

Agricultural Science 2019 v1.3

Unit 1 sample assessment instrument

August 2022

Student experiment

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Schools develop internal assessments for each senior subject, based on the learning described in Units 1 and 2 of the subject syllabus. Each unit objective must be assessed at least once.

Assessment objectives

This assessment instrument is used to determine student achievement in the following objectives:

2. apply understanding of agricultural enterprises, and animal and plant production
3. analyse evidence about agricultural enterprises, and animal and plant production
4. interpret evidence about agricultural enterprises, and animal and plant production
5. investigate phenomena associated with agricultural enterprises, and animal and plant production
6. evaluate processes, claims and conclusions about agricultural enterprises, and animal and plant production
7. communicate understandings, findings, arguments and conclusions about agricultural enterprises, and animal and plant production.

Note: Objective 1 is not assessed in this instrument.

Subject	Agricultural Science
Technique	Student experiment
Unit	Unit 1: Agricultural systems
Topic	Topic 1: Agricultural enterprises A Topic 2: Animal production A Topic 3: Plant production A

Conditions			
Duration	10 hours class time		
Mode	Written response — scientific report	Length	1500–2000 words
Individual/group	Group work with individual report	Other	—
Resources available	School science laboratory and library (online: internet and school intranet, databases, journals)		
Context			
<p>You have completed the following practicals in class:</p> <ul style="list-style-type: none"> • Observe, collect and record information on the physical and biological resources of a production unit including soil, climate, vegetation and topography. • Investigate and compare the digestive systems of a monogastric and a ruminant animal, using real or virtual examples. • Assess phenotypic variation in agricultural products and evaluate this data to make judgments about market suitability. • Analyse representations of both qualitative and quantitative data to make decisions about the selection of breeding stock for specific breeding objectives. • Use a key to classify a range of broadacre and horticultural crops, pastures and weed species to a plant family name level. • Conduct an investigation into either respiration or photosynthesis. • Determine the appropriate fertiliser application type and rate for a given situation (e.g. crop) to use on agricultural plants (e.g. a school market garden). Collect and analyse data in response to the application type and rate (i.e. record measurements for height/yield). 			
Task			
<p>Modify (i.e. refine, extend or redirect) an experiment in order to address your own related hypothesis or question.</p> <p>You may use a practical performed in class, a related simulation or another practical related to Unit 1 (as negotiated with your teacher) as the basis for your methodology and research question.</p>			

To complete this task, you must:

- identify an experiment to modify*
- develop a research question to be investigated*
- research relevant background scientific information to inform the modification of the research question and methodology
- conduct a risk assessment and account for risks in the methodology*
- conduct the experiment*
- collect sufficient and relevant qualitative and/or quantitative data to address the research question*
- process and present the data appropriately
- analyse the evidence to identify trends, patterns or relationships
- analyse the evidence to identify uncertainty and limitations
- interpret the evidence to draw conclusion/s to the research question
- evaluate the reliability and validity of the experimental process
- suggest possible improvements and extensions to the experiment
- communicate findings in an appropriate scientific genre, i.e. scientific report.

*The steps indicated with an asterisk above may be completed in groups. All other steps must be completed individually.

Stimulus

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Checkpoints

- Term 1 Week 6: Select modifications, develop research question and complete risk assessment.
- Term 1 Week 7: Start experiment.
- Term 2 Week 3: Collect and analyse data.
- Term 2 Week 4: Submit draft.
- Term 2 Week 8: Submit final response.

Criterion	Marks allocated	Result
Research and planning Assessment objectives 2, 5		
Analysis of evidence Assessment objectives 2, 3, 5		
Interpretation and evaluation Assessment objectives 4, 6		
Communication Assessment objective 7		
Total		

Authentication strategies

- The teacher will provide class time for task completion.
- Students will provide documentation of their progress at indicated checkpoints.
- The teacher will collect and annotate a draft.
- Students will use plagiarism-detection software at submission of the response.
- Students must acknowledge all sources.
- The teacher will compare the responses of students who have worked together in groups.
- The teacher will ensure class cross-marking occurs.

Scaffolding

The response must be presented using an appropriate scientific genre (i.e. scientific report) and contain:

- a research question
- a rationale for the experiment
- reference to the initial experiment and identification and justification of modifications to the methodology
- raw and processed qualitative and/or quantitative data
- analysis of the evidence
- conclusion/s based on the interpretation of the evidence
- an evaluation of the methodology and suggestions of improvements and extensions to the experiment
- a reference list.

An example of how one of the practicals could be modified to develop a research question

Practical that will be modified: Conduct an investigation into respiration or photosynthesis.

Research question: What is the relationship between light wavelength and growth of soybeans?

Developing the research question:

Description	Example
Identify the independent variable to be investigated	Colour of light
Identify the dependent variable	Plant height
Identify the methodology to be used	Laboratory experiment/glasshouse trial
Draft research questions	<ul style="list-style-type: none">• Why is the wavelength of light important for photosynthesis and growth of plants?• Will different wavelengths of light have the same effect on photosynthesis and plant growth?
Refine and focus the research question	Will changing the wavelength of light a plant is exposed to affect the rate of photosynthesis and plant growth?
Present research question to teacher for approval	What is the relationship between light wavelength and growth of soybeans?

Note: You cannot use this sample research question for your experiment.

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