**Stage 2 Agricultural Systems**

**Practical Investigation**

The aim of this investigation is to design an experiment to investigate a problem for which the outcome is uncertain:

Possible areas for investigation include:

The effect of storage conditions on the Vitamin C content of fruit and vegetables

The effect of pH of soil water on seed germination

The effect of earthworms on nitrogen availability for crops

The benefit of earthworms in intensive cropping systems compared with organic farming systems

**Part A: Experimental Design**

Students work individually to deconstruct a problem and design an experimental procedure to investigate one aspect of the problem. They:

* consider how various factors could affect the outcome of the investigation
* write a hypothesis
* identify the dependent and independent variables
* consider factors that should be held constant and explain why and how they will attempt to control these factors
* identify factors that may not be able to be controlled
* prepare a list of materials required
* write a procedure to test the hypothesis
* consider how the data will be displayed and analysed
* identify safety considerations.

The justified design is submitted to the teacher at the end of the lesson.

**Part B: Investigation**

Students work in pairs or small groups. In consultation with the teacher, one of the students’ procedures will be selected, and modified if appropriate, for the investigation. Students will then submit a materials and equipment request form. Each student should record their own data.

**Part C: Report**

Each student writes an individual report, which should include:

* introduction with relevant agricultural concepts, a hypothesis and variables, or investigable question and/or rationale for the design
* materials/apparatus\*
* method/procedure outlining any trials and the steps to be taken\*
* identification and management of safety and/or ethical risks\*
* results\*
* analysis of results, identifying trends, and linking results to concepts
* evaluation of procedures and data, and identifying sources of uncertainty
* conclusion and recommendations, with justification

The report should be a maximum of 1500 words if written, a maximum of 9 minutes for an oral presentation, or the equivalent in multimodal form.

\*The four asterisked sections (materials/apparatus, method/procedures, risks, and results) are excluded from the word count.

**Part D: Experimental Design**

Briefly outline an idea for a further investigation to strengthen your conclusion. Include alternative equipment and/or procedures where appropriate.

**Assessment Conditions for this task:**

This task may be completed over several weeks.

**Performance Standards for Stage 2 Agricultural Systems**

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| --- | --- | --- | --- | --- | --- | --- |
|  | | **A** | **B** | **C** | **D** | **E** |
| **Investigation, Analysis and Evaluation** | **1**  **2**  **3**  **4** | Critically deconstructs a problem and designs a logical and coherent agricultural investigation with detailed justification.  Obtains, records, and represents data, using appropriate conventions and formats accurately and highly effectively.  Systematically analyses and interprets data and evidence to formulate logical conclusions with detailed justification.  Critically and logically evaluates procedures and their effect on data. | Logically deconstructs a problem and designs a well-considered and clear agricultural investigation with reasonable justification.  Obtains, records, and represents data, using appropriate conventions and formats mostly accurately and effectively.  Logically analyses and interprets data and evidence to formulate suitable conclusions with reasonable justification.  Logically evaluates procedures and their effect on data. | Deconstructs a problem and designs a considered and generally clear agricultural investigation with some justification.  Obtains, records, and represents data, using generally appropriate conventions and formats, with some errors but generally accurately and effectively.  Undertakes some analysis and interpretation of data and evidence to formulate generally appropriate conclusions with some justification.  Evaluates procedures and some of their effect on data. | Prepares a basic deconstruction of a problem and an outline of an agricultural investigation.  Obtains, records, and represents data, using conventions and formats inconsistently with occasional accuracy and effectiveness.  Describes data and undertakes some basic interpretation to formulate a basic conclusion.  Attempts to evaluate procedures or suggest an effect on data. | Attempts a simple deconstruction of a problem and a procedure for an agricultural investigation.  Attempts to record and represent some data with limited accuracy or effectiveness.  Attempts to describe results and/or interpret data to formulate a basic conclusion.  Acknowledges that procedures affect data. |
| **Knowledge and Application** | **1**  **2**  **3**  **4** | Demonstrates deep and broad knowledge and understanding of a range of agricultural concepts.  Applies agricultural concepts highly effectively in new and familiar contexts.  Critically explores and understands in depth the interaction between agricultural science and society.  Communicates knowledge and understanding of agriculture coherently with highly effective use of appropriate terms, conventions and representations. | Demonstrates some depth and breadth of knowledge and understanding of a range of agricultural concepts.  Applies agricultural concepts mostly effectively in new and familiar contexts.  Logically explores and understands in some depth the interaction between agricultural science and society.  Communicates knowledge and understanding of agriculture mostly coherently with effective use of appropriate terms, conventions, and representations. | Demonstrates knowledge and understanding of a general range of agricultural concepts.  Applies agricultural concepts generally effectively in new or familiar contexts.  Explores and understands aspects of the interaction between agricultural science and society.  Communicates knowledge and understanding of agriculture generally effectively using some appropriate terms, conventions, and representations. | Demonstrates some basic knowledge and partial understanding of agricultural concepts.  Applies some agricultural concepts in familiar contexts.  Partially explores and recognises aspects of the interaction between agricultural science and society.  Communicates basic information about agriculture, using some appropriate terms, conventions, and/or representations. | Demonstrates some limited recognition and awareness of agricultural concepts.  Attempts to apply agricultural concepts in familiar contexts.  Attempts to explore and identify an aspect of the interaction between agricultural science and society.  Attempts to communicate information about agriculture. |