Government of **Western Australia**
School Curriculum and Standards Authority

EST CODE
SIPGT
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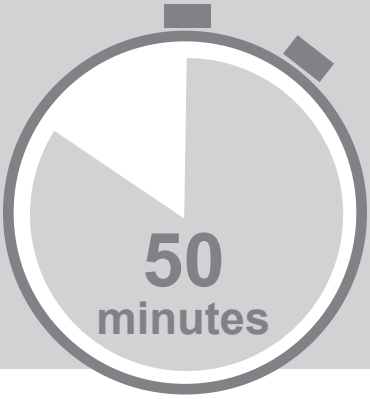
Science in Practice
General course

Externally set task sample one



DO NOT WRITE IN THIS BOX

WA student number: In figures

In words

Before starting this task check that you have:

- pens (blue/black preferred)
- pencils (including coloured)
- sharpener
- correction fluid/tape
- eraser
- ruler
- highlighters
- a calculator of the type used in classroom assessments

DO NOT WRITE IN THIS AREA AS IT WILL BE CUT OFF

Total time for the task: 50 minutes
Total marks: 34 marks
Weighting: 15% of the school mark

Question 1 **(13 marks)**

A group of students carried out an experiment to see how long it took for different volumes of water to be heated to boiling point. Each student was required to write the procedure they followed.

The equipment they were supplied with was: a Bunsen burner, beaker, thermometer, measuring cylinder, stopwatch, tripod and gauze mat.

An example of a procedure written by one of the students is given below.

I will put water into a beaker and time how long it takes to heat up. I will then put more water in and time it again. I will use the same equipment such as the same size beaker and I'll need to be careful because it will get hot.

(a) Identify **two** ways in which the procedure given above would not allow for the collection of valid and reliable data. (2 marks)

One: _____

_____

Two: _____

_____

(b) Modify the student's procedure to ensure that valid and reliable data would be collected. (5 marks)

_____

_____

_____

_____

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_____

_____

_____

_____

_____

See next page

Question 1 (continued)

(c) Construct a table that could be used to collect the data from the student's experiment. (4 marks)

(d) Describe **one** way the students could have improved their investigation to increase the accuracy of their results. (2 marks)

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See next page

Question 2 **(11 marks)**

SAFETY DATA SHEET
Sulfuric acid

1.1 IDENTIFICATION

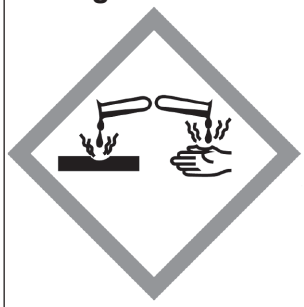
Product name: Sulfuric acid **Product number:** 0000100
Brand: Best Acid Company
Recommended use of the chemical and restriction on use
Use of substance: industrial use, laboratory chemical, battery component
Restriction on use: not for food, drug or household use

Company details
Best Acid Company
100 James Street
Sulferton, Western Australia
Emergency Telephone number: 1300 000 001

2. HAZARD IDENTIFICATION

Classification of substance or mixture
Corrosive to metals (Category 1)
Skin corrosion/irritation (Category 1A)
Serious eye damage (Category 1)

Pictogram



Signal word:
Danger

Hazard statement
H290 May be corrosive to metals
H314 Causes severe skin burns and eye damage

Precautionary statements:
P260 – Do not breathe mist, vapours, spray
P264 – Wash exposed skin thoroughly after handling
P280 – Wear protective gloves and clothing, eye and face protection
P301+P330+P331 – IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303+P361+P353 – IF ON SKIN (or hair): take off immediately all contaminated clothing. Rinse skin with water/shower.
P304=P340 – IF INHALED: remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.

See next page

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel:
Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Use equipment for eye protection, acid-resistant protective clothing and gloves, full face mask with filter or respiratory equipment

Environmental precautions:
Do not let product enter drains or waterways.

Methods and materials for containment and clean up:
Cover drains.
Collect, bind, and pump off spills.
Take up with liquid-absorbent and neutralising material.
Clean contaminated surfaces with an excess of water.

Definitions
Corrosive: eats away, dissolves or destroys
Corrosion: eaten away, dissolved or damaged
Irritation: inflammation or pain or damage
Ventilation: access to fresh air
Neutralising: stopping the effect or reaction

A truck carrying 200 L drums of sulfuric acid has rolled over on a main highway. The Department of Fire and Emergency Services (DFES) is warning motorists to avoid travelling along the highway near the scene of the accident. They also recommend that any car that has travelled near the scene of the accident to wash their vehicle with water as soon as possible.

Best Acid Company, the company supplying the sulfuric acid, has provided the trucking company with the safety data sheet (SDS) on pages 6 and 7.

(a) Identify **two** types of information that should be included on a safety data sheet (SDS). (2 marks)

One: _____

_____

Two: _____

_____

See next page

Question 2 (continued)

Before DFES can clean up the accident, they need to assess the risks.

(b) Prepare a risk assessment identifying **one** potential hazard, a risk associated with the hazard and a suggested management strategy for the hazard. (3 marks)

Refer to the safety data sheet (SDS) on pages 6 and 7 when preparing your risk assessment.

Hazard	Risk	Management strategy

(c) Outline **two** reasons why a risk assessment is essential. (2 marks)

One: _____

_____

Two: _____

_____

(d) Explain why DFES has recommended motorists wash their cars with plenty of water if they have travelled past the scene of the accident. (4 marks)

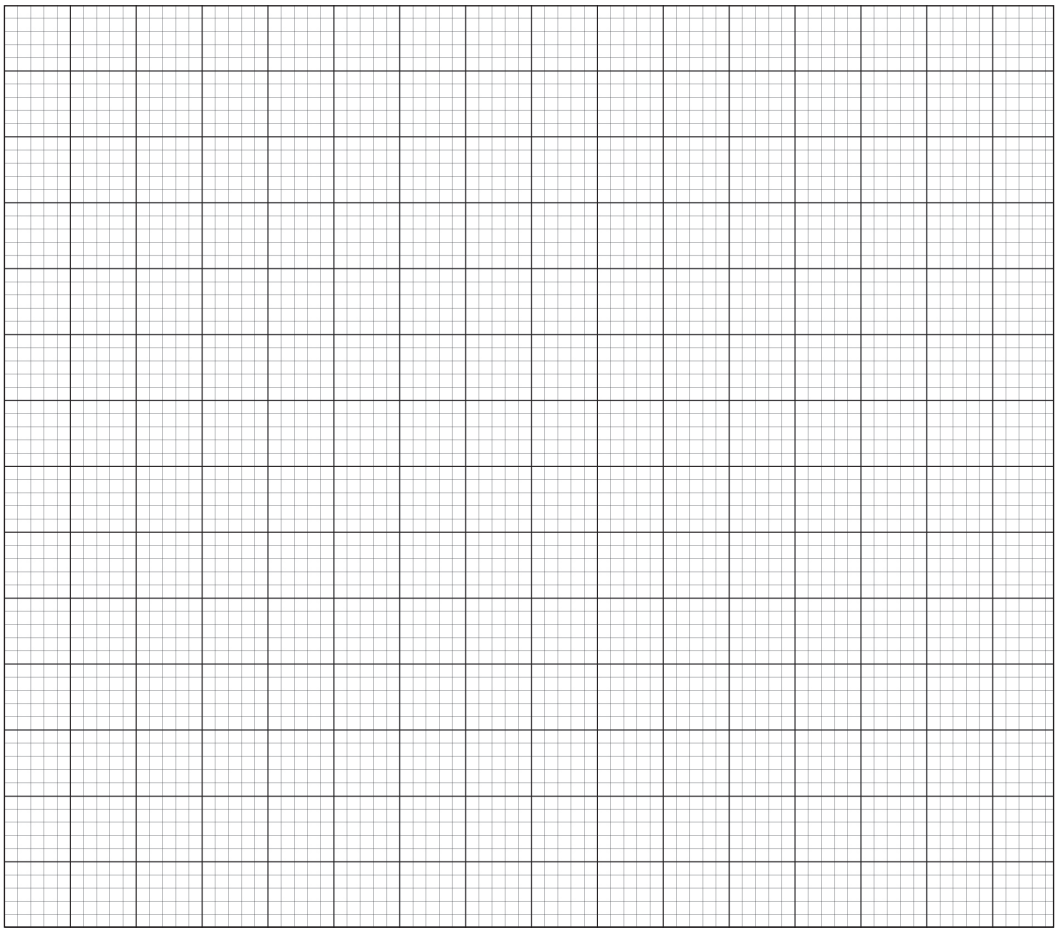
See next page

Question 3 **(10 marks)**

The table below shows some of the data captured over three months during a hay fever season in Perth.

Pollen type	Total pollen count (grains per litre)
Australian pine	720
Bottlebrush	1020
Murray pine	840
Rye grass	4200
Wild oat	1680
Winter grass	4500
Couch grass	6400

(a) Graph the data on the grid provided below. (5 marks)



A spare grid is provided at the end of this booklet. If you need to use it, cross out this attempt and indicate that you have redrawn it on the spare grid.

See next page

(b) (i) State **one** conclusion you can draw from your graph. (1 mark)

(ii) Based on your conclusion, propose a hypothesis that could be used as the basis for a new investigation about pollen counts. (2 marks)

(iii) Identify the independent and dependent variables for your new hypothesis. (2 marks)

Independent: _____

Dependent: _____

End of questions

Supplementary page

Question number: _____

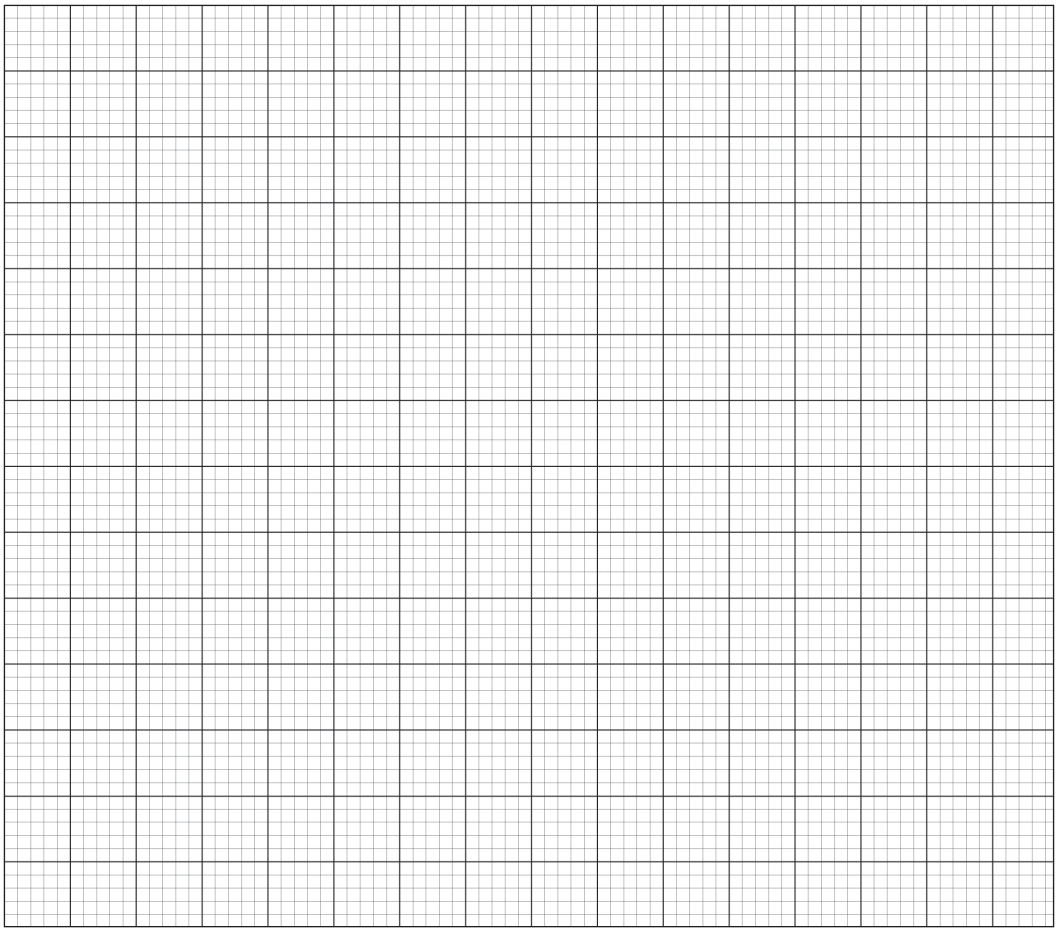
Supplementary page

Question number: _____

Supplementary page

Question number: _____

Spare grid for Question 3(a)



ACKNOWLEDGEMENTS

Question 2 Adapted from: United Nations Economic Commission for Europe. (n.d.). [Pictogram showing a hand and surface having acid poured on them]. Retrieved August, 2023, from https://unece.org/transport/dangerous-goods/ghs-pictograms

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