

Biosecurity planning for schools

Aim

This unit of work has been designed to assist students gain an understanding of biosecurity in NSW through the development of a school farm biosecurity plan which includes management practices to prevent the entry and spread of pests and diseases, and; to prepare and respond to emergency situations. Students will then develop an infographic to represent the key message of the NSW Biosecurity Strategy 2013–2021: *Biosecurity is a shared responsibility*.

Teacher instructions

The sequence of lessons in this unit are designed to build a student's understanding of biosecurity in a staged approach by firstly exploring and engaging in the development of a biosecurity plan, and then, communicating the concept of biosecurity as a shared responsibility of government, industry and the people of NSW. While teachers are encouraged to follow the unit structure provided, the resources provided can be adapted to suit different situations.

Lesson 1 – Overview of biosecurity and completion of a farm biosecurity checklist.

Lessons 2 and 3 – Students research and develop a biosecurity plan for the school farm.

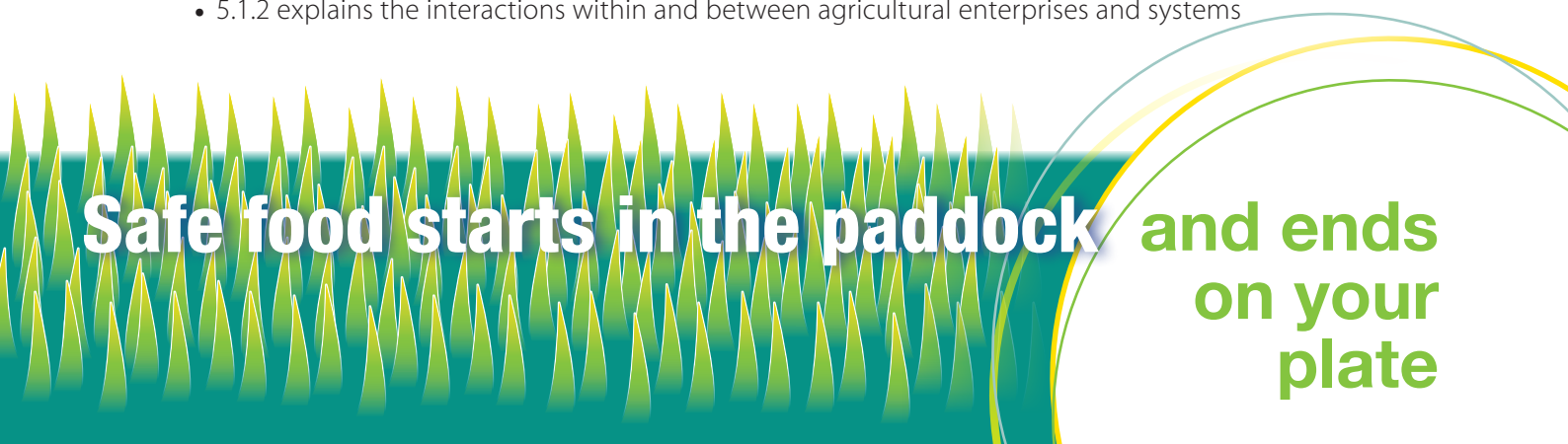
Lesson 4 – Case study biosecurity incident.

Lesson 5 – Students design and develop an infographic to communicate the key message - *Biosecurity is a shared responsibility*.

NSW syllabus outcomes

Agriculture Technology Stages 4 and 5

- 4.1.2 outlines the interactions within and between agricultural enterprises and systems
- 4.2.1 identifies and explains interactions between the agricultural sector and Australia's economy, culture and society
- 4.4.3 implements and appreciates the application of animal welfare guidelines to agricultural practices
- 5.1.2 explains the interactions within and between agricultural enterprises and systems



Safe food starts in the paddock and ends
on your
plate

- 5.2.1 explains the interactions within and between the agricultural sector and Australia's economy, culture and society
- 5.3.3 explains and evaluates the impact of management decisions on plant production enterprises
- 5.3.4 explains and evaluates the impact of management decisions on animal production enterprises
- 5.4.3 implements and justifies the application of animal welfare guidelines to agricultural practices

Agriculture Stage 6

- P1.1 describes the complex, dynamic and interactive nature of agricultural production systems
- P3.1 explains the role of decision-making in management and marketing of agricultural products in response to consumer and market requirements
- H1.1 explains the influence of the physical, biological, social, historical and economic factors on sustainable agricultural production

Acknowledgements

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Disclaimer

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Lesson 1: Overview of biosecurity and farm checklist

Aim: Students gain a general understanding of biosecurity, the key elements of farm biosecurity and how surveillance supports biosecurity and market access.

1. Introduction

- Discuss biosecurity and how it works.
- Outline the importance of biosecurity to agricultural industries in both NSW and across Australia, the environment and our communities. Introduce the *Biosecurity is a shared responsibility* - key message of the *NSW Biosecurity Strategy*.
- Discuss the different types of biosecurity.

2. Activity - complete a school farm biosecurity checklist

- If the school has a farm assistant it is important that they attend this lesson to assist the students compile the information required for the thumbnail sketch of the school farm and the biosecurity measures currently used.
- Complete a thumbnail sketch of the school farm using the example in Table 1 as a guide to the information required.
- Complete the checklist in Table 2 of the current biosecurity measures used.

3. Conclusion

- Discuss the information compiled on the physical attributes of the school farm and the biosecurity measures implemented - which biosecurity categories have measures implemented and where are the gaps?
- Explain that next lesson students will research and complete the action plan column of Table 2.

Resources required

- Organise the farm assistant/s to attend the lesson to assist students compile the current biosecurity measures being implemented.
- Provide digital or hardcopies of Tables 1 and 2 for students. A word version of Table 2 is provided to allow students to enter information.

Background information

Key message - *Biosecurity is a shared responsibility*

Government, industry and the people of NSW working together to protect the economy, environment and community from the negative impacts of animal and plant pests, diseases and weeds for the benefit of all people in NSW.

What is biosecurity?

Biosecurity is defined as the protection of the economy, environment and community from the negative impacts of pests, diseases, weeds and contaminants.

How does biosecurity work?

Biosecurity includes measures to:

- prevent new pests, diseases and weeds from entering our country and becoming established
- manage established pests, diseases and weeds to eradicate them where feasible or lessen their impact
- ensure an appropriate preparedness and response capacity that is internationally recognised and meets our trading obligations and international treaties
- maintain or improve the status of Australia's biosecurity systems.

Why is biosecurity important?

- Australian flora and fauna are unique; by protecting them we protect our natural biodiversity, distinctive ecosystems and heritage.
- Australia's domestic and international markets demand products that are free of pests, diseases and contaminants.
- Biosecurity helps to keep food and other products from our primary industries safe from diseases such as *Salmonella* and pathogenic *E. coli*. Biosecurity also protects people from diseases that can be passed from animals to humans (called *zoonoses*), such as *Hendra virus* and *Avian Influenza*.

Plant biosecurity?

Plant biosecurity is all about protecting the economy, human health and the environment from problems associated with pests and diseases of plants. Due to Australia's geographic isolation and historically strong focus on quarantine, we're in the fortunate situation of being free of many significant pests that adversely affect agricultural production in other countries.

Fewer pest and disease problems mean lower production costs. 'Pest freedom' provides an enormous market access advantage to Australian producers. The social value of public amenities, such as parks and gardens, is maintained if they can be protected from pests.

Animal biosecurity?

Animal biosecurity starts wherever livestock are located, on farms, in feedlots or production sheds, at showgrounds and racetracks, on small hobby blocks and in suburban backyards. NSW DPI and the Local Land Services (Formerly Livestock Health and Pest Authorities, and Rural Lands Protection Boards) work with livestock producers, veterinary practitioners and other stakeholders to ensure the quality and safety of NSW livestock and livestock products.

Aquatic biosecurity?

Aquatic biosecurity protects the economy, human health and the environment from problems associated with aquatic pests, diseases and saltwater weeds. Fishers, fish farmers and ornamental fish enthusiasts all have a vital role to play, managing aquatic biosecurity risks in partnership with government and associated industries.

Farm biosecurity?

Farm biosecurity is a set of management practices and activities that are carried out on-farm to protect a property from the entry and spread of pests and diseases.

Table 1: Thumbnail sketch of a farm

(Students should replace the example text in the Data and Comments columns with information about the school farm).

Standard	Data	Comments
Area	2000ha	1750ha under production 250ha remnant bushland
Production systems on the farm e.g. wheat, cattle, chickens etc	Wheat, barley and lupins, hay Sheep	
Number and type of entrances to the farm	4 1 - main gate to house and shearing shed 1 – gate to grain silos 2 – access gates used by electricity authority to check power lines	
Visitors to the farm	Electricity inspectors Family Neighbours Stock Agents Agronomists Bank Manager Fuel company truck driver Harvesting contractors including grain truck drivers Preg tester Shearers	
Livestock coming onto the farm	About 20 stud rams per year	Delivered by contractor
Livestock leaving the farm	About 1000 fat lambs per year and about 300 cull ewes	Collected by contractor
Farm inputs (not livestock)	Fertiliser Stockfeed Seed for sowing Pesticides Veterinary medicines Fuel	Brought onto the farm by farm staff using a farm vehicle (ute/ truck/car). Delivered by contractor
Farm outputs (not livestock)	Grains: wheat, barley, lupins Wool	Collected by contractor

Table 2: Farm biosecurity checklist for schools.

In the table below, respond to the checklist statements by selecting either the 'Yes' or 'No' column adjacent.

Farm biosecurity category and questions	Yes	No	Action plan
Livestock biosecurity			
Livestock arriving at the school are kept separately from existing livestock for at least 3 weeks to prevent introduction and spread of pests and disease and allow time for testing and / or treatment.			
The boundary fences are regularly inspected and maintained.			
School staff request a National Animal Health Statement from the vendor and relevant to the species being purchased, when buying new livestock.			
The school has a Property Identification Code (PIC).			
School staff keep records of livestock movements (on and off farm) to allow for trace-back of livestock movements including notifying the National Livestock Identification Scheme for the movement of sheep, cattle and goats.			
The school has a current Livestock Introduction plan that includes the health status of livestock and a checklist of procedures to follow in collaboration with a local veterinarian.			
Plant/seed/animal feed/human food movement and storage			
This sentence should read			
The school is a member of the on-farm food safety program Livestock Production Assurance (LPA)			
School staff request vendor declarations/ quality assurance documents when buying new seed or plants or animal feed.			
School staff ensure plant material for animal feed such as hay has been certified as free of weed seeds.			
School staff regularly inspect seed/ animal feed/human food storage areas for pests and diseases and take appropriate action, for example, mice carry a range of infectious diseases that can be transferred to humans and animals.			

Farm biosecurity category and questions	Yes	No	Action plan
If yes above, school staff record these inspections even if they found nothing of note.			
Schools comply with the Stock Foods Act including prohibition of feed that may have come in contact with meat material.			
School staff keep records of the use of seed/animal feed/human food that would allow for trace-back.			
People, vehicles and equipment			
Farm biosecurity signage is used to direct all farm users to designated parking areas.			
A register of visitors to the school is used.			
School staff control where visitors can go in the school.			
Hand washing facilities and instructions for the washing of hands, before and after handling animals, are available at entry and exit.			
All farm users that enter production areas are required to wear clean footwear and clothing.			
Machinery, equipment and vehicles are cleaned down between uses (for livestock, crops and pastures).			
A clean down area for vehicles, equipment and people is available.			
If yes above, school staff ensure that all farm users use this facility.			
Water			
Drinking water resources are managed to minimise the risk of spread of pests and diseases between properties.			
Feral animals, pests, weeds and diseases			
School staff regularly inspect livestock, crops, and pastures for the presence of pests and diseases.			
If yes above, school staff record these inspections even if they found nothing of note.			

Farm biosecurity category and questions	Yes	No	Action plan
School staff know the health status of school livestock/crops/pastures and how to protect these from pests/weeds/diseases eg vaccination of livestock, spraying of crops, removal of weeds.			
School staff know how to manage sick animals in consultation with a veterinarian.			
School staff know how to manage unhealthy crops/pastures.			
School staff keep records of drugs/chemicals used to treat livestock/crops/pastures.			
School staff control feral animals and weeds on the school grounds and record these control activities.			
School staff work with neighbours to control feral animals and weeds in the local area and record these control activities.			
Waste management			
School staff dispose of livestock carcasses and all manure in accordance with environmental and public health legislation.			
School staff dispose of plant waste in a manner that minimises the risk of the spread of pests, weeds and diseases.			
The farm rubbish dump is fenced off.			
Emergency planning			
The school has a current Emergency plan that covers all potential risks to the property and animals kept on site, including, bushfire, flood, biosecurity, utility supply interruption and evacuation procedures.			

Lessons 2 and 3: Research and develop action plan

Aim: Students research and develop a biosecurity plan for the school farm.

1. Introduction

- Revise biosecurity and its importance to our economy, environment and community using the *Biosecurity is a shared responsibility* key message.
- Review the results of the checklist completed in the previous lesson.
- Inform students that they will each formulate a biosecurity plan for the school farm by conducting independent research.

2. Activity – research and develop biosecurity action plan

- The following list of resources are provided to assist students assess the effectiveness of biosecurity measures currently implemented on the school farm and determine where and what other actions are required.
- As a class group work through one category and then allow the students to proceed independently.

3. Conclusion

- As a group identify biosecurity measures that these students were aware of prior to this lesson and vice versa identify some measures that the students didn't know about previously.

Resources required

- Internet and computer access to enable students to conduct individual research using the websites listed below.
- Copy of Tables 1 and 2 from the previous lesson.

Biosecurity

<http://www.farmbiosecurity.com.au/>

<http://www.dpi.nsw.gov.au/agriculture/pests-weeds>

Biosecurity planner

<http://www.farmbiosecurity.com.au/planner/>

Small farms

http://www.lbn.org.au/wp-content/uploads/2015/02/LBN_Small_Farmer_5_Tips_A41.pdf

<https://www.agric.wa.gov.au/livestock-animals/biosecurity-plans-small-landholders>

Plant biosecurity

<http://www.dpi.nsw.gov.au/biosecurity/plant>

<http://www.planthealthaustralia.com.au/national-programs/grains-farm-biosecurity-program/grains-biosecurity-fact-sheets/>

<http://quarantinedomestic.gov.au/destination-new-south-wales-act.html>

Animal biosecurity

<http://www.dpi.nsw.gov.au/agriculture/livestock>

<http://www.dpi.nsw.gov.au/biosecurity/animal>

<http://www.animalhealthaustralia.com.au/programs/biosecurity/biosecurity-planning/>

<http://www.farmbiosecurity.com.au/wp-content/uploads/2013/06/Farm-Biosecurity-for-Livestock-Producers.pdf>

<http://www.lbn.org.au/>

<http://www.farmbiosecurity.com.au/livestock/>

<http://www.ils.nsw.gov.au/livestock/pics>

<http://www.mla.com.au/Meat-safety-and-traceability/Livestock-Production-Assurance>

Animal health and disease

<http://www.dpi.nsw.gov.au/agriculture/livestock/health>

Animals in NSW Schools

<http://nswschoolanimals.com/>

Emergency planning

<http://www.dpi.nsw.gov.au/agriculture/emergency>

<http://www.dpi.nsw.gov.au/agriculture/emergency/management/publications-advice/emergency-guide-animal-holding-establishments>

<http://www.abc.net.au/news/emergency/plan-for-an-emergency/>

Table 3: Optional marking rubric for Biosecurity plan

Performance level	Performance level	Performance level	Performance level	Marks
Analysis				
6	4	2	0	/12
Demonstrated understanding of all five of the requirements of farm biosecurity ¹ .	Demonstrated understanding of three of the four of the requirements of farm biosecurity.	Demonstrated understanding of one or two of the requirements of farm biosecurity .	No demonstrated understanding of the requirements of farm biosecurity.	/6
Provides workable, relevant and realistic actions to address all gaps in farm biosecurity.	Provides workable, relevant and realistic actions to address some gaps in farm biosecurity.	Provides actions to address some or all gaps in farm biosecurity but these actions are not workable, relevant and realistic.	Does not provide actions to address gaps in farm biosecurity.	/6
Structure and Presentation				
6	4	2	0	/6
Evidence of detailed research in completion of the assignment.	Evidence of purposeful research in completion of the assignment.	Evidence of some research in completion of the assignment.	Very little evidence of research in completion of the assignment.	6
Group work				
3	2	1	0	/3
Group members worked effectively as a team to complete the assignment in a timely manner.	Group members worked as a team to complete the assignment.	Group members worked to complete the assignment.	Group members did not complete the assignment.	/3
Total marks and comments				/21

- ¹Make sure only healthy/clean animals/plants/equipment/people/produce come onto and leave your property
- Control where animals/plants/visitors/produce goes on your property
- Control pests/ diseases/weeds on your property
- Follow chemical label directions and record the withholding periods on vendor declarations when selling livestock or grain/fodder.
- Keep records as these will assist you to manage any incidents.

Lesson 4: Scenario biosecurity incident

Aim: Provide an overview of biosecurity in action through using a scenario biosecurity incident for students to manage.

1. Introduction

- Revise biosecurity – what it is, what it involves and its value to the economy, environment, and community.
- Use the scenario biosecurity incidents in Table 4 and the case study information following to discuss what actions could be taken to minimise harm from a suspected exotic pest or disease. This exercise is not really about getting it right but more about thinking in a systematic way about managing a potential incident.
- Discuss the need to:
 - › Keep people and animals away from the possible site of the pest or disease.
 - › Prevent further spread of the pest or disease. For example, anything that touches the pest or diseased animal should stay at the site or be contained so as to not spread the disease or pest.
 - › Start thinking about how the pest or disease arrived – traceback.
 - › Start thinking about where the pest might have spread to — traceforward.

2. Activity - management of a suspected biosecurity incident

- Divide the students into groups of four.
- Give each group a laminated copy of the school farm map, the scenario's in Table 4 and case study notes; and whiteboard markers.
- Explain to the students that you would like them to develop actions (appropriate to the incident chosen) to contain, manage and prevent further spread of the suspected incident.
- Students may use the whiteboard markers to draw on the maps.

3. Conclusion

- Ask each group to report back to the class how they managed the suspected incident.

Resources required

- Print out enough copies of the biosecurity incident scenarios (Table 4) and case study notes for groups of students to use.
- Provide laminated maps of the school farm.
- Whiteboard markers.
- Computer access to research appropriate biosecurity measures using the list of websites provided in Lessons 2 and 3.

Table 4: Biosecurity incident scenarios

What happened	Extra information to consider
<p>Scenario 1</p> <p>You went to the wheat silo to collect wheat and feed the chickens and noticed the wheat smelt “fishy”.</p>	<p>Karnal bunt (<i>Tilletia indica</i>) is a fungus affecting grains of wheat, durum and triticale. It reduces grain quality through the production of masses of powdery spores that discolour the grain and grain products. It is recognised by a ‘dead fish’ smell.</p> <p>Australia is currently free of Karnal bunt.</p> <p>If Karnal bunt was detected in Australia, grain export markets would be affected, as many countries have import restrictions for this pest. Therefore, this fungus poses a major threat to Australia’s grain industry. The sooner a potential introduction of Karnal bunt is detected and reported, the greater the chance of rapid and effective eradication.</p> <p>Think about:</p> <ul style="list-style-type: none"> • What must you do first? <p>Think about trace-back and trace-forward:</p> <ul style="list-style-type: none"> • Where did the wheat come from? • Where has the wheat gone too? • Who has accessed the wheat and where have they been after touching the wheat?
<p>Scenario 2</p> <p>You went to the poultry shed and found many of the hens were sneezing, lethargic and had diarrhoea.</p>	<p>Virulent Newcastle Disease (ND) is a viral disease of domestic poultry and wild birds, which is characterised by gastrointestinal, respiratory, nervous signs and a high death rate.</p> <p>Australia is currently free of virulent Newcastle disease.</p>
<p>Scenario 3</p> <p>You were feeding the cattle and noticed that a couple of them were lame, were dribbling a lot more than normal and appeared to have sores on their noses.</p>	<p>Foot and mouth disease (FMD) causes lesions (sores) on the feet and mouths of cloven hoofed animals (cattle, sheep, pigs). Foot lesions leave animals lame and unable to walk to feed or water. Tongue and mouth lesions are very painful and cause animals to drool and stop eating. Pigs and cattle will also have a severe fever and be depressed.</p> <p>The disease spreads most commonly through the movement of infected animals and animal products including meat and milk.</p> <p>In sheep the signs can be absent or very mild, and undetected infected sheep can be an important source of infection. FMD virus can also be spread on wool, hair, grass or straw; by the wind; or by mud or manure sticking to footwear, clothing, livestock equipment or vehicle tyres.</p> <p>Pigs are regarded as ‘amplifying hosts’ because they can excrete very large quantities of the virus in their exhaled breath.</p> <p>FMD is important in international trade in animals and animal products, with countries that are free of the disease banning or restricting imports from affected countries. This means an outbreak would have serious economic implications for a major livestock-exporting country like Australia.</p>

Scenario 1: Karnal Bunt

- **Karnal bunt** (*Tilletia indica*) is a fungus affecting grains of wheat, durum and triticale. It reduces grain quality through the production of masses of powdery spores that discolour the grain and grain products. It is recognised by a 'dead fish' smell.
- Australia is currently free of Karnal bunt.
- If Karnal bunt was detected in Australia, grain export markets would be affected, as many countries have import restrictions for this pest. Therefore, this fungus poses a major threat to Australia's grain industry. The sooner a potential introduction of Karnal bunt is detected and reported, the greater the chance of rapid and effective eradication.

Scenario 2: Newcastle disease

- **Newcastle disease** is a virus that occurs worldwide and affects a wide range of bird species. It is particularly harmful to poultry and chickens are most affected.
- Australia is currently free of virulent Newcastle disease.
- Australian strains of Newcastle disease circulate in wild birds without causing harm to those birds.
- Some exotic (overseas) strains of Newcastle disease are much more harmful and transmissible than Australian strains. Quarantine measures aim to keep all such viruses out of Australia.
- Outbreaks of Australian-origin Newcastle disease in eastern Australia between 1998 and 2002 were costly and difficult to control.
- Early detection and rapid control of disease reduce cost and disruption to producers, export and domestic markets. Both the poultry industry and governments benefit from these measures.
- Poultry producers must keep records, conduct surveillance, report disease, submit samples and meet biosecurity standards. Long-life chickens must also be vaccinated against Newcastle disease.

Scenario 3: Foot-and-mouth disease

- **Foot-and-mouth disease** (FMD) is by far the most significant biosecurity threat to Australia's livestock industries. An outbreak in Australia could have devastating consequences in lost production, trade and tourism. It would also have social consequences resulting from movement restrictions and response activities during an outbreak.
- FMD is a highly contagious disease of cloven-hooved animals including sheep, cattle, pigs and goats. There have been a number of outbreaks in FMD-free countries that have had large socioeconomic impacts. The 2001 outbreak in the United Kingdom caused losses of more than 8 billion pounds which is approximately \$AUD 19 billion.
- If FMD was diagnosed in Australia, our livestock and livestock product export markets would close until we could prove we were free of the disease. A large outbreak could cost \$52 billion over 10 years (ABARES). This would devastate producers, livestock industries, regional communities and Australia's economy as a whole. However, if we found the outbreak early, the financial and social impacts could be substantially reduced.
- Foot-and-mouth disease could enter Australia by:
 - › illegally imported meat and dairy products being fed to pigs
 - › people returning from overseas with the virus on their clothing, footwear or equipment.

Lesson 5: Design and develop an infographic to communicate the key message of the NSW Biosecurity strategy 2013-2021 - *Biosecurity is a shared responsibility - to your school and local community.*

Aim: Design an infographic to communicate the key message - *Biosecurity is a shared responsibility.*

Background information

An infographic is a visual representation of information or data. There are many styles of infographic see examples at <http://www.creativebloq.com/graphic-design-tips/information-graphics-1232836>.

1. Introduction

- Revise the key message - *Biosecurity is a shared responsibility* - Government, industry and the people of NSW working together to protect the economy, environment and community from the negative impacts of animal and plant pests, diseases and weeds for the benefit of all people in NSW.

2. Activity – design and develop infographic

- As a group unpack the elements of the key message by asking questions such as, list the three categories of people who should be sharing the responsibility for biosecurity, what will be protected if they all take responsibility, what will these groups of people be working to prevent?
- Discuss the forms that an infographic might take eg chart, animation, quote etc.
- Brainstorm ideas about how the *Biosecurity is a shared responsibility* message could be depicted in an infographic.
- Students work in pairs to design and produce infographic.

3. Conclusion

- Ask each group to explain their infographic to the class.

Resources required

- Internet and computer access to enable students to use online design tools, such as the examples in the list below, for the production of their infographic.
- Art materials as required.
- If you are lacking creative confidence try to enlist some outside inspiration for this lesson, such as the school Art teacher; senior students studying art; a creative parent, friend or family member.

Flickr - a database of images

<https://www.flickr.com/photos/landlearnsw/>

PicArtia - create photo mosaics

www.makeuseof.com/dir/picartia

Google Earth - locate places

<http://earth.google.com>

Glogster - where you can mash up media.

www.glogster.com

Six Maps – online mapping tool where you can locate cadastral and spatial imagery of NSW.

<https://maps.six.nsw.gov.au/>

Free online infographic tool

<https://venngage.com/>

<http://piktochart.com/>

<http://www.easel.ly/>