RISK ASSESSMENT **Blackwood High School**

pH with Dilutions

Written by: Lyron Juan Winderbaum **Commenced on:** 5 Sep 2018 **Expires:** 5 Dec 2019

Classes for which experiment is required

Teacher: Lyron Juan Winderbaum (training code 1) **Year Group:** 11 Chemistry

Room	Period	Date
CheL	1-2	Tue 11/9/18
CheL	1-2	Tue 18/9/18

Not sure exactly when we'll do this prac, depends how quickly we get through the material so it could be either week 8 or 9.

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

Each group will need:
- 20mL volumetric pipette
- pipette filler
- 2x200mL volumetric flask
- at least 25mL 0.1M HCl with some starch mixed into it to make it cloudy.
- about 1L DI water.
- spotting tile
- transfer pipette
- universal indicator solution

Procedure or reference, including variations

In this prac you will do serial dilutions (diluting a solution over and over) of an acid to see how the pH is affected.

Initially begin with some 0.1M HCl, and alternate between the following two steps at least 3 times:
1. Transfer some of the previous solution (so, initially 0.1M) onto a spotting tile (use a transfer pipette) and add a single drop of universal indicator, observe the colour and record the pH observed, and the concentration of the HCl.
2. Perform a 1 in 10 dilution of the previous solution. So transfer 20mL of the previous solution (using a volumetric pipette) into a 200mL volumetric flask, and then fill the flask up to the mark with dionised water.

Notice the pattern of how much the pH tends to change with each dilution.

Equipment to be used

glass pipette

Potential hazards
Possibility of ingestion of liquid if pipette filler is not used. ALWAYS USE A PIPETTE FILLER. Possibility of breakage of glass and cuts. Inserting glass pipette into filler inappropriately may result in major hand injuries, if glass breaks.

Standard handling procedures
Provide a properly fitting pipette filler with every pipette. Inspect and discard any chipped or cracked pipettes no matter how small the damage. Sweep up broken glass with brush and dustpan; do not use fingers.

pipette filler

Potential hazards
Can be filled with liquid and used as water pistol. Inserting glass pipette into filler inappropriately may result in major hand injuries, if glass breaks.

Standard handling procedures
Insert pipette, with gentle pressure and rotation, the smallest distance possible into filler to obtain an air-tight seal.

spotting tile

Potential hazards
Can break to form sharp fragments, which may cause injury.

transfer pipette

Potential hazards
Possibility of ingestion of liquid if pipette filler is not used. ALWAYS USE A PIPETTE FILLER. Possibility of breakage of glass and cuts.

Standard handling procedures
Provide a properly fitting pipette filler with every pipette. Inspect and discard any chipped or cracked pipettes no matter how small the damage. Sweep up broken glass with brush and dustpan; do not use fingers.

volumetric flask, medium (100 mL to 500 mL)

Potential hazards
Flat bottom of flask prone to crack or break if dropped; chips around rim may cause cuts.

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

Chemicals to be used

hydrochloric acid <3 M (<10% wt/wt) **$HCl_{(aq)}$**

CAS: 7647-01-0

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

GHS data: Not classified as a hazardous chemical.

Potential hazards
Higher concentrations irritate eyes, lungs and skin.

Standard handling procedures
Avoid inhalation of vapour.

starch, solution

CAS: 9005-84-9

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

GHS data: Not classified as a hazardous chemical.

Potential hazards
Not toxic.

universal indicator, aqueous

Class: nc PG: none Users: 7-12 Training: 1-6

GHS data: Not classified as a hazardous chemical.

Potential hazards
Low toxicity.

Standard handling procedures
Solutions containing <24% wt/wt ethanol are classified similarly.

Knowledge

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

Risk assessment

I have considered the risks of:

fire or explosion	breakage of equipment	exposure to pathogens	waste disposal
chemicals in eyes	injuries from equipment	injuries from animals	improper labelling/storage
inhalation of gas/dust	rotating equipment	intense light/lasers	inappropriate behaviour
chemicals on skin	electrical shock	UV, IR, nuclear radiation	communication issues
ingestion of chemicals	vibration or noise	pressure inside equipment	allergies
runaway reaction	sharp objects	heavy lifting	special needs
heat or cold	falling or flying objects	slipping, tripping, falling	other risks

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 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 classroom.

Electronic Signature: Dr. Lyron Juan Winderbaum **Date:** 5 Sep 2018

You have provided an electronic signature which is the equivalent of signing your name with a pen and as such will constitute a legally binding agreement between the relevant parties. We can give no warranty in respect to fraud or security breach resulting from the use of an electronic signature.

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

Where the risk level is "medium risk", "high risk" or "extreme risk", the following control measures will be employed:

Control measures (attach further pages as required):

☐ safety glasses ☐ gloves ☐ lab coat ☐ apron ☐ fume cupboard

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

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