Stage 5 Agricultural Technology

Year 9 Unit 1: Beef cattle

Description: Beef cattle production is an important industry in the Northern Tablelands, both for the local and Australian economy. This unit will introduce students to a range of beef related issues including: breeds, basic requirements: nutrition, climate/limiting factors: distribution, ruminant digestion, reproduction, calendar of operations, husbandry techniques, pests and diseases, interactions, Australian economy, culture, society, employment opportunities, animal behaviour, intensive v's extensive, social/ethical issues: feedlot, animal welfare and marketing: domestic and export. Students will be involved in numerous practical activities including: mustering and moving cattle; setting up yards and moving cattle through; catching cattle in crush; putting halter on, tying up and leading, parading a steer in show setting; washing and grooming; packing show box; judging live animals; live appraisal (fat and muscle score); feeding cattle, monitoring health, checking water, monitoring and recording growth; drench/backline, estimating weight, setting up scales and weighing. Excursion to saleyards.
Why does this learning matter? The beef cattle industry is very important to the Inverell area. A major export abattoir: *Bindaree Beef* purchases and processes and exports a large portion of the local cattle. *Bindaree Beef* is a significant local business employing over 500 people. Inverell High owns a Murray Grey stud and participates in a number of local and interstate hoof and hook cattle shows. Students are responsible for preparing the cattle for these shows and it instils in them important qualities such as commitment and dedication as well as a comprehensive understanding of many management aspects of cattle.
Suggested duration: 30 periods of 1-hour duration spread across the whole year.

Targeted outcomes

A student:

5.1.1 explains why identified pl. species and animal breeds have been used in agri. enterprises and developed for the Australian environment and/or markets
5.1.2 explains the interactions within and between agricultural enterprises and systems
5.2.1 explains the interactions within and between the agricultural sector and Australia's economy, culture and society
5.3.1 investigates and implements responsible production systems for plant and animal enterprises
5.3.4 explains and evaluates the impact of management decisions on animal production enterprises
5.4.2 evaluates management practices in terms of profitability, technology, sustainability, social issues and ethics
5.4.3 implements and justifies the application of animal welfare guidelines to agricultural practices
5.5.2 collects and analyses agricultural data and communicates results using a range of technologies
5.6.1 applies Occupational Health and Safety requirements when using, maintaining and storing chemicals, tools and agricultural machinery
5.6.2 performs plant and animal management practices safely and in cooperation with others

Resources

Text books
Dynamic Agriculture 1, 2nd ed., Ch. 24.
Dynamic Agriculture 2, 2nd ed., Ch. 14.
Dynamic Agriculture 3, 2nd ed., Ch. 6.
Bannerman et al, *Enterprising Agriculture,* Ch 10.
Agriculture and You, Book 2.
Other references
Handbook of Australian Livestock
Breed Society Journals
The Land newspaper
Ag Skills: Beef and Knots
Dynamic Agriculture Blackline Masters Book 1, Ch. 2
Keeping a Cow, Lucy Newman's Beef Cattle

Internet
For various web sites for different breeds see
The Land, Rural Press Agricultural Publication, 'Internet Farming 2004', Thursday Nov 27th 2003.
Meat and Livestock Australia: www.mla.com.au
Australian Meat Industry Council: www.nmaa.org.au/
Bureau of Meteorology: www.bom.gov.au
Weather Zone: www.weatherzone.com.au
NSW Agriculture: www.agric.nsw.gov.au
Landline: www.abc.net.au/landline

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: bull, cow, heifer, steer, calf, vealer, weaner, bullock, store cattle, culling, gestation, fertility, oestrus(heat), springer, castration, marking time, poll, condition score, carcass, dressed weight, live weight, marbling,		
a. the interactions between plants, animals, soils, climate and micro0organisms (5.1.2)	**a.** identify and discuss interactions within and between agricultural enterprises on the school farm (5.1.2) **b.** use drawings, diagrams and flow charts to sho relationships between plants, animals, soils, climate and micro-organisms for specific enterprises studied. (5.1.2)	**Enterprise interactions** Define enterprise, system, inputs, processes and outputs. Ref: *Dynamic Agriculture 1*, Ch. 7. Give examples of each specific beef enterprise. Discuss the interactions between plants, animals, soils, climate and micro-organisms on the school farm. Draw systems diagrams illustrating these interactions.		
		Parts of a steer/bull Recognise and label parts of a steer. **Prac:** identify parts on a steer, including sites for fat and muscle assessment.		
a. animal breeds specific to chosen agricultural enterprises (5.1.1) **a**. breed selection (5.3.4)	**a.** identify the characteristics of animal breeds specific to chosen enterprises (5.1.1) **a**. identify breeds relevant to a specific enterprise (5.3.4)	**Breeds** Differences between *Bos Taurus* and *Bos Indicus.* Name and describe the variety of beef cattle breeds. Explain why some breeds are specially bred for Australian purposes, e.g. *Brahmans*, or for market purposes, e.g. *Wagyus*.	**Prac test:** Identify breeds of cattle from slides or pictures.	
b. climatic factors affecting animal production including: – humidity – solar radiation – wind patterns – temperature – rainfall (5.1.1)	**b**. measure and assess climatic factors affecting animal production (5.1.1)	**Factors influencing animal production** **Climate** Indicate on a map of Australia where beef cattle are run and give reasons. Describe how the following climatic factors limit production: humidity solar radiation, wind patterns, temperature and rainfall. Ref: *Dynamic Agriculture 2,* p. 183.		

Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
b. reproductive systems of ruminant animals (5.3.4)	**b**. identify and outline the functions of animal reproductive systems (5.3.4)	**Genetics** Describe how an animal's genetics influences production. Briefly outline the genotype X environment interaction. Ref: *Dynamic Agriculture 2*, p. 186. Outline cross breeding and why it is used in beef cattle production. **Reproduction** Recognise and label male and female reproductive systems. **Prac:** Dissect male and female reproductive systems. Outline the functions of the parts of the male and female reproductive systems. Outline the oestrus cycle in cows. **Prac:** Detect a cow on heat. Compare the gestation length of cattle to other animals. Define dystocia. Discuss the types of dystocias. Use an *Estimated calving dates* table to judge the calving date of cows at the farm. Discuss the signs that a cow is approaching calving. **Prac:** Detect a cow that is approaching calving (springer). Look at photos / video of calving.		
j. breeding technologies including: – artificial insemination – embryo transfer (5.3.4) **d**. new technology and its influence on management strategies (5.4.2)		**Breeding technologies** Outline various breeding technologies including: AI, ET, cloning, oestrus synchronisation, EBVs, breed plan. Discuss the impact these technologies have had on management strategies used by farmers. **Prac:** Observe the AI process. **Video:** Semen collection for AI.	**Assignment:** Breeding technologies: Describe AI, oestrus synchronization, ET, cloning, EBVs and breed plan. Outline advantages and disadvantages of each.	

Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
b. digestive systems of ruminant animals (5.3.4) **d**. new technology and its influence on management strategies (5.4.2)	**b**. identify and outline the functions of animal digestive systems (5.3.4)	**Ruminant digestion** Recognise and label the ruminant digestive system. Ref: *Enterprising Agriculture*, p. 90–93; *Dynamic Agriculture 3*, Ch. 6. **Prac:** Dissect the ruminant digestive system. Outline the functions of the parts of the ruminant digestive system. **Prac:** Observe a cow chewing its cud (rumination) and explain why they do it.		
a. the basic requirements of agricultural animals (5.3.1) **b**. intensive and extensive production systems for an animal product (5.3.1)	**b**. apply production systems to animal product (5.3.1)	**Nutrition** Discuss the nutritional needs of cattle. Ref: *Dynamic Agriculture* 2, p. 183. Compare nutritional needs to seasonally available feed. Compare intensive and extensive types of production. Discuss how feedlots can overcome seasonal shortages in feed. Compare the maintenance and production requirements of cattle. **Prac:** Examine the ration used in the schools feedlot and the components. Research various commercially produced feedlot mixes and compare to IHS mix. Research various nutritional supplements, e.g. *Prolick*, and their advantages and disadvantages.	**Research:** Research various commercially produced feedlot mixes and nutritional supplements.	
c. the management and control of significant pests and diseases (5.3.4) **b.** calibrate relevant equipment (5.6.1)	**c**. identify common animal pests and diseases (5.3.4) **d**. implement and evaluate control programs using strategies for pests and diseases (5.3.4)	**Pests and disease** Define disease. Outline IPM. Describe the main pests (parasites) affecting beef cattle: internal: gastrointestinal worms (roundworms) and liver fluke; external: lice, ticks and buffalo fly. Ref: *Enterprising Agriculture*, Ch. 10. Describe the main diseases affecting beef cattle: Johne's, Bloat, Enterotoxaemia, Leptospirosis, Black leg, Akabane and Tetanus. Outline the cause, symptoms, treatment, control and prevention of the diseases. **Prac:** Calibrate drench gun and drench cattle.	**Assignment:** Outline the cause, symptoms, treatment, control and prevention of the diseases.	

Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
f. the calendar of operations in a production cycle (5.3.4) **e**. the use of technology in the production cycle (5.3.4) **a.** the basic requirements of animals (5.3.1) **a**. technologies that assist in record-keeping and monitoring of enterprise performance (5.5.2) **a**. animal welfare codes of practice applicable to a chosen agricultural enterprise (5.4.3) **b**. the correct usage and maintenance of animal husbandry equipment (5.6.1) **a**. animal management practices (5.6.2)	**f**. perform simple animal husbandry operations (5.3.4) **e.** monitor production levels throughout a production cycle (5.3.4) **a**. grow and monitor animals (5.3.1) **b**. make accurate observations and record relevant data relating to specific enterprises (5.5.2) **c**. utilise computer technologies in the analysis and presentation of agricultural data (5.5.2) **a**. apply correct livestock handling methods (5.4.3) **b**. calibrate relevant equipment (5.6.1) **c**. use agricultural equipment, machinery and techniques correctly and safely (5.6.1) **a**. perform procedures in the management animals (5.6.2) **b**. work cooperatively to perform management operations (5.6.2)	**Management/Husbandry operations** **Calendar of operations** Outline various aspects of routine farm management: – grazing management – feeding, including supplementary feeding – mating – calving – marking – weaning – culling – pest and disease control – selling. Explain the basic techniques of moving and handling cattle. **Prac:** – Muster and move cattle – Set up yards and move cattle through – Catch cattle in crush. **Prac:** – Monitor the growth and development of calves. – Set up electronic scales, weigh, record and graph growth of calves. – Set up electronic scales, weigh and record weight variations of cows when dry, pregnant and lactating. Explain the basic techniques of preparing cattle for shows. **Prac:** Preparation of cattle for shows. – Break-in and handle cattle. – Put halter on. – Demonstrate knots used to tie up cattle – Competently lead cattle. – Perform correct rope handling techniques. – Perform correct grooming techniques. – Pack show box for show. – Assist in show entry form and follow information required.	**Prac test:** Muster and move cattle. Catch in crush. Set up scales, weigh and record. **Prac test:** Put halter on, demonstrate knots used to tie up cattle, competently lead cattle.	

Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
a. animal welfare codes of practice applicable to a chosen agricultural enterprise (5.4.3)	**b**. evaluate animal housing conditions in accordance with identified codes of practice (5.4.3)	**Animal welfare** Outline the animal welfare codes of practice. Discuss the requirements of HIS animal welfare policy in line with *Animals in schools* publication. Importance of record keeping in animal production. **Prac:** – Using the Agriculture assistant's farm diary, state the husbandry activities conducted on the cattle at the farm over the last month. – Assess the welfare of the cattle on the school farm. Ref: *Dynamic Agriculture Black Line Masters 2*, p. 21.	**Task:** Assess the welfare of the cattle on the farm.	
a. the role of agriculture within the Australian economy (5.2.1) **c**. the range of training and employment opportunities in agriculture (5.2.1) **d**. the impact of global factors on Australian agriculture (5.2.1)	**a**. investigate the significance of agricultural industries and products produced in the local region and their intended markets (5.2.1) **b**. investigate the effect of agricultural enterprises on employment patterns (5.2.1)	**Agriculture and the Australian (and local) economy** Outline why agriculture is important: – production of plant and animal products to meet society's needs – jobs on farms and support services – export income. Ref: *Dynamic Agriculture 1*, p. 16. List the diverse range of businesses that rely on agriculture in Inverell and describe the services they provide. Investigate the value of the beef cattle industry to Australia. **Excursion:** Sale yards. **Training and employment opportunities** Investigate the range of training and employment opportunities in relation to beef cattle: sale yards, *Bindaree Beef*, stock and station agents (Sandy: Job link plus). **Global factors and Australian agriculture** Examine the effect of foot and mouth and Mad cow disease outbreaks overseas and describe how this affected the Australian beef industry. Examine other relevant global factors.	**Assignment:** Research from newspaper articles and web sites the effect of outbreaks of foot and mouth and mad cow disease on the beef cattle industry.	

Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
		Methods of selling cattle Outline the following methods of selling cattle: – live-weight sales – 'over the hook' sales – price grids – private sales – Computer aided livestock marketing (CALM). **Prac:** Interpret market reports from the Inverell sale yards and record the live-weight prices (cents/kilogram)for vealers, steers and cows.	**Assignment:** Record and graph prices over a six-month period for vealers, steers and cows sold at the Inverell sale yards.	
b. different markets available for a chosen agricultural product (5.3.2) **b**. relevant export and domestic markets (5.2.1) **a**. market specifications and the market standards required in marketing a chosen agricultural product (5.3.2)	**b**. investigate different types of markets available to enterprise production (5.3.2) **a**. assess product specifications (5.3.2)	**Markets: Domestic and export** Discuss the importance of markets. List various domestic and export markets available for beef cattle. **Markets: Specifications** Explain what market specifications involve. Discuss the importance of market specifications. List specifications for various domestic and export markets. Live beef cattle assessment: – structural soundness (legs, feet) – weight and age assessment – fat and muscle assessment (visual, manual and objective assessment) – yield potential. **Pracs:** – Assess structural soundness of cattle at farm. – Estimate weight of cattle at farm and use girth tape measure. – Assess the age of cattle using teeth. – Point out sites for fat assessment on a steer and assess fat cover visually and manually. – Point out sites for muscle assessment on a steer and assess muscling visually and manually. – Use muscle and fat score charts to describe characteristics of cattle.	**Prac test:** Point out sites for fat and muscle assessment on a steer and assess fat cover and muscling visually and manually. Use muscle and fat score charts to describe characteristics of cattle.	

Students learn about:	Students learn to:	Teaching and learning strategies	Assessment	Reg
b. social issues and ethics involved with the production of chosen agricultural enterprises (5.4.2)	**a**. examine the impact of agriculture in the local region (5.4.2) **b**. discuss a number of social and ethical issues that would be confronted in chosen agricultural enterprises (5.4.2) **a**. prepare and present information to justify a particular point of view (5.5.2)	**Social issues and ethics** Debate and discuss ethical issues related to beef cattle production, e.g. feedlots, cloning. **Excursion:** local large scale feedlot.		
c. profitability as a measure of management success (5.4.2)	**c**. assess the profitability of a local agricultural enterprise (5.4.2)	Investigate the costs and returns associated with beef cattle. Describe the uses of a gross margin. Calculate a simple gross margin.		

Student name/assessment task	Prac test: Identify breeds from slides or pictures	Assign: Breeding technologies	Assign: Feedlot mixes and nutritional suppl.	Assign: Pest and diseases	Prac test: Prep yard, move cattle, weigh and record.	Prac test: Put halter on, tie up and lead cattle	Prac test: Assess welfare of cattle at farm	Assign: Research effects of global factors	Assign: Record and graph cattle prices	Prac test: Fat and muscle assess of cattle	Assign: Research social/ethical issue.	Unit test
Outcomes	5.1.1 5.3.4	5.3.4	5.4.2 5.3.1	5.3.4	5.3.1 5.3.4 5.4.3 5.5.2 5.6.1 5.6.2	5.3.4 5.4.3 5.6.1 5.6.2	5.4.3	5.2.1	5.3.2	5.2.1 5.3.2	5.4.2 5.5.2`	5.1.1 5.1.2 5.2.1 5.3.1 5.3.2 5.3.4 5.4.2 5.4.3 5.5.2