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Queensland Curriculum and Assessment Authority

Biology 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: Heredity and continuity of life
Topic/s	Topic 1: Genetics and heredity Topic 2: Continuity of life on Earth
Duration	Approximately 10 hours of class time
Mode / length	One of the following: • Multimodal (at least two modes delivered at the same time) — up to 11 minutes • 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:

- Gene therapy can reverse ageing.
- DNA testing can prove genealogical ancestry.
- Transgenic organisms offer a viable and effective future for human health.
- Sustainable reserve size should be based on the data from gene pool variability.

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 (e.g. scientific essay or multimodal presentation) and contain:

- a claim
- a research question
- a rationale for the investigation
- scientific arguments
- 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 reserve size should be based on the data from gene pool variability.

Research question template: Does **x** of **y** increase the **z** of **c** to (maintain 90% heterozygosity)?

Research question: Does supplementing the prey population of the cheetah (*Acinonyx jubatus*) increase the carrying capacity in the [named] reserve to maintain 90% heterozygosity?

Developing the research question:

1. Identify the key (important) terms in the claim.
    a. ‘gene pool’, ‘variability’, ‘sustainable reserve size’

2. Propose refining questions that need to be addressed to refine key terms and narrow the focus of the claim.
    a. The gene pool for which animal?
    b. Where is the reserve?
    c. What size reserve is needed to maintain variability?
    d. How would we know the variability was sustainable?
3. Provide an example of how one of the claims could be developed into a research question. Conduct research to gather information to address the refining questions.
    a. The [named] cheetah reserve maintains genetic diversity.
    b. The [named] cheetah reserve maintains 90% genetic diversity by supplementing the prey population.
    c. Does supplementing the prey population of the cheetah in the [named] reserve maintain 90% genetic diversity?
4. Draft the research question to address the claim.
    a. Does supplementing the prey population of the cheetah in the [named] reserve maintain 90% genetic diversity?
5. Refine and focus the research question.
    a. Does supplementing the prey population of the cheetah (*Acinonyx jubatus*) in the [named] reserve maintain 90% heterozygosity?
6. Present the research question to the teacher for approval.
    a. Does supplementing the prey population of the cheetah (*Acinonyx jubatus*) increase the carrying capacity in the [named] reserve to maintain 90% heterozygosity?

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