Learning experiences and sample resources

Learning experiences support the educational goals of the subject and align with assessment. Learning experiences are student-based activities that:

- provide opportunities to achieve the objectives described in the dimensions of the syllabus
- occur in authentic, relevant and worthwhile contexts
- vary in scope and depth, duration and degree of challenge
- reflect current practice in the wider community
- suit particular student needs, abilities and interests
- allow students to work independently and with others
- encourage students to think and act for themselves.

Learning experiences should provide a balance and variety of activities across the whole course and cater for the school’s context, resources and the unique characteristics of each cohort of students.

Guidelines for sample resources

The following sample resources incorporate the objectives described in the dimensions of the syllabus, include suggestions that schools could choose to follow, and offer flexibility to cater for a wide variety of students and school contexts.

These sample resources demonstrate:

- organisation and development of course content
- teaching and learning supporting the syllabus
- learning experiences that support achievement of the objectives described in the dimensions
- alignment between content, learning experiences and assessment.

Units of work

One sample unit of work is provided in this resource.

This is not a full unit of work and the materials provided are neither prescriptive nor exhaustive.

This unit of work relates to the context of increasing plant production with *Hibiscus subdantta* (Rosella).

Schools are advised to adapt teaching and learning experiences to suit their agricultural environment and the availability of resources.
Integrating areas of study

This unit of work demonstrates ways of integrating areas of study to provide authentic and relevant learning experiences for students.

When developing units that integrate areas of study, teachers should:

- identify an agricultural issue or problem as a basis for the inquiry-based investigation
- select relevant sustainable resource management factors
- develop relevant key concepts of the selected areas of study
- select key ideas which allow students to develop the depth of knowledge and understanding sufficient to demonstrate the key concepts
- adopt an inquiry-based approach (where possible) to sequence and design authentic and relevant learning experiences which allow students to:
  - engage with the selected agricultural issue or problem
  - participate in inquiry-based learning through developing syllabus objectives
  - develop the knowledge and skills required to respond to the assessment instrument (i.e. practise the elements of the chosen assessment genre).

Within learning experiences listed here, the term ‘investigate’ has been used to encapsulate the objectives of the dimension, Investigation and analysis. Teachers develop a range of learning experiences to guide students as they work through the inquiry process. This may include learning experiences that provide opportunities for students to:

- formulate questions, hypotheses and plans for agricultural investigations
- collect and organise agricultural information
- analyse agricultural information from primary and secondary sources
- interpret agricultural information to compare research results and agricultural industry standards.
Unit title: Increasing plant production — *Hibiscus subdantta*

### Inquiry: How can the production of Rosella plants *Hibiscus subdantta* and profit be increased?

| Dimensions | Knowledge and understanding  
| Investigation and analysis  
| Evaluation and communication |
| Sustainable resource management factors | SRM1 Plant and animal management  
| SRM2 Soil and water management |
| Areas of study | Plant science (PS)  
| Agribusiness (AB) |
| Key concepts | PS1 The potential of agricultural production systems is based on the anatomy and physiology of agricultural plants.  
| PS2 The agronomy of agricultural plants determines the efficiency of production systems.  
| AB1 Agriculture is central to national and international economies, supplying food, fibres and other products.  
| AB2 Management and strategic decision making across the supply chain determine short and long-term success of an agricultural enterprise. |

### Suggested time allocation

55 hours; Year 11

### Learning experiences

Define, describe and explain the anatomy of plants (e.g. cells, tissues and organs). Dissect *Hibiscus subdantta* plants and various other specimens to observe these anatomical structures. Sketch key features. Define, describe and explain the anatomical structures and physiological functions of plant systems. Identify these in specimens. Draw models of plant systems, outlining nutrient requirements and flow of nutrients.

Explain the range of factors which influence plant growth. Factors that could be tested include:

- soil texture and structure  
- nutrient availability and use of chemical fertilisers  
- nutrient cycle management  
- soil management techniques  
- soil degradation potentials (e.g. salinity, acidification, nutrient decline)  
- desiccation agents (e.g. light intensity, temperature, water management).

Conduct secondary research on these factors to determine which may add value to this plant. Formulate questions and hypotheses that outline the effects that manipulating certain factors may have on plant growth.

As a class, conduct experiments to identify a range of these factors which influence plant growth. Maintain a class scientific journal as you record findings. Analyse and interpret results to determine how these factors affect plant growth. Evaluate analyses to make decisions regarding the effect of factors on plant growth.

The inquiry is framed as a question. The inquiry question could be developed using sub-questions, e.g. Which factors have the greatest impact on Rosella production? How can these factors be altered at the best price? During which growth phase can these factors have the greatest impact? Key concepts relevant to this inquiry are selected. Learning experiences are developed using the syllabus objectives and key ideas. Experimental methods are modelled to Year 11 students. Experimentation in Agricultural Science may take place over a number of weeks. Trialling experiments allows students to determine factors they may wish to investigate.
Learning experiences

**Evaluate research methods** to make recommendations for the future.

Define, describe and explain integrated pest management approaches and their effects on crop health.
Analyse each of these methods, trial if possible and evaluate the effects on increases in productivity.
Conduct a **risk assessment** for any chemicals used in this process.
Analyse the impacts these may have on profit.

Dissect the reproductive system of Hibiscus subdantta specimens to identify the anatomical structures and physiological functions.
Investigate the reproductive processes, strategies, stages and timing of these plants.
Apply findings to determine timing for investigations.

Throughout the experiment, consider the Hibiscus subdantta specimens to determine the diversity of products that may be harvested.
As a class, select products and investigate harvesting methods.
**Invite a guest speaker** who is involved in harvesting products to discuss various methods.

Define, describe and explain the components of budgeting, record keeping and other business skills.
Track inputs and outputs while experimenting, along with associated costs.
Analyse the impact of these factors on potential profits.

Investigate a variety of marketing strategies. Compare a number of marketing strategies based on secondary research of competitor businesses.
Analyse, interpret and evaluate strategies to determine those suitable for the selected product.
Devises a **marketing strategy as a class**.

Harvest, market and sell products if possible and calculate returns on investment.
Analyse the quality of the harvested products to determine the effects of these factors on the plant.
Interpret the information by comparing research results and industry standards.
Analyse the costs/profits to determine the viability of this operation.
Visit a local agricultural production system to see this process first-hand.

Establish small groups for conducting an extended agricultural investigation (EAI).
Define, describe and explain business ownership structures and determine roles and responsibilities for team members during the EAI.
Groups formulate questions, hypotheses and plans for investigation.
Groups complete risk assessments. Analyse and evaluate risk management strategies to determine the viable options for this experiment.

Collect agricultural information gathered during the EAI in a **scientific journal**.
Organise the information into tables, graphs, flow charts or diagrams to make meaning of the information.

Define, describe and explain supply and demand rates.
Students investigate market interest (via surveys or market research) to determine a fair price for this product.
As a group, harvest and process the selected product.
Develop quality assurance processes to align products to market specifications.
Develop and enact a **marketing strategy** to sell the product.

Analyse the quality of the harvested products.
Interpret the information by comparing results to industry standards.
Learning experiences

Collect and organise financial information to determine profit/loss. Analyse and evaluate financial information to determine the viability of this value-adding strategy.

Evaluate the analyses. Make and justify conclusions, decisions and recommendations for future ventures.
Evaluate experimental procedures to make and justify conclusions, decisions and recommendations for future experimentation.

Teach the elements of presenting persuasive texts to an audience.
Students prepare a presentation for investors to share findings.
Provide feedback on presentation preparations that align to this stage of the course.

Possible assessments

Three possible assessment ideas are provided here to model the ways in which assessment may be developed in Agricultural Science. These examples are neither prescriptive nor exhaustive.

Possible Assessment A

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Extended research response: Extended agricultural investigation (multimodal presentation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions and objectives</td>
<td>Knowledge and understanding • explain agricultural systems using agricultural concepts • apply understandings to agricultural issues and problems.</td>
</tr>
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<td>Investigation and analysis • formulate questions, hypotheses and plans for agricultural investigations • collect and organise agricultural information • analyse agricultural information from primary and secondary sources • interpret agricultural information to compare research results and agricultural industry standards</td>
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<tr>
<td></td>
<td>Evaluation and communication • evaluate agricultural information to draw conclusions, and make decisions and recommendations • justify conclusions, decisions and recommendations about agricultural issues and problems • communicate using language conventions to suit audiences and purposes</td>
</tr>
<tr>
<td>Possible task</td>
<td>Plan and conduct an extended agricultural investigation (EAI) in which you grow, harvest, market and sell Rosellas. Your goal is to produce the most/best product at the lowest cost by adding value to your product. Prepare a multimodal presentation for a panel of agricultural investors to showcase the findings of your investigation. You should outline your investigation, including the biotic and abiotic factors that influenced plant growth. Further, you should analyse all costs and evaluate the experiment to determine the overall profit from this venture. Present to your class, persuading these acting-investors to invest in your selected value-adding method.</td>
</tr>
<tr>
<td>Conditions</td>
<td>3–5 minutes Scientific journal must be submitted</td>
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</tbody>
</table>

if developing Assessment A or C, teach the principles of effective presentations.

An assessment technique is selected to suit the inquiry and the stage of learning.

Determining an audience and purpose can assist students in selecting appropriate language.

Conditions reflect the syllabus guidelines.
### Possible Assessment B

<table>
<thead>
<tr>
<th>Assessment technique</th>
<th>Extended research response: Written report (Marketing plan)</th>
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</thead>
</table>
| **Dimensions and objectives** | **Knowledge and understanding**  
- explain agricultural systems using agricultural concepts  
- apply understandings to agricultural issues and problems  
  
**Investigation and analysis**  
- collect and organise agricultural information  
- analyse agricultural information from primary and secondary sources  
- interpret agricultural information to compare research results and agricultural industry standards  
  
**Evaluation and communication**  
- evaluate agricultural information to draw conclusions, and make decisions and recommendations  
- justify conclusions, decisions and recommendations about agricultural issues and problems  
- communicate using language conventions to suit audiences and purposes  |
| **Possible task** | As a class, you conducted an extended agricultural investigation in which you grew and harvested Rosellas. Your teacher has asked you to develop a method for processing and marketing a Rosella product. Your task is to prepare a marketing plan in which you propose a processing and marketing strategy. You should outline your proposed methods of processing and marketing and the associated costs, undertaking an analysis of the financial information. Evaluate your marketing plan to make recommendations for action. You will present your marketing report to the teacher who will select the most suitable method for the class to undertake. Providing information about the EAI results is essential and should be used to enhance your marketing plan. |
| **Conditions** | 800–1000 words |

A specialised genre has been selected here due to teacher expertise. Learning experiences are constructed to teach students the conventions of this genre.

Tasks are designed to provide students with opportunities to demonstrate the objectives.
**Possible Assessment C**

<table>
<thead>
<tr>
<th>Assessment technique</th>
<th><strong>Extended research response:</strong></th>
<th>Spoken presentation (pitch to investors)</th>
</tr>
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<tr>
<td><strong>Possible assessment task</strong></td>
<td><strong>As a class, you conducted an investigation in which you grew, harvested, marketed and sold Rosellas.</strong></td>
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<td>Using your learning from this task, you are to select an alternative plant resource (raw product) to determine value-adding opportunities.</td>
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<td>Complete a process of decision-making to select one final product to be made/processed, marketed and sold to the school community.</td>
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<td><strong>Formulate questions, hypotheses and plans and conduct an EAI</strong> to create a sample to showcase to consumers.</td>
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<td></td>
<td><strong>Analyse</strong> and interpret your findings to determine the viability of your product. <strong>Evaluate</strong> the process and make recommendations for future experimentation.</td>
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<td>Complete a scientific journal as you conduct your experiment.</td>
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<td>Present your findings through a spoken presentation to a focus group of school-based consumers to convince them to invest in your idea.</td>
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<tr>
<td><strong>Conditions</strong></td>
<td>3–4 minutes</td>
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<tr>
<td></td>
<td><strong>Scientific journal must be submitted</strong></td>
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