Australian Good Meat Education resources are developed by

MEAT & LIVESTOCK AUSTRALIA

7–8 | LESSON PLAN

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Lesson 3

Management of plants and animals

AUSTRALIAN CURRICULUM CONTENT



Analyse how food and fibre are produced in managed environments and how these can become sustainable. (ACTDEK032, AC9TDE8K04)

Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools. (ACTDEP036, AC9TDE8P02)

LESSON OBJECTIVE

Students will learn about the management of plant (pasture) and animal growth (sheep and cattle) through natural means and with the use of chemicals.

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Lesson 3

LESSON OVERVIEW

Activity 3.1	Stock health and disease	15 mins
Activity 3.2	Management of sheep and cattle through natural means and with the use of chemicals	30 mins
Activity 3.3	Organic farming at Gum Park	15 mins
Activity 3.4	Online learning task: Australian Sheep Breeding Values (ASBVs)	20 mins

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Resources and equipment

ACTIVITY 3.1 – Stock health and disease

1. Worksheet 3.1a – *Stock health and disease*.

ACTIVITY 3.2 – Management of sheep and cattle through natural means and with the use of chemicals

1. Worksheet 3.2a – *Management of plants and animals through natural means and with the use of chemicals.*
2. Worksheet 3.2b – *Chemical and non-chemical use on a farm.*
3. Worksheet 3.2c – *Advantages and disadvantages of chemical and natural means management of animal health.*

ACTIVITY 3.3 – Organic farming at Gum Park

1. Worksheet 3.3a – *Case study: Organic farming at Gum Park.*
2. Computer/digital device access.
3. Producing cattle and sheep...and beef and lamb (5.06).

ACTIVITY 3.4 – Online learning task: Australian Sheep Breeding Values (ASBVs)

1. Computer/digital device access Lesson 3 Online learning task.
2. What are Australian Sheep Breeding Values? (3.46).
3. Philip Gough | Australian Genetics.

ADDITIONAL READING/RESOURCES

- Diseases | Meat & Livestock Australia.
- Stuart Tait, Beef Producer, NSW - antibiotic use.
- Prime lambs | Australian Genetics.

Lesson guide

ACTIVITY 3.1 – Stock health and disease

a. Facilitate a discussion about some health issues cattle and sheep might face on a farm. Record ideas in a central area. Consider:
   - diseases (bacterial, viral, parasitic and protozoal diseases)
   - pregnancy and birth complications
   - digestive diseases, e.g. bloat
   - teeth health
   - nutritional disease (ensuring animals have access to enough quality feed, etc.)

b. Distribute Worksheet 3.1a – *Stock health and disease*. Students complete the cloze passage, and when completed, check their answers with the teacher. (Answers page 15)

ACTIVITY 3.2 – Management of sheep and cattle through natural means and with the use of chemicals

a. Distribute Worksheet 3.2a – *Management of plants and animals through natural means and with the use of chemicals* to students, and use it to generate a discussion about the management of plants (pastures) and animal growth (sheep and cattle), through natural means and with the use of chemicals.

   Students should observe the pictures and consider:
   - What type of chemicals might be used on a farm to control pests and disease?
   - Why are chemicals used/needed?
   - How are chemicals (like medicines and vaccines) given to the animals?
   - Are chemicals needed for both animals and plants on a farm?
   - What sort of natural (non-chemical) management strategies could farmers use?
   - What might be some advantages and disadvantages of both management systems?
     (Answers page 16)

b. Students annotate/take notes next to each picture during the class discussion.

c. Distribute Worksheet 3.2b – *Chemical and non-chemical use on a farm.*

d. Students read the text and highlight important points.

e. As a group, discuss which stakeholders (people/organisms involved in issues) care about the management of health and disease on a farm. Stakeholders include the producers, animals and consumers.

f. Allocate students into groups and provide them with Worksheet 3.2c – *Advantages and disadvantages of chemical and natural means management of animal health.*

g. Students label the stakeholders on the worksheet in the spaces provided.

h. Encourage students to discuss what the various stakeholders might be thinking about the advantages and disadvantages of chemical and natural management when looking after the health of animals such as cattle, sheep and goats and record possible thoughts in each bubble of the concept cartoon.

***Lesson guide** continued next page*

Lesson guide *continued*

i. Provide students with time to feedback their ideas to the class to compare thoughts and discuss them. (Answers page 17)

j. In pairs, have students discuss the reasons why aspects of both natural and chemical management are important. Select some pairs to justify their answers to the class.

ACTIVITY 3.3 – Organic farming at Gum Park

a. Provide students with computer/digital device access and explain that they will examine a case study on how one farm, Gum Park has embraced natural means management and organic farming.

b. Distribute Worksheet 3.3a – *Case study: Organic farming at Gum Park*.

c. Students access the link Producing cattle and sheep...and beef and lamb (5.06) or QR code to view the video clip and answer the information in the provided spaces. (Answers page 18)

ACTIVITY 3.4 – Online learning task: Australian Sheep Breeding Values (ASBVs)

a. Students access Online learning task 3 and complete the provided activities focused on Australian Sheep Breeding Values (ASBVs). (Answers page 19)

Student resources

ACTIVITY 3.1 – Stock health and disease

Worksheet 3.1a	Stock health and disease

ACTIVITY 3.2 – Management of sheep and cattle through natural means and with the use of chemicals

Worksheet 3.2a	Management of plants and animals through natural means and with the use of chemicals
Worksheet 3.2b	Chemical and non-chemical use on a farm
Worksheet 3.2c	Advantages and disadvantages of chemical and natural means management of animal health

ACTIVITY 3.3 – Organic farming at Gum Park

Worksheets 3.3a	Case study: Organic farming at Gum Park

ACTIVITY 3.4 – Online learning task: Australian Sheep Breeding Values (ASBVs)

Lesson 3 Online learning task	Australian Sheep Breeding Values (ASBVs)

Worksheet 3.1a

Stock health and disease

Choose the most appropriate word from the list below to complete the passage.

Read the entire passage before filling in the blanks.

negative	carcase	growth	profitability
death	treatment	plants	weakening
lower	feed	disease	animals

There are a number of animal husbandry techniques producers must carry out to take care of their _____. Some of them are to prevent or treat _____ in their stock.

An animal disease is something that causes a _____ effect on the normal body's functions, generally associated with certain signs or symptoms. Diseases may cause a _____ of the animal, slower _____, and therefore _____ production for a producer, or even result in the _____ of the animal.

The prevention and _____ of livestock diseases significantly increase the health and welfare of livestock and the productivity and _____ of the Australian red meat industry. Improved animal health contributes to enhanced _____ quality, meat quality and overall yield.

Diseases are controlled and managed on a farm using a variety of techniques. Some diseases in cattle include: Calf Scours, Bovine Respiratory Disease, Bovine Ephemeral Fever, Bloat, Theileriosis, Pestivirus (BVDV) and Pinkeye. Some diseases in sheep include; Ovine Johne's disease, Weaner Ill-thrift, Flystrike, Bloat, Footrot and Ryegrass toxicity.

Producers must also take care of the _____ that the animals eat on their farm and ensure that they provide enough quality _____ for their stock.

Worksheet 3.2a

Management of plants and animals through natural means and with the use of chemicals

Chemical management







Natural management







Worksheet 3.2b

Chemical and non-chemical use on a farm

Producers can use chemical and natural methods on their farms to produce their plants and animals.



Both these methods may be used to promote improved growth and development in living things, or to prevent and control pests and diseases. Farmers may decide to use a combination of strategies on their farms to maximise their animal and plant production. Using a combination of strategies to control pests and diseases is called **integrated pest management.**

Quarantine is an important way of protecting the agricultural industry. Any animal or plant entering Australia from overseas is held for a length of time that is long enough to observe if the animal or plant is infected. Australia also uses this method between states and territories to help stop the spread of some pests and diseases. Other methods include: **eradication** (culling any affected animals), **biological** control (using a living organism to control another organism), **genetic** control (breeding animals that are resistant to disease), **natural** management (producers using good hygiene, correct stocking rates, paddock rotations to break pest cycles, etc), **vaccinations** (initiate a protective immune response in the animal) and other **chemical** controls.

Chemicals are substances that can be used on farms for a specific reason. Synthetic chemicals are made by humans. Examples of chemicals include: medicines (treatment and prevention of disease), insecticides (kills insects), herbicides (kills weeds) and fertilisers (added to soil to increase fertility).



Without the use of chemicals, the productivity of plants and the productivity and welfare of livestock would be negatively impacted. A specific example of a chemical used in animal production is a vaccination. Cattle in Australia can be vaccinated with a 5 in 1, or a 7 in 1 injection that protects them from a number of serious diseases. Animals are given 2 doses when young and an annual booster. Each dose costs the producer approximately $2.35 per dose.

Worksheet 3.2b continued next page

Worksheet 3.2b continued

Worksheet 3.2b

There are advantages and disadvantages with the use of chemicals in agriculture, and producers must consider these carefully before selecting and using chemical means on their farms.

Some advantages of chemical use in agriculture include:

- Improved growth and productivity of animals and plants, helping to ensure adequate food supply.
- Prevention of disease, reducing management costs and loss of production.
- Generally fast control of pests and disease which stops the spread to other plants and animals and protects the welfare of animals.
- Prevention of weed growth which would negatively impact the growth of desirable pasture and crops.



Disadvantages and issues associated with chemical use in agriculture include:

- Some chemicals need to be strictly regulated to ensure the safety of consumers so that the chemical is not present in food.
- Relying on the use of chemicals over time can make them less effective as a treatment and prevention strategy as the pests, diseases and weeds can become resistant (not affected) to the chemical being used.
- Chemicals can impact desirable organisms in environments if they are exposed to them.

Natural methods of producing and managing animal and plant products are used by farmers too. Sustainable farming methods are focused on protecting all areas of ecosystems, and farmers are increasingly looking for solutions to produce food and fibre in ways that will not impact the environment. Examples include: looking at natural ways to improve soil fertility instead of using fertilisers, such as, growing particular plants that supply nitrogen to the soil; ensuring pastures have rest periods and encouraging organic matter in the soil, which will increase the amount and type of organisms, like dung beetles, in the environment.

Natural means of controlling pests and disease include biological, genetic and management strategies, as well as natural chemicals that are produced without any human intervention. Naturally occurring chemicals can be either:

- An unprocessed chemical that is found in nature, such as chemicals from plants, micro-organisms, animals, the earth and the sea.
- A chemical that is found in nature and extracted using a process that does not change its chemical composition[1] (see references).

Worksheet 3.2b continued next page

Worksheet 3.2b continued

Worksheet 3.2b

An example of a natural means of pest and disease control involves growing a variety of crops and avoiding monocultures (growing the same crop in successive years) so that the life cycle of pests and diseases is stopped when a different plant is grown.

Just like using chemical methods, relying on natural means on a farm can offer many advantages and disadvantages.

Some advantages of natural means of agriculture include:

- Protecting the beneficial organisms within the environment.
- Decreasing environmental contamination linked with synthetic chemical use and protecting water quality.
- Encouraging biodiversity within the ecosystem.



Disadvantages and issues associated with natural production means in agriculture include:

- Organic foods are not necessarily chemical free because farmers may use natural pesticides.
- If consumed in large amounts, natural pesticides may cause problems to humans if interrupted.
- Desirable outcomes can be slow to achieve as ecosystem balance is restored. This may result in production loss during this period.

Worksheet 3.2c

Advantages and disadvantages of chemical and natural means management of animal health

1. Identify the stakeholders interested in the management of animal health on a farm.
2. In the thought clouds, outline what each of the stakeholders might be thinking about the advantages (marked with a +) and the disadvantages (marked with a -) of chemical and natural management of animals so that they can be produced for red meat.

Chemical management:

\+ _____

_____

– _____

_____

Chemical management:

\+ _____

_____

– _____

_____

Chemical management:

\+ _____

_____

– _____

_____

Natural management:

\+ _____

_____

– _____

_____

Natural management:

\+ _____

_____

– _____

_____

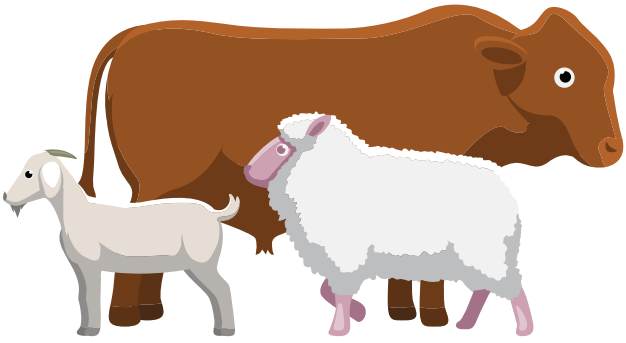
Natural management:

\+ _____

_____

– _____

_____







_____ _____ _____

Worksheet 3.3a

Case study: Organic farming at Gum Park

Gum Park is an organic farm that produces plants and animals using natural means.

Access and view the video clip using the QR code or the video link and answer the questions, summarising how the producers manage animals and plants on their farm.

1. Briefly describe Gum Park. (Location, size, features and production type)
2. Explain what Dee Nolan states as the key purpose of organic farming.
3. Describe how the olive trees and sheep both benefit from the integrated farming system of Gum Park.
4. Identify the breed of sheep on Gum Park farm.
5. Identify the reasons why the producers on this farm have chosen this breed of sheep.

Worksheet 3.4

Online learning task: Australian Sheep Breeding Values (ASBVs)

a. Access Online learning task 3 and complete the activities as directed.

Stock health and disease

Worksheet 3.1a – Stock health and disease

There are a number of animal husbandry techniques producers must carry out to take care of their animals. Some of them are to prevent or treat disease in their stock.

An animal disease is something that causes a negative effect on the normal body's functions, generally associated with certain signs or symptoms. Diseases may cause a weakening of the animal, slower growth, and therefore lower production for a producer, or even result in the death of the animal.

The prevention and treatment of livestock diseases significantly increase the health and welfare of livestock and the productivity and profitability of the Australian red meat industry. Improved animal health contributes to enhanced carcase quality, meat quality and overall yield.

Diseases are controlled and managed on a farm using a variety of techniques. Some diseases in cattle include: Calf Scours, Bovine Respiratory Disease, Bovine Ephemeral Fever, Bloat, Theileriosis, Pestivirus (BVDV) and Pinkeye. Some diseases in sheep include; Ovine Johne's disease, Weaner Ill-thrift, Flystrike, Bloat, Footrot and Ryegrass toxicity.

Producers must also take care of the plants that the animals eat on their farm and ensure that they provide enough quality feed for their stock.

Activity 3.2

Management of sheep and cattle through natural means and with the use of chemicals

Worksheet 3.2a – Management of plants and animals through natural means and with the use of chemicals.

Key for pictures:

1. Sheep drenching.
2. Vaccination for cattle.
3. Spraying pesticide.
4. Dung beetle on hand.
5. Examination of soil and pasture.
6. Sheep in a fenced paddock. (Can be used to discuss stock rotation).

- The type of chemicals that might be used on a farm include, medicines to treat disease, vaccinations to prevent disease, herbicides to kill unwanted plant species in a pasture, etc.
- Chemicals are given to the animals via vaccinations, drenching, backline application, and plants, via spraying.
- Chemicals are needed for both animals and agricultural plants on many farms. Some organic farms manage their animals via natural means.
- Chemicals are needed to prevent disease, treat disease, prevent unwanted plants (weeds) growing in pasture. These all can adversely affect growth of the animals, and therefore, reduce production and profit for producers.
- Natural management strategies that farmers could use include: introducing natural ways to improve the soil fertility by incorporating plants that fix atmospheric nitrogen; resting pastures by rotating stock and crops; using natural fertilisers, such as manure; and encouraging microbes and invertebrates such as dung beetles.
- There are negatives and positives with both management systems (see Worksheet 3.2b).

Worksheet 3.2c – Advantages and disadvantages of chemical and natural means management of animal health

Chemical management:
\+ Chemicals can help me increase production and help my profitability.
– Chemicals are expensive.

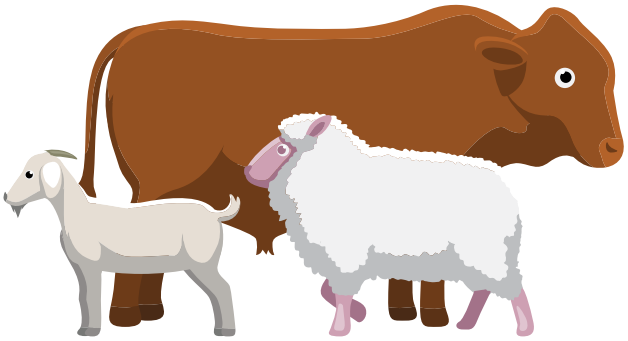
Chemical management:
\+ Decreased environmental contamination is good.
– I want animals to be treated quickly and effectively with chemicals when they are sick. I don't want them to suffer.

Chemical management:
\+ I want to be treated quickly with chemicals when I'm sick. I don't want to suffer.
– Chemicals can negatively impact other animals in my environment.

Natural management:
\+ I am happy that I'm looking after the environment and contributing to sustainability.
– I might have production losses as I transition to natural management.

Natural management:
\+ Chemicals help animals and plants increase production to feed the increasing population.
– I don't want the environment contaminated with chemical run-off.

Natural management:
\+ If I don't need vaccinations or drenches, I'm handled less and this reduces my stress.
– I might get unwell and it might take a while for me to improve without chemicals.







Animals | Farmers or producers | Consumers

Activity 3.3

Organic farming at Gum Park

Worksheet 3.3a - Case study: Organic farming at Gum Park.

1. Briefly describe Gum Park. (Location, size, features and production type)
• Hynam, South Australia, near Naracoorte. Located in the Limestone Coast region • 100 acres • Produces sheep (Southdown sheep, for meat) and olives (for olive oil) • Certified organic
2. Explain what Dee Nolan states as the key purpose of organic farming.
No chemicals or fertilisers are used. They start from the soil up and make sure that it is healthy. This then affects the plants (olive trees and grasses) and ultimately the animals (sheep) on their property, as they eat the plants.
3. Describe how the olive trees and sheep both benefit from the integrated farming system of Gum Park.
Gum park produces olive oil from their olive grove which the sheep graze in. The sheep manure fertilises the olive trees and keeps the grass down so that the trees can grow without the competition of other plant species. The sheep benefit by eating some of the leaves on the lower branches of the olive trees and are provided shade by the trees.
4. Identify the breed of sheep on Gum Park farm.
Southdown sheep
5. Identify the reasons why the producers on this farm have chosen this breed of sheep.
• short wool • muscular/fuller frame • large hindquarters • easy lambing • quality meat product • easy to work with

Activity 3.4

Online learning task:
Australian Sheep Breeding Values (ASBVs)

1. A- Australian, S- Sheep, B- Breeding, Vs- Values
2. Producers would be interested in ASBVs because they can research the values prior to purchasing particular sheep and predict certain characteristics about them and their progeny. Traits including: growth rates, wool quality and characteristics, reproduction percentages and twinning statistics, health, carcase measurements and eating quality traits. These traits will impact on their productivity, and therefore, profitability to a producer.
3. The ASBVs are:
   - Number of lambs weaned.
   - Lambing ease.
   - Growth.
   - Muscle.
   - Positive fat.
   - Negative worm egg counts.
4. The market Phil is aiming to supply his lamb to are the retail supermarkets.
5. Phil has both Corriedales and Coopworths on his farm. (He crosses these breeds to give him ‘hybrid vigour’.)
6. Improvements since Phil started using ASBVs:
   - Increased lambing percentage.
   - Increased kilograms per hectare.
   - Increase in weaning rate.