

# Biology 2019 v1.2

## Unit 2 sample assessment instrument

August 2018

### Research investigation

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.

### Unit objectives

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

2. apply understanding of homeostasis and infectious disease
3. analyse evidence about homeostasis and infectious disease
4. interpret evidence about homeostasis and infectious disease
5. investigate phenomena associated with homeostasis and infectious disease
6. evaluate processes, claims and conclusions about homeostasis and infectious disease
7. communicate understandings, findings, arguments and conclusions about homeostasis and infectious disease.

**Note:** Objective 1 is not assessed in this instrument.

<b>Subject</b>	Biology		
<b>Technique</b>	Research investigation		
<b>Unit</b>	Unit 2: Maintaining the internal environment		
<b>Topic</b>	Topic 1: Homeostasis Topic 2: Infectious disease		
<b>Conditions</b>			
<b>Duration</b>	10 hours class time		
<b>Mode</b>	Written response — scientific report	<b>Length</b>	1500–2000 words
<b>Individual/group</b>	Individual	<b>Other</b>	—
<b>Resources available</b>	School library (online: internet and school intranet, databases, journals)		
<b>Context</b>			
<p>Investigate one of the following claims:</p> <ul style="list-style-type: none"> <li>• Models of human thermoregulatory responses can predict how the body will react in nature.</li> <li>• The use of hormones in agriculture does not affect human health.</li> <li>• Future medicine will only be based on synthetic DNA (XNA) technology.</li> <li>• Mass vaccination programs are more successful when informed by disease outbreak models.</li> <li>• It is increasingly important for Australia to protect its environment through quarantine measures.</li> </ul> <p>You may identify an alternative claim in consultation with your teacher. This claim must be related to Unit 2 subject matter.</p>			
<b>Task</b>			
<p>Gather secondary evidence related to a research question in order to evaluate the claim. Develop your research question based on a number of possible claims provided by your teacher.</p> <p>Obtain evidence by researching scientifically credible sources, such as scientific journals, books by well-credentialed scientists and websites of governments, universities, independent research bodies, or science and technology manufacturers. You must adhere to research conventions.</p>			

**To complete this task, you must:**

- select a claim to be evaluated
- identify the relevant scientific concepts associated with the claim
- pose a research question addressing an aspect of the claim
- conduct research to gather scientific evidence that may be used to address the research question and subsequently evaluate the claim
- analyse the data to identify sufficient and relevant evidence
- identify the trends, patterns or relationships in the evidence
- analyse the evidence to identify limitations
- interpret the evidence to construct justified scientific arguments
- interpret the evidence to form a justified conclusion to the research question
- discuss the quality of the evidence
- evaluate the claim by extrapolating the findings of the research question to the claim
- suggest improvements and extensions to the investigation
- communicate findings in an appropriate scientific genre, i.e. scientific report.

**Stimulus**

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**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.

**Feedback**

### 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 drafts.
- The teacher will conduct interviews or consultations with each student as they develop the response.
- Students will use plagiarism-detection software at submission of the response.
- Students must acknowledge all sources.

### Scaffolding

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

#### **An example of how one of the claims could be developed into a research question**

**Claim:** The use of hormones in agriculture does not affect human health.

**Research question:** Does hormone  $x$  (i.e. recombinant bovine somatotropin rBST) affect  $y$  (i.e. human growth hormone receptors) through  $z$  (i.e. the consumption of cow's milk)?

#### **Developing the research question:**

1. Identify the key (important) terms in the claim.
  - a. hormone
  - b. agriculture
  - c. human health
2. Propose questions that need to be addressed to refine key terms and narrow the focus of the claim.
  - a. Which hormone?
  - b. Which agricultural industry?
  - c. Where is the agricultural industry located?
  - d. What effect could the addition of this hormone have on an aspect of human health?
3. Conduct research to gather information to address the questions.
  - a. Do hormones affect human health?
  - b. Are there hormones from animals in food consumed by humans?
  - c. Which hormone is found in cow's milk?
4. Draft the research question to address the claim.
  - a. Does recombinant bovine somatotropin affect human health?
5. Refine and focus the research question.
  - a. Does recombinant bovine somatotropin (rBST) affect human health through the consumption of cow's milk?
6. Present the research question to the teacher for approval.
  - a. Does hormone recombinant bovine somatotropin (rBST) affect human growth hormone receptors through the consumption of cow's milk?

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