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Queensland Curriculum and Assessment Authority

Agricultural Science 2025 v1.2

IA3: Sample assessment instrument

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

Student name	sample only
Student number	sample only
Teacher	sample only
Issued	sample only
Due date	sample only

Marking summary

Criterion	Marks allocated	Provisional marks
Forming and Finding	5	
Analysing	5	
Interpreting	5	
Evaluating	5	
Overall	**20**	

Conditions

Technique	Research investigation
Unit	Unit 4: Agricultural management
Topic/s	Topic 1: Enterprise management Topic 2: Evaluation of an agricultural enterprise's sustainability
Duration	Approximately 10 hours of class time
Mode / length	Written: up to 2000 words
Individual / group	Individual
Resources	School library (online: internet and school intranet, databases, journals)

Context

Investigate one of the following claims:

- sustainable natural resource use is essential for the continuation of agricultural industries in Australia
- dryland salinity is affecting Australian agriculture
- animal welfare requirements will change animal production practices in Australia
- intensive animal industries need to have efficient waste management systems
- biofuel production can save the Australian grain industry
- soil degradation can be controlled with sustainable farming practices
- climate change is threatening the continuation of the grain industry in temperate Australia.

You may identify an alternative claim in consultation with your teacher. This claim must be related to Unit 4 subject matter.

Task

Gather evidence related to a research question to evaluate a claim relevant to Unit 4 subject matter. Develop your research question based on a number of possible claims provided by your teacher.

Obtain evidence by researching scientifically credible sources, such as books and podcasts by well-credentialed scientists, 'popular' science websites or magazines, websites of governments, universities, independent research bodies or science and technology manufacturers, and scientific journals. You must adhere to research conventions.

To complete this task, you must:

- select a claim to be evaluated, from a list provided by the teacher
- identify the relevant scientific concepts associated with the claim
- conduct research to gather evidence from scientifically credible sources to evaluate the claim
- pose a research question that addresses an aspect of the claim
- identify relevant evidence to answer the research question
- identify the trends, patterns or relationships in the evidence
- analyse the evidence to identify limitations
- interpret the evidence to construct scientific arguments
- interpret the evidence to form a conclusion to the research question
- discuss the quality of the evidence
- evaluate the claim by applying the findings of the research to the claim
- suggest improvements and/or extensions to the investigation
- communicate findings in an appropriate scientific genre, e.g. report, journal article, essay, conference presentation.

You may complete the following aspects of the task as a group:

- selecting a claim
- identifying the relevant scientific concepts associated with the claim
- conducting research.

Checkpoints

☐ Week 1: Select claim and develop research question

☐ Week 2: Identify sources and conduct research

☐ Week 3: Analyse and evaluate evidence

☐ Week 4: Submit draft

☐ Week 5: Submit final response

Authentication strategies

- You will be provided class time for task completion.
- You will provide documentation of your progress at indicated checkpoints.
- Your teacher will collect and annotate a draft.
- Your teacher will conduct interviews or consultations as you develop the response.
- You will use plagiarism-detection software to submit your response.
- You must acknowledge all sources.

Scaffolding

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

- a claim
- a research question
- a rationale for the investigation
- justified scientific arguments using evidence
- a conclusion to the research question based on the interpretation of the evidence
- evaluation of the claim and suggestions of improvements and extensions to the investigation
- a reference list.

Example of how a claim could be developed into a research question

Claim: Sustainable natural resource use is essential for the continuation of agricultural industries in Australia.

Research question: How have centre-pivot and lateral-move (CPLM) irrigation machine systems improved water efficiency in cotton production compared to traditional furrow irrigation systems in terms of producing higher yields with less irrigation water?

Developing the research question

Steps	Details
1. Identify the key (important) terms in the claim.	• Sustainable natural resource • Resource use • Agricultural industries
2. Propose refining questions that need to be addressed to refine key terms and narrow the focus of the claim.	• How can sufficient and relevant evidence be collected to evaluate sustainable natural resource use? • How do you determine what is a sustainable agricultural management practice? • Which agricultural industry in Australia should be chosen to investigate?
3. Provide an example of how one of the claims could be developed into a research question. Conduct research, gathering information to respond to the refining questions.	• The natural resource relevant to agriculture that will be investigated is water, specifically the use of water for irrigation purposes. • Cotton is an agricultural industry that has a high demand for irrigation water. • There are several different types of irrigation systems that growers currently use or could convert to. • There are differences between irrigation systems in terms of water-use efficiency. • The efficiency of water use can be measured by the volume of water required to produce one bale of cotton. Other factors to consider when choosing an irrigation system are the reliability of irrigation water, soil type, infrastructure costs, energy requirements for pumping water, etc.
4. Draft the research question to address the claim.	What effect can the choice of irrigation system have on sustainable water use and the sustainability of the cotton industry?
5. Refine and focus the research question.	• What type of data is relevant? • What time period and range of environmental conditions would be considered sufficient to demonstrate the water efficiency of a specific irrigation system and its effect on the sustainability of the industry?
6. Present the research question to the teacher for approval.	How have CPLM irrigation machine systems improved water efficiency in cotton production compared to traditional furrow irrigation systems in terms of producing higher yields with less irrigation water?

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

Instrument-specific marking guide (IA3): Research investigation response (20%)

Forming and Finding	Marks
The student response has the following characteristics:	
• a considered rationale identifying clear development of the research question from the claim • a specific and relevant research question • selection of sufficient and relevant sources • appropriate use of genre conventions • acknowledgment of sources of information through appropriate use of referencing conventions	4–5
• a reasonable rationale that links the research question and the claim • a relevant research question • selection of relevant sources • use of basic genre conventions • use of basic referencing conventions	2–3
• a vague or irrelevant rationale for the investigation • an inappropriate research question • selection of insufficient or irrelevant sources • inadequate use of genre conventions • inadequate acknowledgment of sources.	1
The student response does not match any of the descriptors above.	0

Analysing	Marks
The student response has the following characteristics:	
• the identification of sufficient and relevant evidence • thorough identification of relevant trends/patterns/relationships in evidence • thorough and appropriate identification of limitations of evidence	4–5
• the identification of relevant evidence • identification of obvious trends/patterns/relationships in evidence • basic identification of limitations of evidence	2–3
• the identification of insufficient and irrelevant evidence • identification of incorrect or irrelevant trends/patterns/relationships in evidence • incorrect or insufficient identification of limitations of evidence.	1
The student response does not match any of the descriptors above.	0

Interpreting	Marks
The student response has the following characteristics:	
• justified scientific argument/s • justified conclusion linked to the research question • fluent and concise use of scientific language/representations	4–5
• reasonable scientific argument/s • reasonable conclusion relevant to the research question • competent use of scientific language/representations	2–3
• inappropriate or irrelevant argument/s • inappropriate or irrelevant conclusion • incorrect use of language/representations.	1
The student response does not match any of the descriptors above.	0

Evaluating	Marks
The student response has the following characteristics:	
• justified discussion of the quality of evidence • extrapolation of credible findings of the research to the claim • suggested improvements and extensions to the investigation that are considered and relevant to the claim	4–5
• reasonable description of the quality of evidence • application of relevant findings of the research to the claim • suggested improvements and/or extensions to the investigation that are relevant to the claim	2–3
• cursory or simplistic statements about the quality of evidence • application of insufficient or inappropriate findings of the research to the claim • ineffective or irrelevant suggestions.	1
The student response does not match any of the descriptors above.	0