



Stage 5 Agricultural Technology

Year 9 Unit 3: Winter crops – Wheat

Description: Winter crops are an important part of agricultural production in this area. This unit will introduce students to a variety of wheat related issues including: types, varieties and uses, basic requirements, structure, function and reproduction, photosynthesis, production cycle, stages of growth, climate/limiting factors – distribution, soils, pests and diseases, calendar of operations, Aboriginal/European land use, sustainability, cultural influences including Aboriginal, markets and marketing – specifications and export, and OHS. Students will be involved in numerous practical activities including: growing and monitoring a wheat crop; collecting, pressing, presenting plants at different stages of growth; harvesting a wheat crop; soil testing: pH, texture, colour; identifying a range of cereal plants, seeds and fertilisers; identifying a range of weeds (plant collection); identifying machinery; hazard identification and risk assessment of tractor and machinery. Excursion: local machinery dealer (demo of machinery technologies)

Why does this learning matter? Wheat production was a traditional industry in the Inverell area, with a rail head and large silo complex. The study of wheat will allow students to investigate historical aspects of agricultural production in Australia, sustainability issues as well as developing skills in different methods of plant production.

Suggested duration: 25 periods of 1-hour duration (10 weeks)



Targeted outcomes

A student:

- 5.1.1 explains why identified plant species and animal breeds have been used in agricultural enterprises and developed for the Australian environment and/or markets
- 5.3.1 investigates and implements responsible production systems for plant and animal enterprises
- 5.3.2 investigates and applies responsible marketing principles and processes
- 5.3.3 explains and evaluates the impact of management decisions on plant production enterprises
- 5.4.1 evaluates the impact of past and current agricultural practices on agricultural sustainability
- 5.6.1 applies Occupational Health and Safety requirements when using, maintaining and storing chemicals, tools and agricultural machinery

Resources

Text books

Dynamic Agriculture 2, 2nd ed.

Kondinin Workboot series: *Wheat*.

Senior Australian Agriculture (SAA), 3rd ed.

Sutherland, *Introduction to Agriculture*

Internet

AWB Ltd: www.awb.com.au

GrainCorp (incl. Grainco): www.graincorp.com.au

Australian Grain Harvesters Association Inc: www.agha.org.au

Grain Growers Association:

www.graingrowers.com.au

Grains Research and Development Corporation:

www.grdc.com.au

NSW Agriculture: www.agric.nsw.gov.au

Bureau of Meteorology: www.bom.gov.au

Weather Zone: www.weatherzone.com.au

Australian Bureau of Agricultural and Resource

Economics: www.abare.gov.au

Australian Bureau of Statistics: www.abs.gov.au

Dept. of Primary Industries: www.dpie.gov.au

Others

Dept. Ag publication: *Agfacts*

Assessment

A number of tasks have been listed for this topic, both theory and practical based (see assessment column). Tasks have been listed in the grid (on the last page) indicating where each outcome is addressed and enabling the tracking of students in meeting these outcomes.

Evaluation



Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
		Introduction and words to know: Ref: <i>Dynamic Agriculture 2</i> , pp. 147–148, Kondinin: <i>Wheat</i> , pp. 66–67. annual, AWB, bran, carbohydrate, cereals, export, fallow, germinate, Gramineae, head, lodge, node, resistant, shot grain, sprung grain, stubble, sustainable, tillering, varieties, weed.		
		Wheat products Identify and list products made from wheat.		
c. the impacts of a range of cultures including Aboriginal cultures on Australian agricultural production (5.1.1) a. the impact of European and Aboriginal practices on the development of Australian agriculture (5.4.1)	d. identify some impacts of a range of cultures including Aboriginal cultures on Australian agricultural production (5.1.1) a. compare agricultural systems of today with Aboriginal land management practices (5.4.1) b. discuss the effect of European and Aboriginal agricultural practices on agricultural production and sustainability (5.4.1)	History of wheat in Australia Outline the origin of wheat. Ref: <i>ASMP wheat</i> , pp. 2–3. Discuss the development of wheat in Australia. Ref: <i>ASMP wheat</i> , pp. 3–6, <i>Dynamic Agriculture 2</i> , p. 149. Sustainability Define sustainability. Compare Aboriginal land management practices to farming methods of today. Discuss European land management practices and the effect it had on early agricultural farming methods in Australia (production and sustainability). (Empathise with early Australians – they were doing ‘the best they could’ with the knowledge they had at the time – using European farming methods unsuited to the shallow, relatively infertile soils of Australia). Discuss the effect of Aboriginal agricultural practices on agricultural production and sustainability.	Research: European and Aboriginal land management practices. Compare to farming methods of today. Sustainability of European and Aboriginal land management practices.	

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Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
a. the basic requirements of agricultural plants and animals (5.3.1) b. climatic factors affecting plant and animal production including: humidity solar radiation wind patterns temperature rainfall (5.1.1) d. seasonal variation in crop/pasture production (5.3.3)	b. measure and assess climatic factors affecting plant and animal production (5.1.1) c. tabulate and graph climatic conditions in the local region relative to a chosen enterprise (5.1.1)	Factors influencing plant production The ability of plants to produce is affected by a number of factors including: climate, nutrition (soils), pests and diseases, genetics (varieties), and management. Climate List climatic requirements of wheat. Ref: Kondinin: <i>Wheat</i>, p. 9; <i>Dynamic Agriculture 2</i>, p. 154. Indicate on a map of Australia the wheat growing areas and give reasons (climate, topography). Describe how the following climatic factors limit production: humidity, light, wind patterns, temperature and rainfall. Ref: <i>Dynamic Agriculture 2</i>, pp. 96–97. List the requirements for germination. Prac: Germination requirements. Outline growing season of wheat. Prac: Measure temperature and rainfall over wheat growing season. Tabulate and graph. Discuss seasonal variation in crop production, e.g. winter and summer crops. Photosynthesis Define photosynthesis. Write the simple word equation for photosynthesis. Draw a diagram illustrating the inputs, processes and outputs of photosynthesis. Discuss the climatic factors that affect photosynthesis.	Prac report	



Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
c. the role of soil and water in determining plant management strategies (5.3.3)		Nutrition Name the elements required by plants and classify as macro, micro and trace. Outline the role of nutrients in the soil. Table. Ref: SAA, p. 75–76. Explain Liebig's Law of the minimum. Draw the barrel diagram. Ref: SAA, p. 74; <i>Introduction to Agriculture</i>. Soils Name and describe a range of important soil types. Ref: Kondinin: <i>Wheat</i>, p. 10–11. Describe the components of a soil – inorganic material (sand, silt and clay), organic matter, water, air and living organisms. Ref: SAA, p. 58. Describe the physical characteristics of a soil including: profile, structure, texture, colour, temperature, pH, water holding ability, porosity. Ref: SAA, p. 58; <i>Dynamic Agriculture 2</i>, p. 33–40. Pracs: • Soil components. Ref: <i>Dynamic Agriculture 3</i>, p. 259. • Measure the texture of a soil (feel and ribboning). • Measure pH. Discuss soil fertility. See <i>Nutrition</i> section above. Land degradation problems Describe the cause, effect and treatment of various land degradation problems including: erosion, salinity, acidity and soil structure decline. Methods of improving soil fertility Outline different methods including: composting, green manuring, mulching, worms, legume cropping, crop rotation.	Prac report	
b. the management and control of significant pests and diseases (5.3.3)	d. identify common plant pests and diseases (5.3.3) e. implement and evaluate strategies for the management and control of plant pests and diseases for a chosen agricultural enterprise (5.3.3)	Pests and diseases Define pest and disease. Discuss their effects on wheat production. List and describe some common pests and diseases of wheat. Ref: <i>Dynamic Agriculture 2</i>, p. 155–158; <i>ASMP: Wheat</i>, p. 22–29; Kondinin: <i>Wheat</i>, p. 24–26. Prac: Implement a management strategy for the control of a pest (if a pest becomes a problem in the system). Evaluate this management strategy.	Assignment: Weed collection and presentation. Pests and diseases research. Prac report	



Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
c. the correct usage and maintenance of agricultural equipment (5.6.1)	a. grow and monitor plants and animals (5.3.1) a. perform management operations for a plant enterprise (5.3.3) c. use agricultural equipment, machinery and techniques correctly and safely (5.6.1) g. demonstrate and apply harvest techniques to plant production (5.3.3)	Genetics See varieties of wheat section above. Management Draw up a calendar of events for wheat production in our area. Pracs: Prepare an area to sow, grow and harvest wheat. (Use this plot for a number of related pracs throughout this topic). Discuss soil preparation methods. Ref: Kondinin: <i>Wheat</i>, p. 19–23; <i>Dynamic Agriculture 2</i>, p. 159. Prac: Prepare soil for sowing. Describe conventional and minimum tillage methods. List the advantages and disadvantages of each. Define fallowing. List machinery used for the various soil preparation methods. Ref: Kondinin: <i>Wheat</i>, pp. 19–21. Discuss their effect on the soil. Revise crop rotation and reasons for its use. Ref: Kondinin: <i>Wheat</i>, p. 28; <i>Dynamic Agriculture 2</i>, p. 161. OHS hazard identification and risk assessment of tractor and machinery. Discuss sowing methods. Prac: Sow wheat. List machinery used for the various sowing methods. Ref: Kondinin: <i>Wheat</i>, pp. 22–23; <i>Dynamic Agriculture 2</i>, p. 161–162. Discuss harvesting methods. Prac: Harvest wheat. List machinery used for harvesting. Ref: Kondinin: <i>Wheat</i>, pp. 30–31; <i>Dynamic Agriculture 2</i>, p. 162. Activity: Search <i>The Land</i> newspaper and others for machinery pictures. Excursion: McBean and Son (John Deere dealer) for technology in new machinery.		



Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
a. market specifications and the market standards required in marketing a chosen agricultural product (5.3.2) b. different markets available for a chosen agricultural product (5.3.2) c. the role of transport, handling and packaging in marketing a chosen agricultural product (5.3.2)	a. assess product specifications (5.3.2) b. investigate different types of markets available to enterprise production (5.3.2) c. select transport, handling and packaging methods for marketing a chosen agricultural product (5.3.2)	Markets: Domestic and export Revise the importance of markets. List various domestic and export markets available for wheat. Ref: <i>Dynamic Agriculture 2</i>, p. 164–165. Market: Specifications Revise what market specifications involve. Discuss the importance of market specifications. Revise the different classes of wheat from the <i>Varieties</i> section earlier in this unit. List the specifications for each class of wheat. Ref: Kondinin: <i>Wheat</i>, p. 37; <i>Dynamic Agriculture 2</i>, p. 162–164. List specifications for various domestic and export markets. Who buys Australian wheat? List the variety of uses of exported wheat. Discuss the transport, handling and packaging of wheat from paddock to plate: flow diagram. Ref: Kondinin: <i>Wheat</i>, p. 37. Draw a diagram illustrating how flour is made. Ref: Kondinin: <i>Wheat</i>, pp. 40–41; <i>Dynamic Agriculture 2</i>, p. 103. Prac: Make bread.	Assignment: Markets for Australian wheat. Specifications. Transport, handling and packaging.	

Student name / assessment task	Research	All prac reports: booklet	Wheat plant collection and presentation	Assignment: • weed collection and presentation • pests and diseases research.	Assignment: Markets for Australian wheat. Specifications. Transpt, handlg etc.	Unit test
Outcomes	5.1.1 5.4.1	5.1.1 5.3.1 5.3.3 5.6.1	5.3.3	5.3.3	5.3.2	5.1.1 5.3.1 5.3.2 5.3.3 5.4.1 5.6.1