Stage 5 Agricultural Technology: Year 9
Unit 4: Cereal cropping

Name of enterprise: Winter cereal production	
Duration: 8 weeks but trials will have to go for longer or be started earlier.	
Factors to consider: Senior classes will have planted trial plots.	
Date started:	**Date completed:**

Outcome	Enterprise specific objectives At the end of this unit students should be able to:	Suggested teaching and learning strategies
5.1.1	• Name and classify a range of plant products into categories such as fruits, pasture plants, winter cereals, summer cereals, oilseeds etc.	• Brainstorm on blackboard and complete worksheet.
5.1.1 5.3.3	• Distinguish between monocots and dicots. • State that cereals are grasses.	*This will probably have been done in the vegetable unit but should be revised.* • If this is new information: Draw and label stylised plants, e.g. in *Agriculture Studies Book 1*, p. 59. • Farm or school walk. • Use a dichotomous key, e.g. in Shadwick, *Skills through Science*. • Use a dichotomous key to identify grasses.
5.1.1 5.2.1 5.3.2 5.5.1 5.5.2 5.6.2	• Define a winter cereal. • State winter cereals are broad acre crops. • Name the important winter cereals in Australia and state their uses. • Name the important winter cereals in our region. • Compare changes in production levels of wheat to other crops, e.g. other cereals or oilseeds over time.	• Brainstorm and develop a definition. • Product collage. • Visit supermarket to identify products containing cereals. • Graphing exercise, e.g. ABARE or *Australian Agriculture* (NFF).
5.1.1	• Identify the months in each season.	• Draw a table and colour in the seasons. Remember what season their birthday is in, e.g. December is the first month of summer, January is mid summer etc.

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5.1.1 5.1.2 5.2.1 5.3.2 5.3.3 5.5.1 5.5.2 5.6.1 5.6.2	• Draw and label the parts of a cereal plant. • State the functions of the parts. • Draw and label the heads and seeds of the main winter cereals. • Make a word equation to show the inputs, processes and outputs of photosynthesis. • State the importance of photosynthesis to agriculture and to life. • Define tillering and state what affects it	• Copy from books or live samples. • Preserved plant collection. • This could be revision from vegetable unit. Use live specimens either collected and brought to the classroom or ones growing at the school farm. • Make a seed model. • Experiment to find out what is in a seed. • Discuss photosynthesis and respiration highlighting their importance to life. • Photosynthesis experiments, e.g. extraction and separation of chlorophyll, light requirements (covering leaves), transpiration (bags on leaves), Bromothymol Blue test for CO_2 in light and dark using elodea, O_2 production using elodea etc. See also Shadwick, *Skills through Science 2*. • Demonstrate transport in plants using food dyes and celery. • Split stem of white calla lily and put each half of the stem in different colour food dyes. • Practical identification test. • Trial on seed rate and tillering.
5.1.1 5.1.2 5.4.1 5.5.1 5.5.2	• Map the distribution of a selected cereal (wheat) in Australia.	• Use a map template. • Research wheat growing areas. Refer *Work boot series*: Wheat. • Using an atlas, students find our home town plus 15 other NSW towns in wheat growing areas and mark on the map. • Each student to find the average rainfall and the rainfall distribution for one town. • Class to tabulate. • www.meares.com.au

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5.1.1 5.1.2 5.3.1 5.3.3 5.4.1 5.4.2 5.5.1 5.5.2 5.6.1 5.6.2	• Relate distribution of the selected crop to plant requirements including climatic factors, topography, links with sheep industry etc. • State the reasons behind the development of different varieties. • Name and define a range of important soil types. • Name and define the components and qualities of soil. • State the effects of soil characteristics on plant production, e.g. soil structure, texture, colour, pH water holding capacity and porosity. • State the role of nutrients in the soil in general and the importance of N, P and K specifically. • Explain Liebig's Law of the Minimum. • Describe ways of improving the soil, e.g. composting, green manuring, gypsum, ploughing, discing, aerating, worms, mulching, legume cropping, crop rotation. • Name some forms of land degradation such as erosion, salinity, soil acidification, soil structure decline. State their causes, effects and prevention strategies.	• Conclusion from rainfall information. • Class discussion. • How can farmers manipulate climatic conditions? • NSW Dept of Agriculture, *Agfacts* publication. Create a table listing the characteristics for different varieties of wheat. • List the components of the soil, i.e. – organic: C, H and O – inorganic: N, P, K, S, Ca, Mg, Zn, B, Co, Fe, Cu, Mn, Na, Cl – air – water – micro-organisms and invertebrates. • Conduct simple experiments to test soil characteristics, e.g. – texture and ribboning – colour (Munsell chart) – soil pH – porosity. • Discuss soil structure, texture, colour, pH and porosity. • Handout of, or students draw, a barrel showing Liebig's Law of the Minimum (Macleod et al, *Australian Agriculture series Bk 2* or Sutherland, *Understanding Agriculture*). Discuss importance. • Research assignment. • Video: *Composting* (Gardening Australia). • In class assessment. e.g. oral presentation. • Various videos on sustainability, land degradation etc by Marcom, MR videos, Landline, Museum Victoria.
5.1.2 5.3.3 5.4.2 5.5.1 5.5.2 5.6.1	• Grow some cereals.	• Either trial plots at the farm or in pots at school. Plant them in staggered plantings so they can be used for other activities such as cereal identification or stages of growth. • Could also be used for fertiliser or other trials if warranted.

Outcome	Enterprise specific objectives At the end of this unit students should be able to:	Suggested teaching and learning strategies
5.6.2		
5.3.3 5.5.1	• Draw stages of growth including a time scale.	• ASMP *Wheat* book and others. • Trial plots.
5.1.2 5.2.1 5.3.1 5.3.3 5.4.1 5.4.2 5.5.2	• Make a calendar of events for cereal/wheat production in our district – conventional farming (including machinery, fertiliser and irrigation requirements). • Name jobs associated with Agriculture generally and winter cereals specifically. • State how employment patterns would be affected. • Compare and contrast conventional and minimum tillage farming practices. • List benefits of crop rotation. • Compare and contrast current best practice with earlier systems and link to sustainability.	• Discussion/brainstorming. • Homework assignment. • Use of ASMP slides. • Observe sowing or harvest. • • Careers books and posters, brainstorm and discussion. • Research job opportunities on Internet or in rural newspapers. • Create table. • Video: *Heritage Farming*. • John Deere videos. • Make a comparison table.
5.1.2 5.3.3 5.4.1 5.4.2 5.5.1 5.5.2 5.6.1 5.6.2	• Identify machinery used for cropping and state their purpose, characteristics and affect on soils. • State role of Global Positioning Systems (GPS) in modern agricultural production.	• Search *Land* and *Weekly Times* newspapers etc for pictures. Use to make a flow chart or collage or other visual. • Visit machinery dealer or farm. • Conduct a ploughing comparison at school farm using different implements. • Discussion and Internet.
5.6.1 5.6.2	• Conduct daily check on tractor. • Identify safety features of tractor. • Identify hazards and risks associated with tractor and machinery use. • Safely operate tractor.	• Demonstrations and discussions. Practice. • Videos: e.g. John Deere collection, Bitter harvest or Workcover Victoria etc • Conduct pre-start and safety checks. • Drive tractor. • Practical assessment of tractor driving skills.
5.6.1 5.6.2	• Attach towed implement. • Attach implement to 3-point linkage. • Operate rotary hoe and/or other implements.	• Demonstrations and discussions. Practice. • Videos: e.g. John Deere collection, Bitter harvest or Workcover Victoria etc

Outcome	Enterprise specific objectives At the end of this unit students should be able to:	Suggested teaching and learning strategies
		• Practical assessment.
5.1.2 5.3.1 5.3.3 5.4.1 5.4.2 5.5.1 5.5.2 5.6.2	• Relate soil nutrients to fertilisers. • Compare organic and inorganic fertilisers and relate to use, suitability and profitability.	• Product label exercise. • Internet research. • Plant nutrient experiment/fertiliser trial.
5.1.2 5.3.3 5.4.1 5.4.2 5.5.1 5.5.2 5.6.1 5.6.2	• Understand the limiting effects of plant diseases and pests. • Describe a range of methods to control, prevent, manage or treat cereal diseases or pests (include concept of IPM). • Discuss the role of chemicals in cropping. • Understand safe handling and application of chemicals.	• Research assignment/class seminar presentations. • Agfacts. • Dynamic Agriculture, 3 and 4, Senior Australian Agriculture, Enterprising Agriculture etc. • Interpret chemical labels. • Find examples of chemicals on the Internet or in rural newspapers. • List safety items (PPE). • Experiment to test rain fastness of Roundup: spray planted area and hose off at hourly (or half hourly) intervals and tabulate results.
5.3.2 5.4.1 5.4.2	• List product specifications for a cereal, e.g. protein levels, accepted contamination levels etc. • Describe a quality assurance program for a cereal.	• *Work boot series*: Wheat. • Grains web sites e.g. http://www.awb.com.au etc • Discuss ethics of QA.
5.1.1 5.3.2 5.5.2	• Describe what happens to wheat from gate to plate including receival, sales processing, exporting.	• Graph end uses. • Graph export volumes to various countries. • Create a flow chart. • Cook with end products, e.g. use different protein levels to compare biscuits or bread. • Compare different types of bread, e.g. Turkish, pitta, loaf, lavash, naan etc and relate to wheat/grain type. Taste breads in cultural context. Explain why changes have occurred – immigration, increased travel, restraint development, changing lifestyle expectations etc.

Outcome	Enterprise specific objectives At the end of this unit students should be able to:	Suggested teaching and learning strategies
		• Visit to or by district agronomist. • Excursion to Grain Handling Authority.

Resources:

Books:

Australian Agriculture (NFF)

Bannerman et al, *Enterprising Agriculture*

Brown et al, *Dynamic Agriculture 1–4*

Brown et al, *Dynamic Agriculture Blackline masters*

Clarke, *Senior Australian Agriculture*

Francis et al, *Agriculture and You 1*

Macleod et al, *Australian Agriculture series Bk 2*

NSW Dept of Agriculture, *Agfacts*

Shadwick, B. *Skills through Science Books 1 & 2*

South Australian Education Dept (1977) Agriculture Studies Book 1

Sutherland, *Understanding Agriculture*

Victorian Dept of Agriculture, *Agnotes*

Work boot series, *Wheat*, Kondinin Group

Web sites:

AWB
AWB is a supplier of wheat worldwide.
http://www.awb.com.au/AWBL/Launch/Site/Customers/Content/GrainProducts/Wheat/

Meares and Associates
Meares and Associates is a specialist rural property marketing agency. Go to resources for information on agriculture in Australia.
www.meares.com.au

Commonwealth Scientific and Industrial Research Organisation (CSIRO)
Innovation in the sheep and wool industry.
www.csiro.au

Australian Bureau of Agricultural and Resource Economics (ABARE)
An Australian government economic research agency.
www.abare.gov.au

The Farmshed
Agriculture news.
www.thefarmshed.com.au

NSW Agriculture
Information about animals by category.
http://www.agric.nsw.gov.au/reader/12

And other government web sites, e.g. Qld DPI etc.

Ways of assessing student progress:

- Preserved plant collection.
- Research assignment on land degradation and/or ways of improving soil. Written work or oral presentation.
- Tractor skills test.
- Plant/cereal plant practical identification test.

Skills achieved in this topic:

- Identify machinery used for cropping.
- Conduct daily check on tractor.
- Identify safety features of tractor.
- Identify hazards and risks associated with tractor and machinery use.
- Safely operate tractor.
- Attach towed implement.
- Attach implement to 3-point linkage.
- Operate rotary hoe and/or other implements.
- Interpret chemical labels.
- Identify plants.
- Use a key.
- Make graphs.
- Record information.
- Conduct experiments.
- Use grid reference points.