to prevent, 101 (*See also* chemical storage)
- electrical hazards, 69-71 (*See also* electricity and electrical hazards)
- fire blankets, 26, 37
- fire detectors in science facilities, 32
- fire drills and fire dept. access, 21-22
- instruction in location of fire exits, 167
- legislation on, 8, 21, 101-104
- legislation on fire extinguishers, 35, 38-39
- MSDS information on, 83
- NFPA Hazchem Code for hazards, 126-128
- student safety contract on, 149
- See *also* flammable and combustible materials

**first aid and first aid kits**

- about, 39-40, 47
- about emergency medical treatments, 23-27
- for field trips, 39-40, 47, 63
- kits in science classrooms and chemical storage areas, 35, 39-40, 101
- labels with information on, 107
- legislation on, 10-11, 23, 47
- MSDS information on, 83
- on chemical laboratory safety inspection checklist, 151
- science department policies and procedures on, 167
- staff responsibilities for, 27, 133-137
- staff training in, 23-27, 49
- student safety contract on, 149
- See *also* accidents and accident reports; medical emergencies and treatments

**first aid and first aid kits**

- about, 35, 39-40, 139
- about emergency medical treatments, 23-27
- for field trips, 39-40, 47, 63
- kits in science classrooms and chemical storage areas, 40, 101
- labels with information on, 107
- legislation on, 13, 15, 28, 53
- MSDS information on, 86
- on chemical laboratory safety inspection checklist, 151-153
- science department policies and procedures on, 167
- staff responsibilities for, 133-137, 27
- staff training in, 23-27, 49
- student safety contract on, 145, 149
- See *also* incidents and incident reports; medical emergencies and treatments

**flammable and combustible materials**

- about use of, 91-93
- cryogenic substances as hazards for, 89-90
- electrical equipment hazards for, 70
- Hazchem code for, 127
- how to heat flammable liquids, 163
- NFPA hazard ratings for, 126-128
- reactive nature of special-case organic substances, 123
- spill management of, 92-93
- storage of, 99-104, 128
- storage of waste, 109-110
- TDG hazard classes, 129-130
- use of fire extinguishers on, 38-39
- WHMIS hazard class for, 128
- WHMIS symbol for, 106
- See *also* controlled products; explosive substances; fires and fire prevention

**food and drinks**

See edible substances

**formaldehyde and formalin**

hazards of, 57-58, 111

**fume hoods**

use of, 33-34,37

**fungi**

safety procedures for cultures, 56-57

See *also* biological hazards

**funnels**

for microscale experiments, 113

**G**

**garbage sites**

See landfills and sewers

**gases**

about emergency response to leaks, 22-23

cryogenic substances, 89-90, 103

disposal of atmospheric gases, 131

NFPA standards for storage cabinets for, 91

from rockets (See rocketry hazards)

TDG hazard classes, 129-130

See *also* compressed gases

**generators**

about use of, 70-71

avoiding electrical charge build-ups, 163

**glasses, eye**

contact lenses use in student safety contract, 149

use of UV filtering glasses, 38, 76

See *also* eyes, care of; personal protective equipment

**glassware**

about use of, 68

disposal in separate waste containers, 41

how to cut glass tubing, 162

how to insert or remove stoppers, 162

how to shake test tubes, 165

mercury hazards of thermometers, 86-87

special sizes for microscale experiments, 113

use of heat resistant, 71

use of test tube holders, 71

**gloves**

about use of, 38, 52

for dissection, 58

for handling heated objects, 71

for protection from animals, 60

for protection from cryogenics, 90

for protection from mercury, 86

for protection from nonionizing radiation, 76

for spill cleanups, 38, 115

for spills of biohazard materials, 57-58, 92

See *also* personal protective equipment

**glucose**

storage as general substance, 103-104

**glycerine**

storage of, 101-102

**glycol**

waste management categories of, 110

**goggles, protective, 37**

See also eyes, care of; personal protective equipment

**H**

**halogens**

handling and storage of, 123

hazards of, 88

storage of, 128-129

See also corrosive and toxic substances

**hand washing**

facilities in science classrooms, 36

in science safety rules, 14, 16, 147

in student safety contract, 145, 149

**hands, protection of**

See gloves; personal protective equipment

**hazard ratings, NFPA, 126-128**

**Hazardous Products Act (Canada)**

controlled products, 8, 13

See also controlled products

**hazardous waste disposal**

See waste management and disposal

**Hazchem Codes**

NFPA hazard ratings, 126-128

**Hazorb spill control pillows, 41, 92**

**health emergencies and treatments**

See medical emergencies and treatments

**Health of Animal Regulations, 58**

**hearing**

sound hazards for, 73

**heat**

about heat hazards, 71-73, 88

heat detectors in science facilities, 32

heat resistant glassware, 68

heat resistant gloves and tongs, 38

how to boil liquids without “bumping,” 162-163

how to heat flammable liquids, 163

See also burns; sterilization

**heavy metal salts**

precipitation for waste disposal, 115-116

**high voltage equipment**

hazards of, 70-71

See also electricity and electrical hazards

**hoods, fume, 33, 34, 37**

**hot plates**

use of, 72

**housekeeping for clean-up of non-toxic substances**

equipment in facilities, 34-35

in lab safety inspections, 42, 151-153

science safety rules on, 147

special cautions in biology, 63  
storage of consumer products, 99, 102  
student cleanup after follow-up procedures, 14, 16  
student safety contracts on, 145, 149

*See also* edible substances

**human tissues and fluid specimens**

on use of, 55

**hydrochloric acid**

waste management by neutralization, 115

**hydrogen, liquid**

*See* compressed gases

**hydrogen peroxide**

explosive substance risks of, 91

labelling of hazards, 109

storage of, 103

|

**ice**

not to use as burn treatment, 25

storage of, 103

*See also* refrigeration

**ice, dry (solid carbon dioxide)**

hazards of, 89-90

**infectious material**

about accidental infections, 55-58

use of human tissues and fluids, 55

TDG hazard classes for, 129-130

use of disinfectants, 63

WHMIS hazard class for, 128

WHMIS hazard symbol for, 106

*See also* biological hazards

**Incidents and incident reports**

about, 27-28

due diligence requirements, 5-9

investigations of, 6, 27-28

liability for (*See* liability, legal)

near-miss incidents, 28, 49, 155-156

report form, 28

report form (template), 155-156

staff responsibilities, 28, 167, 133-137

training in response and reporting, 49

treatment of injuries (*See* medical emergencies and treatments)

**information table, chemical hazard**

*See* chemical hazard information table

**inoculating loops**

use of, 59

**inorganic acids**

storage of, 103, 128

**inspections**

about general safety inspections, 19, 69

legislation on, 10-11, 19  
of employment conditions, 19  
of fire extinguishers, 35, 38-39  
of fume hoods, 33, 37  
of TDG training records, 50  
safety inspection of chemical laboratories, 42  
safety inspections of chemical laboratories (checklist), 151-153

**instructional strategies**

for reduction of risks, 46-48, 113-114

See *also* safety equipment

**inventory of chemicals**

See chemical inventories

**iodine**

chemical treatment for waste management, 117

storage of, 103

**iron**

precipitation for waste management, 115-116

See *also* metals

**isolation transformers**

use of, 70

**L**

**lab stations**

for instruction, 45, 113

See *also* instructional strategies

**labels**

about use of, 105-108

legislation on, 10-13,

liability for improper or omission of, 109

on chemicals as safety measure, 89

on controlled products, 13

on recovered substances, 114

on waste containers, 40-41, 109-110

student awareness of, 51

TDG labels, 12, 108

WHMIS requirements for, 10-11

WHMIS symbols and labels, 105-108

**laboratories, science**

See science laboratories

**laboratory coats**

use of, 43

**laboratory technicians**

See science technicians

**Labour Standards**

about, requirements, 8

**landfills and sewers**

about disposal in, 112

as a disposal method (in chemical hazard information table), 131

disposal of alcohol-based specimens in, 58

disposal of aqueous solutions in, 115

disposal of radioactive substances in, 74-75

disposal of sulfides in, 118  
 legislation on disposal in, 11, 13, 50, 110-112  
 See *also* waste management and disposal; licensed consignee

**lasers**  
 use of, 76-77

**lead salts**  
 precipitation for waste management, 115-116

**leaks and spills of non-toxic substances**  
 See housekeeping

**leaks and spills of toxic substances**  
 See spills of toxic and corrosive substances

**learning strategies**  
 for reduction of risks, 46-48, 113-114  
 See *also* safety equipment

**legislation on safety, 8-13**  
 about legislated requirements, 8-13  
*Canada Water Act*, 11  
 Education Act, 8  
*Environmental Management and Protection Act 2002*, 11, 50, 110-111  
*Environmental Spill Control Regulations*, 111  
*Fire Prevention Act 1992*, 8, 38  
*Guide to Education*, 13-16  
*Hazardous Substances Regulations*, 111  
*Hazardous Products Act*, 13, 107  
*Labour Standards Act*, 8  
*Municipal Refuse Management Regulations*, 111  
*National Building Code of Canada, 2010*, 8  
*Occupational Health and Safety Act 1993*, 5, 8-11, 19, 21, 23, 27, 35, 39, 46, 47, 49, 82, 83, 99, 102, 107, 124  
*Transportation of Dangerous Goods Act*, 12, 50, 108, 129-130  
*Waste Dangerous Goods Regulations*, 111  
*The Saskatchewan Workers' Compensation Act, 2013* 27  
 See *also* bylaws, municipal; liability, legal

**liability, legal**  
 legislation, 5, 109

**Licensed consignee, 111-112**

**light**  
 about hazards of, 76-77  
 levels in secondary science labs, 31-32  
 as non-ionizing radiation 75-77  
 See *also* eyes, care of

**liquids and solutions**  
 about hazards of corrosive and toxic, 88-89  
 evaporation of, for waste management, 115  
 how to dilute concentrated acids or bases, 161-162  
 how to pour into funnel filters, 161  
 how to prevent uneven boiling (bumping), 162-163  
 spill management of, 40-42, 91-93  
 (See *also* spills of toxic and corrosive substances)

See *also* flammable and combustible materials; spills of toxic and corrosive substances; water

**local bylaws**

See bylaws, municipal

**M**

**machinery**

rotating machinery as hazard, 67

**magnesium ribbon**

dispensing of, 113

as source of UV radiation, 76

**magnets**

use of, 68

**manganese**

precipitation for waste management, 115-116

See also metals

**marine pollutants**

TDG hazard classes for, 129-130

**material safety data sheets (MSDSs)**

about material safety data sheets (MSDS), 10, 82-83

in chemical inventory, 103, 105, 169-173

disposal of chemicals without, 111

requirements under OHS Act and Regs, 10-11

substances excluded from, 106, 109

training in, 48-49

as WHMIS requirement for controlled products, 13

**medical emergencies and treatments**

about emergency response plans, 19-23

allergies (See allergies and allergens)

infections (See infectious material)

NFPA hazard ratings, 126-127

poison and drug information services (contact info), 25, 26

(See also poisonous materials)

student medical information for, 14, 15, 27, 60, 63, 149

treatments, 23-27

See also incidents and incident reports; emergency preparedness and response plans; liability, legal

**mercury**

special hazards of, 85, 86-87

waste management of, 86-87, 109-110

**metals**

precipitation of heavy salts for waste disposal, 115-116

reactive nature of acid sensitive, 122

storage of metal powders, 103-104

use of fire extinguishers on combustible metals, 39

waste management of mercury, 86-87, 109-110

WHMIS hazard symbol for, 106-107

See also flammable and combustible materials

**methane, liquid**

See compressed gases

**methanol**

recycling of used, 114

See also flammable and combustible materials

**micro-organisms**

hazards of cultures of, 56-57

See *also* biological hazards

**micro-scale experiments**, 46, 113

See *also* instructional strategies

**microwaves**

as nonionizing radiation, 75-77

**microwave ovens**

cautions on use for sterilization, 63

radiation hazards of, 77

in science facilities, 34

**mineral acids**

handling and storage of, 123

See *also* acids

**mineral spirits**

labelling of, 109

**model rockets**

hazards of use of, 73

**mouth, use of**

cautions on, 55, 59

See *also* edible substances

**MSDS**

See material safety data sheets (MSDSs)

**municipal bylaws**

See bylaws, municipal

**museums**

risk management strategies for field trips, 47

**N**

***National Building Code of Canada, 2010***

about requirements of, 8

**National Fire Protection Association (NFPA)**

about NFPA Hazchem Codes, 126-128

compressed gas storage recommendations, 91

fire extinguisher recommendations, 38-39

flammable substances storage recommendations, 91

**natural gas**

emergency response to leaks, 23

**nature sites**

risk management strategies for field trips, 40

See *also* field trips

**near-miss incidents**

about reports of, 28, 49

incident report form for, 49, 155-156

staff responsibilities, 133-137

See *also* incident and incident reports

**NFPA**

See National Fire Protection Association (NFPA)

**nickel**

precipitation for waste management, 115-116

See *also* metals

**nitrates**

storage of, 103-104

See *also* ammonium nitrate; oxidizing materials

**nitric acid**

neutralization of, 115

storage of, 100, 103-104

waste management by neutralization, 115

**nitrogen, liquid**

See compressed gases

**nonmetal halides**

about handling corrosive substances, 88

See *also* corrosive and toxic substances

**Nuclear Substances and Radiation Devices Regulations, 74**

**O**

**occupant loads, maximum**

fire code requirements, 8

***Occupational Health and Safety Act***

accident reports under, 27-28

safety requirements under, 5, 8-11, 19, 21, 23, 27, 35, 39, 46, 47, 49, 82, 83, 99, 102, 107, 124

first aid kit requirements under, 35, 39-40

sound hazard exposure limits under, 73

Web sites, 139, 141, 143

WHMIS training requirements under, 10, 48-49

**oil**

waste management categories of, 109-110

**organic acids**

storage of, 99-104, 128

TDG hazard classes for, 129-130

**organic substances**

reactive nature of special-case organic substances, 121

**owl pellets**

use of, 57

**oxygen**

liquid oxygen (See compressed gases)

**oxidizing materials**

about handling corrosive substances, 88

as controlled products, 131

NFPA hazard ratings, 126-127

NFPA Hazchem special notice for, 128

reactive nature of oxidation-reduction sensitive chemicals, 123

reduction of, for waste management, 117

storage of, 99-104, 128

TDG hazard classes for, 129-130

waste management categories of, 109-110

WHMIS hazard classes, 128

WHMIS symbol for, 106

See *also* controlled products; corrosive and toxic substances

**P**

**paint**

waste management categories of, 109-110

**parents**

information in incident form, 155-156  
role in science safety, 133-137  
signatures on student safety contracts, 145, 149  
See *also* students, science

**pathogenic organisms**

about use of cultures, 56-57  
on use of human tissues and fluids, 55

**personal protective equipment**

about items used for, 37-38  
Hazchem code for health hazards, 126-127  
liability for use and availability of, 37-38 (See *also* liability, legal)  
as preventative measure in MSDSs, 82-83  
in safety inspection checklist, 152  
student safety contracts on, 149  
use in elementary schools, 13-14  
See *also* safety equipment

**petroleum ether**

recycling of used, 114  
storage of, 103-104  
See *also* flammable and combustible materials

**physics hazards, 67-77**

about hazards, 67  
electrical hazards, 69-71 (See *also* electricity and electrical hazards)  
heat hazards, 71-73  
radiation hazards, 74-77 (See *also* radioactive materials)  
rocketry hazards, 73  
sound hazards, 73  
testing structural designs, 68-89

**pillows, spill control, 41, 92-93**

See *also* spills of toxic and corrosive substances

**pipettes**

disposable for micro-scale experiments, 113  
infections from, 55  
use of mouth on, 59

**plans for emergencies**

See emergency preparedness and response plans

**plants**

about use of, 60-62  
poisonous plants, 13-16, 61-62

**plumbing**

safety standards for, 34

**Poison and Drug Information Services, 25, 26**

**poisonous materials**

about finding information on, 25, 26  
about toxic effects, 84-85  
chemical dose levels and poisons, 81  
as controlled products, 131  
exposure to toxic materials, 84  
MSDS information on, 25

poisonous plants, 14-16, 60-62

WHMIS hazard classes, 128

WHMIS symbol for, 106

**polychlorinated biphenols**

waste management categories of, 110

**potassium hydroxide**

waste management by neutralization, 115

**potassium permanganate**

reduction of, for waste management, 117

storage of, 103-104

**precipitation of heavy metal salts**

for waste management, 115-116

**preserved specimens**

on use of human tissues and fluids, 55

use of, 57-58, 63

**pressure cooker**

use in place of autoclave, 63

**pressurized gases**

See compressed gases

**primus cartridge burners**

use of, 72

See *also* burners

**principals**

See school administrators

**professional development**

See training in science safety

**projectile launchers**

safety measures for, 68

**propane gas**

emergency response to leaks, 23

See *also* compressed gases

**protozoa**

use of cultures of, 56-57

**PTC paper**

cautions on use of mouth, 55, 59

**pyrophors**

reactive nature of, 123

**R**

**radioactive materials**

about radiation hazards, 74-77

not included in MSDSs, 106, 109

TDG hazard classes for, 129-130

**reactive material, dangerously**

NFPA hazard ratings, 126-128

WHMIS hazard classes for, 128

WHMIS symbol for, 106

See *also* controlled products

**recycling and recovering of substances**

about, 114

as disposal methods in chemical hazard information table, 131

information on, in chemical inventory, 103-105, 110, 173

**references on science safety, 176**

**refrigeration**

about, 34

about separation of edibles from chemicals, 99, 103

disinfectant use on refrigerator, 63

ice storage, 103

not recommended for flammable liquids, 102

not to use ice as burn treatment, 25

of fresh tissues, 58

**respirators**

use of, 41

**response plans for emergencies**

See emergency preparedness and response plans

**risk management, 45-52**

about risks, 45-46

due diligence for, 5-6

in elementary school science programs, 13-14

in emergency response plans, 19-21

for field trips, 40

monitoring and assessment for risk reduction, 42

near-miss reports, 28

in secondary school science programs, 15-16

for use of toxic and corrosive chemicals, 88-89

**rocketry hazards, 73**

**S**

**safety equipment**

about basic equipment, 32, 35-38

in lab safety inspection checklist, 151

legislation on, 10-11

for spills of toxic and corrosive substances, 35-38

staff responsibilities for, 133-137

student responsibilities for, 137

student safety contracts on, 145, 149

telephones as, 32

training on use of, 5, 7, 10-11, 49, 50

See *also* personal protective equipment

**Saskatchewan Education**

human tissues and fluids prohibition, 14

role in science safety, 133-137

**saliva**

See human tissues and fluid specimens

**salt**

storage of, 102-104

**salts, heavy metal**

treatment for waste disposal, 115-116

**sand**

for chemical spills, 41-42

**scalpels**

how to use, 164

- safety measures for, 67
  - sharps disposal, 41
- school administrators**
  - about roles and responsibilities of, 134-135
  - due diligence duties, 5-8
  - staff training, 5-6, 27-28
- TDG and *Environmental Management and Protection Act*, compliance by, 50
- school boards and superintendents**
  - about roles and responsibilities, 133
  - due diligence requirements for, 5
  - policies on cryogenics, 89-90
  - policies on mercury, 86-87
- safe and caring environment required under *Education Act*, 8
  - staff training by, 49
  - use of waste management brokers  
(See waste management)
  - See also legislation on safety
- science departments**
  - See elementary school science programs; secondary school science programs
- science laboratories**
  - about safety in (handouts), 167
  - about general safety equipment for, 35-38
  - chemicals in (See chemicals and chemical hazards)
  - chemical hazards (See chemical hazard information table)
  - chemical storage (See chemical storage)
  - evaluation of facilities (checklist), 32-35
  - instructional strategies to reduce risks in, 46-48, 113-114
  - safety inspection of, 42
  - safety inspection of (checklist), 151-153
  - spills safety equipment, 40-42 (See also spills of toxic and corrosive substances)
  - student safety contracts, 14, 16, 145, 149
  - waste management in (See waste management and disposal; licensed consignee)
  - See also chemical storage; safety equipment
- science students**
  - See students, science
- science technicians**
  - about roles and responsibilities of, 136
  - application of WCB to, 27
  - training in general safety equipment, 35-38
  - training in WHMIS, 10, 13
- secondary school science programs**
  - about safety procedures for, 15-16, 147
  - instructional strategies, 46-48, 113-114
  - policies for safety procedures, 51-52
  - policies for safety procedures (sample), 167
  - storage systems for gr. 1–8, 101-103
  - storage systems for gr. 9–12, 101, 103-104
  - student safety contracts, 14, 16, 145, 149

See *also* science laboratories; waste management and disposal

**sewers**  
See landfills and sewers

**sharps disposal**, 41

**shelf life of chemicals**, 98, 111

**shock and fainting**  
emergency response to, 26 (See *also* medical emergencies and treatments)

**short circuits**  
fire hazard from, 69  
See *also* electricity and electrical hazards

**showers in science labs**  
about emergency use of, 36  
safety requirements for, 32, 34, 152

**sight and seeing**  
See eyes, care of

**silicon carbide**  
use as boiling chips, 162

**skin, care of**  
about personal protective equipment for, 37-38  
about treatment of injuries to, 23-27  
NFPA hazard code for avoiding skin contact, 126-127  
TDG hazard classes for corrosives that destroy skin, 129-130  
ultraviolet radiation hazards for skin, 76  
See *also* gloves; medical emergencies and treatments; personal protective equipment

**sodium carbonate**  
waste management by neutralization, 115

**sodium chlorate**  
reduction of, for waste management, 117

**sodium hydroxide**  
separate storage of solid and liquid forms, 101-104  
waste management by neutralization, 115

**sodium hypochlorite solutions**  
use for cleaning scalpels, 164

**sodium periodate**  
reduction of, for waste management, 117

**sodium persulfate**  
waste management by neutralization, 117

**solids**  
flammable solids, 101, 102, 104, 129-130 (See *also* flammable and combustible materials)  
spill management of, 93 (See *also* spills of toxic and corrosive substances)  
storage classes, 128-129  
storage of, 101-104  
waste disposal in landfills (See landfills and sewers)  
waste inventory of, 109-112

**solutions**  
See liquids and solutions

**solvents**  
recycling of organic solvents, 114  
spill management of, 40-42, 91-93 (See *also* spills of toxic and corrosive substances)

**sound hazards**  
ear damage from, 73

**spark timers**  
use of, 70

**specimens, biological**  
collection and use of, 56-58, 63  
See *also* biological hazards

**spills of non-toxic substances**  
See housekeeping

**spills of toxic and corrosive substances**  
about management of, 91-93  
about safety equipment for, 40-42  
containers for waste management, 41  
in emergency response plans, 21, 22-23, 91-93  
micro-organism cultures, 56-57  
special policies on mercury, 86-87, 110  
spill control pillows, 41, 91-93  
spill kits for, 40-42  
training in clean-up, 49  
See *also* emergency preparedness and response plans *and* *specific substances*

**spirometers**  
use of mouth on, 59

**squeeze bottles in eyewash stations**, 32-33, 36  
See *also* eyes, care of

**starch**  
storage of, 102-104

**sterilization**  
autoclave maintenance and cleaning, 63  
how to use an autoclave, 164  
of culture mediums, 56-57  
use of pressure cooker for, 63  
use of sterilizing cabinet for, 37, 63

**stoppers**  
how to remove from glass tubing or thermometers, 162-163

**stroboscopes**  
use of, 77

**structural design tests**  
use of, 68-69

**students, science**  
about roles and responsibilities, 51-52, 137  
about rules and procedures for (handout), 167  
about student safety contracts, 145, 149  
student medical information, 14, 15, 27, 60, 63, 137, 145, 149  
training in science safety, 50-52, 71  
See *also* medical emergencies and treatments; parents;  
students, special needs

**students, education**

roles and responsibilities, 137

**students, additional needs**

about support systems for, 133-137

doorway widths in science facilities, 33

**students, work experience, 9, 27**

WHMIS requirements for, 48

**sulfides**

chemical treatment for waste management, 118

**sulfuric acid**

waste management by neutralization, 115

**sunglasses, UV filtering**

use of, 38, 76

*See also* eyes, care of

**supplier labels, 107**

*See also* labels

**syringes**

use of, 59

**T**

**table, chemical hazard information**

*See* chemical hazard information table

**TDG**

*See* Transportation of Dangerous Goods

**teachers, science**

about roles and responsibilities of, 13-16, 135, 167

about safety procedures and policies, 49-52

duty of due diligence, 5-7

duty to refuse unsafe work, 46

instructional strategies, 46-48, 113-114

occupational legislation on, 8-11

risk management by, 45-46

safety policies and procedures (handout), 167

**teachers, substitute**

duty to refuse unsafe work, 46

science department policies and procedures for, 167

**teaching strategies**

for reduction of risks, 46-48, 113-114

*See also* safety equipment

**technicians, science**

*See* science technicians

**telephones**

as safety equipment, 32

**tesla coils**

use of, 70

**test tubes**

how to shake, 165

use of test tube holders, 71

**thermometers**

cautions on use of mouth on, 59

how remove from stoppers, 162

mercury hazards, 86-87

**tobacco**

exclusion from WHMIS requirements, 106

**tongs**

use of, 37, 71

**tools**

use of, 67

**toxic plants**, 14, 15, 60-62

**toxic substances**

See corrosive and toxic substances; poisonous materials;

spills of toxic and corrosive substances

**training in science safety**

about roles of teachers, 135-136

about topics for, 49

due diligence requirements, 5-13

in emergency medical treatments, 23-27

in emergency response plans, 19-21

in first aid, 23, 39, 40, 49

records on, inspection of, 8, 50, 151-153

roles of school board and school administrators, 48-49, 133-134

student safety contracts, 145, 149

student training, 51-52, 71

TDG training, 12, 50, 99

WHMIS training, 7, 10, 12, 42, 48-49, 81

**transportation**

for field trips, 47

***Transportation of Dangerous Goods Act (Saskatchewan)***, 12,

**Transportation of Dangerous Goods (TDG) regulation**

about requirements under, 12, 50

data on, in chemical inventory, 103, 173

hazard classes and divisions under, 129-130

labels for substances under, 108

receiving orders of chemicals, 99

role of science teachers and technicians, 135-136

training on, 12, 49-50, 99, 133-137

waste materials transported under, 111-112

**turpentine**

labelling of hazards of, 109

**U**

**ultraviolet rays**

as radiation hazard, 74-77

use of UV filtering sunglasses, 38, 76

use of UV sterilizing cabinets, 37, 69

**unknown chemicals**

transportation of, 111

use of lab stations to avoid, 113-114

waste management categories of, 109-112

**urine specimens**

on use of human fluids, 55

**V**

**Van De Graaff generators**

how to avoid a discharge from, 163

use of, 70-71

**ventilation**

exhaust systems for, 33, 34, 37

**vermiculite**

for chemical spills, 41

**video presentations**

use of, 46

See *also* instructional strategies

**vinegar**

storage of, 102-104

**viruses**

on use of human tissues and fluids, 55-57

safety procedures for cultures, 56-57

See *also* biological hazards

**vision care**

See eyes, care of

**volunteers**

role in science safety, 137

**W**

**waste management and disposal**

about wastes, 109-112

biohazard disposal, 41

information on, in chemical hazard information table, 131

information on, in chemical inventory, 103-105, 173

instructional strategies to reduce, 113-114

(See instructional strategies)

inventory of waste, 109-110

legislation on, 8-13, 50, 110-112

licensed consignee, 111

recycling and recovery, 114

(See *also* recycling and recovering of substances)

separation of wastes, 112

sharps disposal, 41

shelf life of chemicals, 98, 111

special disposal, 111-112

staff roles and responsibilities for, 133-137

staff training in, 133-134, 49

storage of wastes, 109-110

TDG hazard classes and divisions, 129-130

treatment of wastes before disposal, 114-118

**waste generator identification numbers, 111**

**water**

NFPA hazard ratings for water reactive, 126-128

reactive nature of water sensitive chemicals, 123

shock hazard from electrical equipment near, 69

See *also* liquids and solutions

**Web sites**

on carcinogens (list), 87

- on emergency response plans, 21
  - on model rockets, 73
  - on MSDS information, 82
  - on NFPA rating systems, 128
- on OHS requirements for first aid kits, 139
  - on radiation hazards, 75
  - on toxic and nontoxic plants, 62
  - on WHMIS training, 10, 49
- references on science safety, 176

**welders**

- as source of non-ionizing radiation, 75-77

**WHMIS**

See Workplace Hazardous Materials information System

**Workers' Compensation Act, 2013**

- requirements of, 27

**Workplace Hazardous Materials Information System (WHMIS)**

- about WHMIS system for controlled products, 10, 13, 48-49
- about material safety data sheets (MSDSs), 9, 82-83
- application to staff and students, 48-49
  - for chemical inventory, 105-106, 173
- disposal of chemicals without WHMIS info, 111
  - labels for materials, 106-109
  - labels for recovered substances, 114
  - labels for waste, 109
  - symbols, 106
  - training agents for, 10, 49

See *also* controlled products; labels

**workplace labels, 108**

See *also* labels

**X**

**X-rays, 74**

**Z**

**zinc**

- precipitation for waste management, 115-116

See *also* metals

**zoos**

- field trips to, 47

See *also* field trips