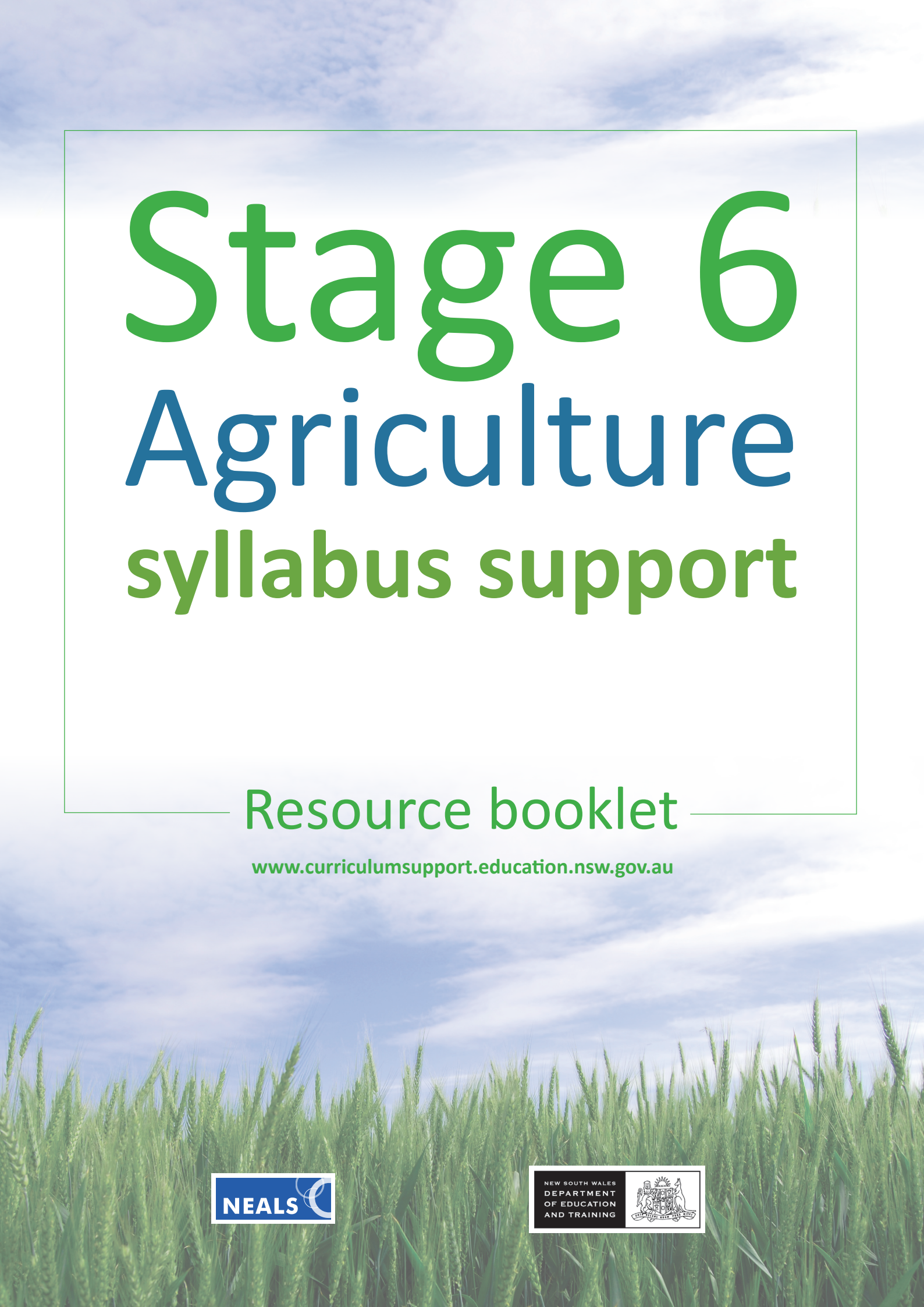
Stage 6 Agriculture syllabus support

Resource booklet

www.curriculumsupport.education.nsw.gov.au



NEALS

NEW SOUTH WALES DEPARTMENT OF EDUCATION AND TRAINING

Acknowledgements

The Technology Unit of the Curriculum K–12 Directorate has developed professional learning workshops for secondary agriculture teachers in NSW public schools to provide practical strategies and resources to support teachers of Stage 6 Agriculture.

Materials developed by:

David Randall	Richmond High School
Arthur Kelly	Camden High School

The following people contributed to the consultation and development process of these materials:

Sally Bannerman	Curriculum K-12 Directorate
Peter Annetts	Cherrybrook Technology High School
Megan Chandler	Narara Valley High School
Phillip Hurst	Hawkesbury High School
Grant Jackson	Gosford High School
Julie King	Curriculum K-12 Directorate
Samantha McAuliffe	Mount View High School
Michael Roffey	Erskine Park High School
Liz Ruis	Windsor High School
Sheryl Thornthwaite	Galston High School

For more information contact:
Julie King
R/Manager Technology
julie.king@det.nsw.edu.au

Contents

Programming planning tool 4

What ECAT is and does 6

Stage 6 Preliminary Agriculture Unit 3: Plant production 8

Analysing an agricultural research study 12

Written paper marking process 14

Glossary of key words 15

Marking guidelines questions 4 and 8 18

2009 examination notes 20

Web sites 26

	Activities on school farm, local resources.	School based dates	Unit ideas	Assessment tasks
Prelim Term 1				
Prelim Term 2				
Prelim Term 3				

	Activities on school farm, local resources.	School based dates	Unit ideas	Assessment tasks
HSC Term 4				
HSC Term 1				
HSC Term 2				
HSC Term 3				

What ECAT is and does

ECAT is an *Excel* spreadsheet. It can be used as *either*

- a way of checking that your existing course plan (or program) addresses the content (dot points, *learn tos*, *learn abouts*) from the syllabus

or

- a way of ensuring that a course plan in the process of development covers the content in an even way *as it is written*.

This tool cannot produce a unit of work, course plan or program. It cannot think of strategies or activities. It was never intended to do this.

Provides a somewhat less tedious way (compared to doing it manually) to cross check content from the course plan and the syllabus. It makes it obvious if there is content left out. It also makes the user aware if content is often revisited.

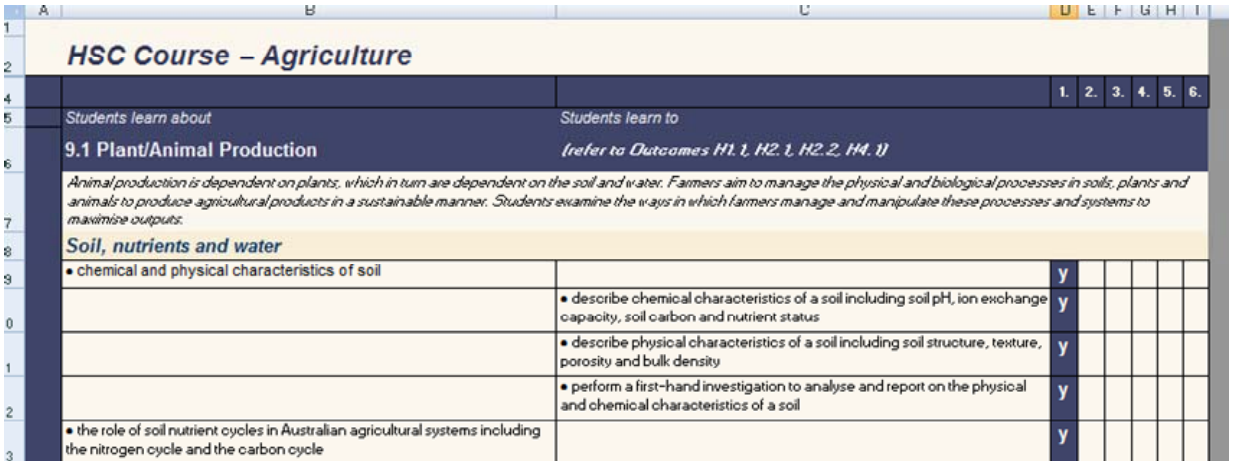
If the course plan or the program is already written, the user would work through the program, entering content in the ECAT. If the plan or program is being developed, the user would work through the ECAT, thinking of strategies and activities.

Instructions

There is an ECAT for the Preliminary course and one for the HSC course. Both spreadsheets work in much the same way. Screen shots are from the HSC course.

Open the file and save it immediately using a different name to be sure you are working with a copy, not the original.

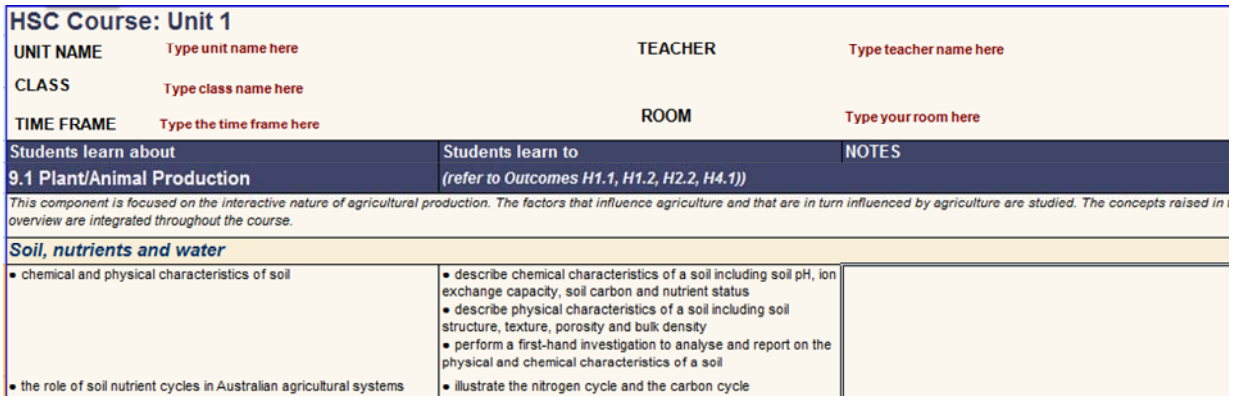
When the document opens, you will see the screen below. As you scroll down you will see that the *learn abouts* and *learn tos* from the entire course are listed. Where you find content in the unit of work that matches with the syllabus, fill in a 'Y' in the row matching the syllabus content and in the column matching the unit.



HSC Course – Agriculture

Students learn about	Students learn to	1.	2.	3.	4.	5.	6.
9.1 Plant/Animal Production	*(refer to Outcomes H1.1, H2.1, H2.2, H4.1)*						
Animal production is dependent on plants, which in turn are dependent on the soil and water. Farmers aim to manage the physical and biological processes in soils, plants and animals to produce agricultural products in a sustainable manner. Students examine the ways in which farmers manage and manipulate these processes and systems to maximise outputs.							
Soil, nutrients and water							
• chemical and physical characteristics of soil		y					
	• describe chemical characteristics of a soil including soil pH, ion exchange capacity, soil carbon and nutrient status	y					
	• describe physical characteristics of a soil including soil structure, texture, porosity and bulk density	y					
	• perform a first-hand investigation to analyse and report on the physical and chemical characteristics of a soil	y					
• the role of soil nutrient cycles in Australian agricultural systems including the nitrogen cycle and the carbon cycle		y					

- In the example above, a 'y' has been entered in 5 cells. This means that in unit 1,two *learn abouts* have been covered for Soil, nutrients and water and three *learn tos*.
- Now select the unit you want to work on from the bottom bar. Save the spreadsheet.
- Note that content from the syllabus has been copied to this sheet wherever a 'y' was entered on the previous sheet.



HSC Course: Unit 1

UNIT NAME	Type unit name here	TEACHER	Type teacher name here
CLASS	Type class name here		
TIME FRAME	Type the time frame here	ROOM	Type your room here

Students learn about	Students learn to	NOTES
9.1 Plant/Animal Production	*(refer to Outcomes H1.1, H1.2, H2.2, H4.1))*	
This component is focused on the interactive nature of agricultural production. The factors that influence agriculture and that are in turn influenced by agriculture are studied. The concepts raised in overview are integrated throughout the course.		
Soil, nutrients and water		
• chemical and physical characteristics of soil	• describe chemical characteristics of a soil including soil pH, ion exchange capacity, soil carbon and nutrient status • describe physical characteristics of a soil including soil structure, texture, porosity and bulk density • perform a first-hand investigation to analyse and report on the physical and chemical characteristics of a soil	
• the role of soil nutrient cycles in Australian agricultural systems	• illustrate the nitrogen cycle and the carbon cycle	

- Enter the unit name, class, time frame, teacher and room.
- Adjust the height of appropriate cells so that all data can be seen.
- You can enter notes that may be useful to you in the programming process.
- You can also transfer the syllabus content and comments to a teaching and learning sequence by copying and pasting.
- Before you print the document, ensure that the correct print area is set. This may save you accidentally printing pages of empty cells. The simplest way to do this is to adjust the page breaks
- Check on *Print Preview* which pages you need to print.

Stage 6 Preliminary Agriculture Unit 3: Plant production

Unit 3: Plant production Timing: 9 weeks

Outcomes

A student:

P2.1 describes the biological and physical resources and applies the processes that cause changes in plant production systems

P3.1 describes the role of decision-making in management and marketing of agricultural products in response to consumer and market requirements

P4.1 applies the principles and procedures of experimental design and agricultural research.

P5.1 investigates the role of associated technologies and technological innovation in producing and marketing agricultural products

Resources: Bread video and w/sheets, strawberry runners, plant cuttings, soil test kit, fertilisers for practical tests, maize / radish seeds, newspapers / magazines, Ag-facts for pest/disease research & legume inoculation prac., Narara Hort. Res. Station (DPI), Texts, Internet.

Students learn about	Students learn to	Strategies and activities	Outcomes	Register
Plants and their commercial production • basic morphology and function of leaves, stems, roots, flowers and fruits • regionally significant plants • consumer and market requirements for commercial plant products	• describe the functions of leaves, stems, roots, flowers, seeds and fruits • distinguish between the external and internal anatomy of monocotyledons and dicotyledons • identify a range of regionally significant plants • recognise the features of plant products that are important to consumers	**Plant production** – collect a variety of plants from the school farm, label their parts and identify differences in leaves, roots, flowers and seeds – list range of crops grown in the district, native and introduced pastures, dominant trees, significant weeds – collect, press, dry and identify pasture species	P2.1	

Students learn about	Students learn to	Strategies and activities	Outcomes	Register
• propagation techniques	• propagate plants by sexual and asexual methods • grow and monitor a crop/pasture from planting through to harvest	– grow plants using a variety of propagation techniques, e.g. strawberry runners, potatoes, cuttings, budding and grafting		
Animals, climate and resource interaction • effects of soil texture, structure, pH and fertility on plant production	• measure and describe the features of soil, including colour, texture, structure, pH, organic matter, parent material and water-holding capacity	**Interactions** – make notes on effects of climate, animals and resource interactions on plant production (refer to farm case study) – observe and compare structure and texture of two different soils; measure soil pH, clay dispersion tests, infiltration and drainage rates, OM content. – define meaning of the terms texture and structure – analyse and identify components of a soil		
• inorganic and organic fertilisers	• identify macro and micro nutrients important for plant growth • select fertiliser(s) appropriate to the soil and the requirements of the crop/pasture	**Practical Test:** Effect of fertilisers on soil pH		
• cultivation and/or grazing practices	• select appropriate tillage implements and/or techniques to establish a crop or pasture • outline various grazing practices	• compare tillage methods, e.g. conventional, minimum till, direct drill • discuss grazing management, e.g. feedlotting, time control grazing, effects of stock on pastures.	P2.1	
• management for sustainable production	• recognise sustainable management practices including crop rotation, green manuring, minimum tillage and mulching	• discuss systems used in local district, zero till, tree planting, landcare issues • observe pasture species and discuss in relation to amount and seasonal distribution of rainfall, e.g. chemical fallowing to conserve moisture, water-holding capacity of soils etc		

Students learn about	Students learn to	Strategies and activities	Outcomes	Register
• effective rainfall and the concept of the growing season	• collect and use meteorological data such as temperature, rainfall and evaporation • outline one important disease and one pest for a selected crop/pasture • outline the role of beneficial organisms in plant production systems	**Climate** • collect annual rainfall/temperature data from Narara Research Station/internet (www.bureauofmeteorology.com.gov.au) • graph monthly average rainfall/temperature • **Plant and grow maize** (sow before end Term 4) • plant plots at 3 different densities (to use in HSC interference trial) • collect, draw and label stages of growth. • research information on fertilisers, herbicides, disease control and marketing of maize.	P5.1	
Microbes, invertebrates and pests • the nature and impact on plant production systems of microbes, invertebrates and pests	• evaluate methods that can be used to control or prevent plant pests and diseases	**Pests and diseases** • research information and write a report on one regionally significant crop pest or disease, lucerne aphid, white fly (tomatoes), mentioning causes, symptoms, effects, e.g. effect on plant and product, use of resistant varieties and control/prevention	P4.1	
Technology • use of technologies in producing and marketing plant products	• research and describe a current technology in plant production or marketing	**Technology** • Review technology used on case study farm, e.g. haymaking equipment, greenhouse production, tunnel ventilated broiler sheds, NLIS tags for cattle		

Students learn about	Students learn to	Strategies and activities	Outcomes	Register
Experimental design and research • elements of experimental design • collection and simple analysis of data • recent research findings that contribute to plant production systems	• recognise elements of experimental design including control, randomisation, replication and standardisation of conditions • conduct a simple plant trial using appropriate methodology • calculate mean and standard deviation using trial data • use a range of sources to gather information about a specific agricultural problem or situation in plant production systems	etc **Biometry** – write definitions of terms used in biometry, e.g. mean, mode, range, median etc – design and conduct a simple plant trial/experiment, e.g. legume inoculation experiment – Experiment to include: • treatment (inoculum) • control (no inoculum) – replication (10 replicates of each legume seed) – randomization (randomly place test tubes in racks) – standardization (same conditions, e.g. temperature, light, humidity, agar etc) – from experimental results calculate mean, mode, median and range – draw conclusion and formulate recommendations – construct a suitable graph of results		

Analysing an agricultural research study

Project title:

Authors of the study:

Project location:

Project aim or research question under study:

Background information. What lead to this study being undertaken?

Research methodology

Treatments:

Control:

Standardisation:

Replication:

Randomisation:

Possible improvements in experimental design:

Data collection and analysis

What data was collected?

How was this data collected?

How was the data presented?

Was the data presentation effective in conveying the results? Why/not?

How was the data analysed?

Could the data collection, presentation and/or analysis have been improved in any way? Explain.

Conclusions. What findings were made from the research?

Of what value are these findings to farmers? (ie production benefits, cost savings etc)

Further research that might arise from this project:

How does this research relate to the efficient use and conservation of water?

Ethical issues involved in this research:

Written paper marking process

1. The written marking operation is managed by the Supervisor of Marking supported by the Chairperson of the Exam Committee and a number of Senior Markers.
2. Each senior marker supervises a team of approximately 6 markers, all of whom mark a single examination question, e.g. Question 1.
3. When the examination paper is written it includes a set of marking criteria which are used to guide the marking process.
4. Marking commences with the Senior Markers reviewing the marking criteria for their question, marking a sample of exam scripts to familiarise themselves with the criteria.
5. The senior marker copies scripts showing a range of responses. These are used to allow markers to discuss issues and identify where marks should be awarded.
6. A number of exam scripts are selected and marked by the team of markers to ensure the marking criteria are applied consistently by all markers. This process continues until all markers are consistently applying the marking guidelines.
7. Markers commence marking written scripts, these are sample checked by the Senior Marker for accuracy. At regular intervals a control script is marked to ensure markers are not deviating from the marking criteria.
8. The NSW Board of Studies has a pilot program using online marking, markers work at computers and scanned student scripts are electronically delivered to them. This program may also be extended to domestic marking. This will allow more teachers to participate in HSC marking.

A Glossary of Key Words

This glossary contains key words that appear frequently in Board of Studies syllabuses, performance descriptions and examinations.

The purpose behind the glossary is to help students prepare better for the HSC by showing them that certain key words are used similarly in examination questions across the different subjects they are studying.

In classrooms, teachers of different subjects could use the glossary to help students to better understand what the examination questions in their subject require. Students should recognise the consistent approach of teachers of different subjects and get cues about how to approach examination questions.

For example, students would be better placed to respond to 'explain' questions if, in the context of different subjects, they developed an understanding that 'explain' could require them to relate cause and effect; make the relationships between things evident; provide why and/or how.

It is also important that the key words should not be interpreted in an overly prescriptive way. Teachers must ensure that they do not use them in ways that conflict with their particular meaning within subjects. To do this would be counterproductive. A term like 'evaluate', for example, requires a different kind of response in Mathematics from that required in History and this needs to be respected.

When using key words to construct questions, tasks and marking schemes, it is helpful to ask what the use of the term in a particular question requires students to do.

Key words are best discussed with students in the context of questions and tasks they are working on, rather than in isolation.

It is important to note that examination questions for the HSC will continue to use self-explanatory terms such as 'how', or 'why' or 'to what extent'. While key words have a purpose, they will not set limits on legitimate subject-based questions in examination papers.

Account

Account for: state reasons for, report on. Give an account of: narrate a series of events or transactions

Analyse

Identify components and the relationship between them; draw out and relate implications

Apply

Use, utilise, employ in a particular situation

Appreciate

Make a judgement about the value of

Assess

Make a judgement of value, quality, outcomes, results or size

Calculate

Ascertain/determine from given facts, figures or information

Clarify
Make clear or plain

Classify
Arrange or include in classes/categories

Compare
Show how things are similar or different

Construct
Make; build; put together items or arguments

Contrast
Show how things are different or opposite

Critically (analyse / evaluate)
Add a degree or level of accuracy depth, knowledge and understanding, logic, questioning, reflection and quality to (analyse/evaluate)

Deduce
Draw conclusions

Define
State meaning and identify essential qualities

Demonstrate
Show by example

Describe
Provide characteristics and features

Discuss
Identify issues and provide points for and/or against

Distinguish
Recognise or note/indicate as being distinct or different from; to note differences between

Evaluate
Make a judgement based on criteria; determine the value of

Examine
Inquire into

Explain
Relate cause and effect; make the relationships between things evident; provide why and/or how

Extract
Choose relevant and/or appropriate details

Extrapolate
Infer from what is known

Identify
Recognise and name

Interpret
Draw meaning from

Investigate
Plan, inquire into and draw conclusions about

Justify
Support an argument or conclusion

Outline
Sketch in general terms; indicate the main features of

Predict
Suggest what may happen based on available information

Propose
Put forward (for example a point of view, idea, argument, suggestion) for consideration or action

Recall
Present remembered ideas, facts or experiences

Recommend
Provide reasons in favour

Recount
Retell a series of events

Summarise
Express, concisely, the relevant details

Synthesise
Putting together various elements to make a whole

Question 4 (a) (i)

Outcomes assessed: H2.1

MARKING GUIDELINES Criteria	Marks
• Suggests ALL of the correct months for sowing wheat	2
• Suggests at least TWO of the correct months for sowing wheat	1

Question 4 (a) (ii)

Outcomes assessed: H2.1

MARKING GUIDELINES Criteria	Marks
• Shows the relationship between the time of year for growth and temperature at germination on crop production	3
• Shows relationship between the time of year for growth and temperature at germination	2
• Identifies the range of temperature important for millet germination above 80% OR • Outlines how germination leads to the growth of millet OR • Identifies an environmental factor, other than temperature, that may affect germination or plant growth	1

Question 4 (b)

Outcomes assessed: H2.1

MARKING GUIDELINES Criteria	Marks
• Sketches in general terms the genetic basis of a method of plant breeding that improves plant quality/ productivity aspects of plants	3–4
• Sketches in general terms the method of plant breeding OR • Sketches in general terms the quality/ productivity trait	2
• Identifies a method of plant breeding OR • Identifies a quality or productivity trait that can be bred for	1

Question 4 (c)

Outcomes assessed: H2.1

MARKING GUIDELINES Criteria	Marks
• Identifies issues and provides points for and/or against the use of introduced pasture species in Australian pasture production systems	5–6
• Identifies an issue and provides points for and/or against the use of introduced pasture species in Australian pasture production systems OR • Outlines reasons for and/or against the use of introduced pasture species in Australian pasture production systems	3–4
• Outlines a reason for and/or against the use of introduced pasture species in Australian pasture production systems OR • Identifies one reason for and/or against the use of introduced pasture species	1–2

Question 6 (a) *Outcomes assessed: H3.1*

MARKING GUIDELINES Criteria	Marks
• Provides characteristics and features of how the changes in farm ownership has affected Australian agriculture	5
• Provides characteristics and features of farm ownership in Australian agriculture	3–4
• Identifies a type of farm ownership OR • Identifies a change in farm ownership	1–2

Question 6 (b)

Outcomes assessed: H3.3

MARKING GUIDELINES Criteria	Marks
• Identifies issues and provides a number of points for and/or against strategies farmers can use to manage risk associated with the changing costs of farm inputs and irregular income	9–10
• Provides some points for and/or against strategies farmers can use to manage risk associated with the changing costs of farm inputs and irregular levels of income	7–8
• Provides characteristics and features of the risk associated with changing costs of inputs and irregular levels of income	5–6
• Outlines how farmers can manage risks associated with the changing costs of inputs and irregular levels of income	3–4
• Outlines how income can fluctuate OR • Identifies the risks associated with an enterprise OR • Identifies costs associated with inputs	1–2

2009 HSC Notes from the Marking Centre – Agriculture

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Agriculture. It contains comments on candidate responses to the 2009 Higher School Certificate examination, indicating the quality of the responses and highlighting their relative strengths and weaknesses.

This document should be read along with the relevant syllabus, the 2009 Higher School Certificate examination, the marking guidelines and other support documents which have been developed by the Board of Studies to assist in the teaching and learning of Agriculture.

General comments

Teachers and candidates should be aware that examiners may ask questions that address the syllabus outcomes in a manner that requires candidates to respond by integrating their knowledge, understanding and skills developed through studying the course. It is important to understand that the Preliminary course is assumed knowledge for the HSC course.

Candidates need to be aware that the mark allocated to the question and the answer space (where this is provided on the examination paper) are a guide to the length of the required response. A longer response will not in itself lead to higher marks. Writing far beyond the indicated space may reduce the time available for answering other questions.

Candidates need to be familiar with the Board's Glossary of Key Words which contains some terms commonly used in examination questions. However, candidates should also be aware that not all questions will start with or contain one of the key words from the glossary. Questions such as 'how?', 'why?' or 'to what extent?' may be asked or verbs may be used which are not included in the glossary, such as 'design', 'translate' or 'list'.

Paper 1

Section I

Question 1

a. Better responses named a process that occurred at X, for example harvesting, shearing, pasteurisation, and then outlined the process.

b. Better responses named a marketing strategy at Y, for example value adding or promotion, and described the marketing strategy.

c. Better responses described the relationship between supply and demand of their named farm product on the price paid by consumers. These responses also usually provided specific examples to help illustrate the answer.

Question 2

a.

i. Better responses identified 50 kg/ha as being the rate of fertiliser application that gave maximum dry matter yield in grasses.

ii. Better responses recognised that legumes produce their own nitrogen and are thus less responsive to nitrogen fertiliser than are grasses. They gave relevant details of the nitrogen fixation process. Weaker responses did not make the link between legumes and nitrogen fixation.

b. Better responses linked the overuse of fertilisers to runoff into waterways, algal blooms, eutrophication and the subsequent impacts on aquatic life. Many also stated that the application of fertilisers caused an increase in soil acidity. Weaker responses typically identified an impact of fertilisers on the environment without providing relevant detail or simply outlined the effects of fertiliser usage on plant growth.

Question 3

a. Better responses identified the control in the trial as an application rate of 0 (zero) litres per hectare.

b. In the best responses, candidates stated that the role of this control was as a nil treatment to provide a basis of comparison for the treatments and that it indicated that the differences in results were due to treatment effect and not just normal variations.

Mid-range responses demonstrated a general understanding of the basis of comparison.

c. Better responses calculated the cost of 1 litre of Chlorothalanil as $30 per litre. Weaker responses did not ascertain the fixed application cost from the data in the table, considering the application rate of 0 had no associated cost.

d. Better responses clearly outlined two factors required for consideration and related these to the decision whether or not to apply a fungicide on chickpeas.

Mid-range responses outlined factors. Weaker responses simply stated a number of factors and provided no explanation.

Section II

Question 4

a.

i. In better responses, candidates named all months from April to September or stated months where the temperature ranged from 0–10ºC. Weaker responses did not identify the full range of correct months.

ii. In better responses, candidates understood from the data given that millet was a summer growing crop and that October sowing allowed optimal growth and productivity. They recognised that germination and growth were different processes and that soil temperature is not the only factor in choice of sowing time. Weaker responses simply identified a relationship between temperature and germination and/or re-presented the data provided.

b. Better responses identified a method used and demonstrated an understanding of the genetics behind the process. They were illustrated with a productivity trait or quality. Weaker responses named a method or identified parts of the process involved but did not outline the generic basis of the method.

c. Stronger responses discussed the advantages and disadvantages of introduced pastures, providing examples and discussing their use and impact on sustainable production systems. Weaker responses listed the characteristics of the introduced pastures systems but did not discuss their role or impact in pasture production systems, for example to increase carrying capacity, provide soil nitrogen, reduce soil structure decline. Some weaker responses did not distinguish between pastures and crops.

Question 5

a.

i. In better responses, candidates identified a trend from the graph or compared the optimum to at least one other live weight with a lower lambing percentage.

ii. In better responses, candidates showed clearly how a management practice would assist farmers to manage ewes to an optimum weight to maximise lambing percentages. Weaker responses often re-stated weights and lambing percentages from the graph or identified a management practice but failed to provide enough detail for this management practice.

b. Better responses included the identification of two differences (usually shade and sticking rate) and explained how these differences affected the animals and linked this to the variation in growth rates for each pen. Weaker responses identified differences without linking these to effects on growth rate.

c. Better responses displayed an understanding of hormones and their role in both reproduction and behaviour. These responses also provided diagrams and a number of examples.

Mid-range responses gave general outlines of the role of one or more hormones on either reproduction or behaviour.

The weakest responses reflected limited understanding of the hormones involved in animal reproduction and behaviour. Some weaker responses described other animal hormones not involved in reproduction.

Section III

Question 6

a. Better responses clearly identified a form of change in farm ownership and described the changes. The best responses described the effect that the change has had on production, society or the industry.

   Weaker responses did not describe a change in the nature of ownership, but discussed a change in the same form of ownership, for example farmer to farmer.

b. Better responses clearly identified and discussed strategies which are used to manage the risk associated with changing costs as well as those used to reduce the risk of irregular levels of income.

Question 7

a. Better responses provided the key links between land use practices and soil salinity levels. Mid-range responses identified land use practices that resulted in soil salinity.

b. Better responses explained the factors and the implications of these for the farmer's decision-making.

Question 8

a. Better responses included the key steps in photosynthesis. The best responses linked the key steps to specific examples of growth in plants (for example, elongation of stems, cell division).

b. Better responses described techniques to manage plant interference and related this to improvement in plant productivity. The best responses provided a value judgement on the techniques described.

Question 9

a. Better responses outlined nutritional requirements (for example protein, fats, carbohydrates) for a named animal. They also explained the link between each of those requirements and the function they have in the animal.

   Some weaker responses made general statements such as 'feed is needed for growth' but did not name a specific nutritional requirement. Other weaker responses named a nutritional requirement but did not link the requirement to the function it has in the animal's metabolism.

b. Better responses accounted for more than one impact that publicity has on animal production systems. These responses also made a judgement on the value/outcome of this impact on animal production systems.

Paper 2

Question 1 – Agribusiness

a. Better responses provided characteristics and features of the research methodology used in the study.

b. Better responses compared these organisations, identifying similarities and/or differences. Mid-range responses outlined the features of the nominated advisory services.

c. The best responses included a judgement on the value of the impacts of international markets on farm businesses. Mid-range responses described how features impact on farm business.

Question 2 – Animal management

a. Better responses identified a study of a current technique/technology, and stated reasons why the data was collected.

b. Better responses outlined the relationship between a vaccine and an animal's immune system, and how this prevented disease. They also gave examples of vaccines.

Mid-range responses related the vaccine injection to the body's response. Weaker responses outlined the process of injecting an animal with a vaccine.

c. Better responses provided a detailed account of a technique that is available to farmers to manipulate animal reproductive efficiency, identified features of the technique and provided a judgement on the value of this technique.

Mid-range responses described the technique with some features but did not provide a judgement. Weaker responses only named a technique and outlined the technique briefly.

Question 3 – Horticulture

a. The best responses described methods of presenting results and linked the results to the horticulture industry.

Weaker responses reiterated the question without naming a study or providing an example of how the results of a study were reported.

b. Better responses clearly linked the characteristic to a use in horticulture.

Weaker responses sketched in general terms the features or physiology of plants and did not clearly provide a link to a horticultural use.

c. Better responses provided a well-written, clearly defined example of a post-harvest handling technique such as a cooling chain process or the influence of a changing market on fruit production. These responses provided examples within the horticulture industry that dealt with market influences or post-harvest processes and placed a value on the resulting change in production systems.

Weaker responses did not provide examples or a link to the impact on production systems and generalised the influence of supply and demand in the marketplace.

Question 4 – Innovation and diversification

a. Better responses named an experiment and described features of the findings from a study. Weaker responses identified a study but provided no features of the findings.

b. Weaker responses provided features of the innovation rather than the marketing technique, or failed to use features or compare their effectiveness.

c. Better responses provided some environmental, occupational health and safety and animal health (POCTA) requirements and described some of the requirements of marketing organisations. They provided a judgement on the value of meeting such requirements.

   Weaker responses were more general and could not separate institutional or legal requirements.

Question 5 – Plant management

a. The better responses provided characteristics and features of the way data was analysed in a specific study.

   Weaker responses provided considerable information describing a trial but did not address any aspect of data analysis.

b. The better responses related the uptake and movement of soluble plant nutrients by diffusion from the soil solution across concentration gradients in cells and membranes of plants.

   Mid-range responses addressed nutrient movement into roots via osmosis. The weaker responses identified the presence of nutrients in the soil.

c. The best responses provided a detailed account of techniques and provided an in-depth judgement against various criteria.

   Mid-range responses identified and describe two suitable techniques to manage soil moisture, for example irrigation, mulching, stubble retention.

Question 6 – Sustainable management

b. Better responses demonstrated an understanding of the importance of water regulation in Australian agriculture and explained the implications of such regulations.

   Weaker responses tended to use more urban examples of water regulation that were not relevant to agricultural production systems.

c. Better responses described strategies employed in the development of a whole farm plan or catchment management program. They made a clear judgement on the value of the plan, program or individual strategies.

   Weaker responses did not demonstrate an understanding of the difference between the whole farm planning process and short- to medium-term farm planning, or the difference between catchment management and on-farm water catchment/storage strategies.

Resources

Curriculum Support website

http://www.curriculumsupport.education.nsw.gov.au

Centre for Learning Innovation

http://tale.edu.au

NSW HSC online

http://hsc.csu.edu.au/agriculture/

Landline website

http://www.abc.net.au/landline/

Department of climate change and energy efficiency

http://www.climatechange.gov.au/

Bureau of Meteorology

http://www.bom.gov.au/

University of Sydney Science alliance newsletters and teacher courses

http://www.science.usyd.edu.au/outreach/sa/newsletters.shtml

NSW Department of primary industries

http://www.dpi.nsw.gov.au/

Land learn

http://www.landlearnnsw.org.au/home

American association for the advancement of science (journal access)

http://www.sciencemag.org/

Copyright questions

www.smartcopying.edu.au

NSWAAT

http://nswaat.org.au/

NSWAAT
2010 Biennial Conference

TAMWORTH
and the surrounding region.

Farrer Agricultural High School

(To arrive Monday evening and depart Friday morning, with Tues-Thurs the main conference days)

Conference fee to include:

- Discounts for members; so why not JOIN NOW?
- Professional discussion
- Syllabus updates
- Industry updates
- All meals
- Range of merchandise
- Conference dinner
- Conference Packages
- Pleasant surroundings
- Plenty of good times!!!

Any enquiries please contact:

Graeme Harris

Ph: 0438 656 692

or by email to

graeme.harris@det.nsw.edu.au

CLAIM THE DATE!!
Monday 4 – Friday 8 October 2010

"The science of agriculture practically everywhere"

You are warmly invited to join ...

Members and guests of the NSW Association of Agriculture Teachers at their

Biennial Conference 2010

*There is considerable 'discussion' at present about the future directions for **Australian Agriculture**. The debate is being portrayed in both in the press and in parliamentary circles. The science, technology, practicalities and sustainability of agriculture need to be understood and communicated clearly. Teachers of agriculture and agricultural educators in general are very well placed to do this and are key players in the future of agriculture in Australia and indeed globally.*

DRAFT CONFERENCE DETAILS ON REVERSE

HOWEVER…..

Ensure your Principal and/or Professional Learning Coordinator knows of your interest and enthusiasm to attend

NOW!!!

Please join us!

NSWAAT Biennial Conference to be held in Tamworth from 4th – 8th October, 2010.

An early draft of the program is shown below.

- Keep an eye out for registration forms via association emails and our website www.nswaat.org.au
- Accommodation is available in air-conditioned rooms at Farrer Agricultural High School.

For more info email graeme.harris@det.nsw.edu.au

Day/Date	Approximate Time	Activities
		Monday 4th October
4th/10	4-8pm	Registration
	6pm	Welcome BBQ
		Tuesday 5th October
5th/10	6.30-7am	Optional Milking Activity (Farrer Ag High School)
	7-8am	Breakfast
	8-9am	Registration
	9-9.05am	NSW AAT President's Welcome
	9.05-9.07am	Welcome to Country
	9.07-9.15am	Welcome to Tamworth
	9.15-10.15am	Keynote Speaker
	10.15-11.10am	HSC Agriculture or Primary Industries' Syllabus changes
	11.10-11.35am	Morning Tea
	11.35-12.30pm	Early stage teaching practice, AFISC programs
	12.30-1.30pm	Lunch
	1.30-4pm	Industry & Investment Current Research & Programs
	4-5pm	AELEC Tour
	6pm	Dinner
	8pm	Social
		Wednesday 6th October
6th/10	7-8am	Breakfast
	7-8am	Tours – Developing Industry Currency
	7.30am-6pm	**Tour A Cotton** – Aust Cotton Research Institute, Auscott, ACC
	9.00am-4.30pm	**Tour B Poultry** – Baiada Hi Tech Hatchery, poultry health and immunology, feed mill, broiler farm, broiler processing plant
	9.00am-4.30pm	**Tour C Cattle & Grapes** – Breeza Stn, Killara feedlot, Winery, Cargill, Meat Judging
	9.00am-4.30pm	**Tour D Mixed Enterprises** – Peel Valley Milk, Nundle woollen mill, Arc en ceil Trout (Lunch), Koolkuna Berries
	6.30-10pm	Conference Dinner and Awards
		Thursday 7th October
7th/10	7-8am	Breakfast
	8.30-9.30am	NSW AAT BGM
	9.30-12.30pm	Farm Sustainability Plans
	12.30-1.30	Lunch
	1.30-3.00	Prac skills; Fencing, Farm Water, Horticulture, Beef
	3.00-3.15	Afternoon Tea
	3.15-6.00pm	Plenary session
	6.00pm	Dinner at Nemingha pub, own cost
		Friday 8th October
8th/10	7-8am	Breakfast
	8.30-9.30am	Depart for Home