Student RiskAssess

www.riskassess.ca

Software for Student Risk Assessments in Science

Student RiskAssess allows students to easily carry out risk assessments of experiments that they design themselves, as required for the International Baccalaureate, and for student-initiated experiments. More than 420 schools in Australia, New Zealand and Canada subscribe to Student RiskAssess.

See next page for curriculum and legal requirements for student-designed experiments.

Student RiskAssess has been optimized for student use:

- students must agree to conduct each experiment safely in accordance with school rules and teacher instructions
- student name(s) are recorded for individual or group work
- security PIN option to allow use for student assessment purposes
- student(s) assess risks on the basis of likelihood and consequences
- student(s) assess inherent risk and record control measures
- teachers sign that they have checked students' risk assessments and appropriate control measures are in place
- separate lab scheduling page for student experiments to help lab technicians
- on-line help screens, electronic documents and User Guide for Student RiskAssess are provided.

2 WEEK FREE TRIAL: send your school name to info@riskassess.ca

Student RiskAssess continues to have all the facilities of RiskAssess:

- database information on chemicals, equipment and biological items
- GHS data on 1200 chemicals and their solutions
- electronic templates that follow the ISO Standard on Risk Management
- electronic signing by teacher and science technician, and archiving of risk assessments for legal purposes
- GHS labelling system, compliant with WHMIS 2015, for pure chemicals and solutions.

Student RiskAssess can be used in the classroom on laptops, iPads (and other tablets) and on smart phones (iPhones, Android, etc). Students can access Student RiskAssess from home or from any location with an internet connection. Unlimited numbers of students can use Student RiskAssess at the same time.

The cost of a year's subscription to Student RiskAssess is $250.00 per school campus. This is in addition to the cost of a subscription to staff RiskAssess. A subscription lasts 365 days from the date that payment is received and includes all upgrades during that period. More than 246,000 risk assessments have been performed by students using Student RiskAssess.

You can subscribe on-line at **www.riskassess.ca/subscribe/student** and a tax invoice will be emailed to you. Please see our website for more details or contact Phillip Crisp on +61 2 9415 8677 if you wish to discuss Student RiskAssess further.

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Safety requirements for students carrying out student-designed science experiments

The legislation in each Province and Territory[1] requires risks to be assessed before an experiment is carried out. This requirement applies whether the experiment is designed by school staff or by students.

National legislation for WHMIS 2015 mandates the GHS (Globally Harmonized System of Classification and Labelling of Chemicals) throughout every workplace.

In particular jurisdictions, specific legislation applies.
In Alberta, for example, recent changes to the Alberta OHS Act require[2]

- All employers must inform workers about potential hazards and have access to basic health and safety information

The school curriculum in each Province or Territory specifies safety procedures that must be followed. In Alberta, for instance, the Program of Studies[3] includes:

Safety
Students will be encouraged to show concern for safety in planning, carrying out and reviewing activities, referring to the Workplace Hazardous Materials Information System (WHMIS) and consumer product labelling information; e.g.,

- treat equipment with respect and manipulate materials carefully
- value the need for safe handling and storage of chemicals
- recognize the significant role that chemical researchers and the chemical industry play in identifying risks and developing guidelines for safe exposure
- assume responsibility for the safety of all those who share a common working environment
- clean up after an activity and dispose of materials in a safe place according to safety guidelines.

Specific outcomes for skills

- describe procedures for the safe handling, storage and disposal of materials used in the laboratory, with reference to WHMIS and consumer product labelling information

International Baccalaureate
The IB largely defers to legislation in the jurisdiction[4], but cites the Laboratory Safety Institute guidelines, including:

7. Require all employees to read the appropriate safety manual. Require students to read the institution's laboratory safety rules. Have both groups sign a statement that they have done so, understand the contents, and agree to follow the procedures and practices. Keep these statements on file in the department office.

9. Make learning how to be safe an integral and important part of science education, your work, and your life.

11. When conducting experiments with hazards or potential hazards, ask yourself these questions:
–What are the hazards?
–What are the worst possible things that could go wrong? How will I deal with them?
–What are the prudent practices, protective facilities and equipment necessary to minimize the risk of exposure to the hazards?

13. Require every pre-lab/pre-experiment discussion to include consideration of the health and safety aspects.

[1] Please see www.riskassess.ca/info/legally_required for a summary of the legislation.

[2] Government of Alberta, Alberta Occupational Health and Safety Act, Highlights of Changes Effective June 1, 2018.

[3] Program of Studies, Chemistry 20 and Chemistry 30: Attitude Outcomes p15, p41; Specific Outcomes for Skills p44.

[4] International Baccalaureate, Diploma Programme Chemistry Guide, 2016, p174-177.

RISK ASSESSMENT **Ecosolve High School Students**

Properties of carbon dioxide

Written by: Bill Wilkins, Mary Newt, Christina Lee **Commenced on:** 28 Jan 2016 **Expires:** 28 Apr 2017

Classes for which experiment is required

Teacher: Phillip Crisp (training code 1) **Year Group:** 10 Chemistry

Room	Period	Date
611	3	Fri 6/7/18

Items to be prepared by laboratory technician (training code 1)

10 g marble chips
100 mL 5M HCl
large test tube
100 mL beaker
wooden splints
100 mL limewater
matches

Procedure or reference, including variations

S&B p67
In addition, pour carbon dioxide from test tube into beaker to extinguish burning splint.

Equipment to be used

beaker, small (<250 mL)

Potential hazards
Breakage of beaker. Cuts from chipped rims.

Standard handling procedures
Inspect and discard any chipped or cracked beakers, no matter how small the damage. Sweep up broken glass with brush and dustpan; do not use fingers.

test tube, ignition, large (~150 x 25 mm)

Potential hazards
Breakage of test tubes. Cuts from chipped test-tube rims. More fragile than smaller test tubes. Large test tubes preferred for exothermic reactions, since material less likely to be ejected.

Standard handling procedures
Inspect and discard any damaged test tubes. Sweep up broken glass with brush and dustpan; do not use fingers.

wooden splint

Potential hazards
When lit, it acts as an ignition source; may cause burns. Possibility of splinters, especially if damaged.

Standard handling procedures
Extinguish all tapers with water before disposal.

Chemicals to be used

calcium carbonate (calcite, chalk (rock), lime (limestone), limestone, marble chips) **$CaCO_3$**
CAS: 471-34-1

Class: nc PG: none Users: K-12* Training: 1-6

GHS data: Not classified as a hazardous chemical.

Potential hazards
Not toxic.

Standard handling procedures
Solubility ~0.6 mg/L at 20°C.

hydrochloric acid 3-8 M (10-25% wt/wt) **$HCl_{(aq)}$**
CAS: 7647-01-0

Class: nc PG: none Users: 7-12 Training: 1-5

GHS data:

WARNING

Causes serious eye irritation
Causes skin irritation

Potential hazards
Irritates eyes, lungs and skin.

Standard handling procedures
Avoid inhalation of vapour or skin contact.

Chemicals to be produced

carbon dioxide, gas generated during experiment **CO_2**
CAS: 124-38-9

Class: 2.2 PG: none Users: K-12 Training: 1-6

GHS data: Not classified as a hazardous chemical.

Potential hazards	*Standard handling procedures*
Harmless, in quantities generated during experiments. Toxic at high concentrations in air due to absorption through lungs into blood, lowering the pH.	DO NOT GENERATE CARBON DIOXIDE IN A CLOSED CONTAINER SINCE THE CONTAINER MAY EXPLODE. Magnesium burns in carbon dioxide to form magnesium oxide and carbon.

Knowledge

I/we have read and understood the potential hazards and standard handling procedures of all the equipment, chemicals and biological items, including living organisms.
I/we have read and understood the (Material) Safety Data Sheets for all chemicals used and produced.
I/we have copies of the (Material) Safety Data Sheets of all the chemicals available in or near the laboratory.

Agreement by student(s)

I/we, Bill Wilkins, Mary Newt, Christina Lee, agree to conduct this experiment safely in accordance with school rules and teacher instructions.

Risk assessment

I/we have considered the risks of:

fire	breakage of equipment	electrical shock	radiation
explosion	cuts from equipment	escape of pathogens	waste disposal
chemicals in eyes	sharp objects	heavy lifting	inappropriate behaviour
inhalation of gas/dust	rotating equipment	slipping, tripping, falling	allergies
chemicals on skin	vibration and noise	falling objects	special needs
runaway reaction	pressure	heat and cold	other risks

Assessment by Student(s)

I/we have assessed the risks associated with performing this experiment in the classroom on the basis of likelihood and consequences using the School's risk matrix, according to International Organization for Standardization Standard ISO 31000:2009.

I/we consider the inherent level of risk (risk level without control measures) to be:

Low risk **Medium risk** High risk Extreme risk

Control measures:

Always point test tube away from any person.
Add hydrochloric acid slowly and carefully to avoid vigorous reaction and projection of material from test tube.
Dip matches and tapers in water to ensure extinguished before disposal.
Additional measures: safety glasses, gloves

With the specified control measures in place, I/we have found that all the risks are "low risk". Risks will therefore be managed by routine procedures in the classroom, in combination with the specified control measures.

Certification by Teacher

I have assessed the risks associated with performing this experiment in the classroom on the basis of likelihood and consequences using the School's risk matrix, according to International Organization for Standardization Standard ISO 31000:2009. I confirm that the risk level and control measures entered by student(s) above are correct and appropriate.

Name: ..... **Signature:** ..... **Date:** .....

Certification by Laboratory Technician

I have assessed the risks associated with preparing the equipment, chemicals and and biological items, including living organisms, for this experiment and subsequently cleaning up after the experiment and disposing of wastes, on the basis of likelihood and consequences using the School's risk matrix, according to International Organization for Standardization Standard ISO 31000:2009.

I consider the inherent level of risk (risk level without control measures) to be:

Low risk Medium risk High risk Extreme risk

Risks will therefore be managed by routine procedures in the laboratory.

Name: ..... **Signature:** ..... **Date:** .....

Monitoring and review

This risk assessment will be monitored using comments below and will be reviewed within 15 months from the date of certification.