RISK ASSESSMENT **Ecosolve High School Students**

Properties of carbon dioxide

Written by: Bill Wilkins, Mary Newt, Christina Lee **Commenced on:** 1 Sep 2017 **Expires:** 1 Dec 2018

Classes for which experiment is required

Teacher: Phillip Crisp **Year Group:** 10 Chemistry

Room	Period	Date
611	3	Mon 25/9/17

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 and produced

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.

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
Harmless, in quantities generated during experiments. Toxic at high concentrations in air due to absorption through lungs into blood, lowering the pH.

Standard handling procedures
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.

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	*Standard handling procedures*
Irritates eyes, lungs and skin.	Avoid inhalation of vapour or skin contact.

Knowledge

I/we have read and understood the potential hazards and standard handling procedures of all the equipment, chemicals and 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 and the Risk Management Guidelines, HB 436:2013.

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 and the Risk Management Guidelines, HB 436:2013. 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 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 and the Risk Management Guidelines, HB 436:2013.

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.

Attach further pages as required