Chapter 7.

Sustainable Food

Terms and concepts

Garden, sustainable, management, layers, fertiliser, organic, soil fertility, permaculture, compost, soil, ecological footprint, poultry, husbandry, groundcover, canopy, nutrients inputs, outputs, food chain, evaporation, pollinator.

Background Information:

The Coal loader Community garden and Coal Loader platform garden plots are wonderful resources for any school wanting to know more about growing food and getting students involved in the learning opportunities that a garden allows.

The Community garden was originally a carpark for workers at the Coal Loader until 1992 and then became the caretaker's courtyard garden between 1992 and 2006, this beautiful area is now a community garden.

Established in 2007, and planned and built by local residents, the Garden is operated on organic principles and is irrigated using rainwater captured from the roof of the adjacent building. The garden is open to all within the community.

The garden uses several forms of composting including compost heaps, compost bins and worm farms. Composting and worm farming are one the best ways to utilise green kitchen waste and makes great organic fertiliser.

The community garden at the Coal Loader is designed using permaculture principles. Permaculture (or permanent agriculture) is a garden design philosophy that is a garden design philosophy that encourages zonation around the home – herbs and vegetables closest, livestock further away and food trees further away in the orchard. Many gardeners today use permaculture as a way to become more self-reliant through the design and development of productive and sustainable gardens and farms.

Growing your own food is not only good for your health, it is good for the environment and a good way to get involved locally.

Organic, home-grown fruit, vegetables and herbs are fresher, more nutritious and more delicious than conventionally farmed fruit, vegetables and herbs. You are eating in the right season and you know where your food has come from.

Freshly eaten home-grown food produces little or no greenhouse emissions. Your home-grown food travels metres instead of hundreds or thousands of kilometres. Reducing your food miles is a great way to reduce our ecological footprint.

The Coal Loader Community Garden offers an excellent opportunity to demonstrate how to grow food and keep chickens to students and teachers alike. Like all community gardens, it has its roots in motivated local residents coming together around a common need and goal to produce local fruit, vegetables and eggs sustainably in a community space.

Syllabus Links

- Geography Stages 1-5
- Curriculum Priority Sustainability – Geography – Stage 2, 3 4 and 5
- Science and technology and Science Stages STl, ST2, ST3, ST4
- Cross Curriculum Priority Sustainability – Science – STl, ST2, ST3, ST4

Further Information:

Watch the Coal Loader Grow your Own Food three minute video which will give your class an overview of what you will find at the Coal Loader.

Refer to websites such as:

- *www.northsydney.nsw.gov.au/homepage/43/community-gardens*
- Coal Loader Garden Project – *www.ideas.org.au/uploads/resources/456/CoalLoaderGardenProjectResource.pdf*
- NSW DET – *education.nsw.gov.au/teaching-and-learning/curriculum/sustainability/teaching-and-learning/kitchen-gardens*
- Poultryhub – *https://www.poultryhub.org/*
- Permaculturenorth – *https://permaculturenorth.org.au/*
- Organicschools – *https://organicschools.au/*

North Sydney Council thanks the Coal Loader Community Garden Group for providing advice and information on this chapter.

Activity 1 – Student Worksheet
An investigation into the Coal Loader Centre's sustainable gardens.

Name .....

Activity Summary:

Students will identify, categorise and locate the different ways the Coal Loader Centre's community garden and community plots operate as sustainable gardens.

Inquiry Questions:

1. What are the features of Coal Loader Centre's sustainable gardens, and where are they?
2. How do the Coal Loader Centre's gardens operate sustainably?
3. What are the benefits of sustainable gardens and sustainable food?

Syllabus Outcomes:

- Describes the ways people,places and environments interact. GE2-2
- Explains interactions and connections between people, places and environments. GE3-4
- Discusses management of places and environments for their sustainability. GE4-5
- Describes observable features of living things and their environments. ST2-4LW-S
- Examines how the environment affects the growth, survival and adaptation of living things. SC4-14LW
- Describes how agricultural processes are used to grow plants and raise animals for food, clothing and shelter. ST3-5LW-T
- Investigates how food and fibre are produced in managed environments. TE4-5AG

Materials and preparation:

- Each student will need a clipboard and writing equipment.
- Each student will need a copy of the student worksheet.
- A4 laminated Coal Loader Map.
- Students should participate in a pre-excursion class brainstorming session or discussion around the inquiry question, what is the difference between sustainable gardens and non-sustainable gardens?

Background Information:

The benefits of keeping chickens include providing regular supply of fresh eggs, recycling food waste, making excellent pets, helping aerate garden soil, managing insect pests, and providing the garden with fertiliser.

Raising and keeping chickens provides a great way to teach us about responsibility and how to care for living things. They also provide an experience in small animal farming and egg hatching if eggs are fertile.

Chickens can be fed food scraps, including waste that cannot be composted such as the remains of dishes that incorporate meat, pasta, rice and bread. Hens need to have a secure, warm, and safe environment in which to lay their eggs. If their environment is conducive to production, one hen can lay an egg a day in the laying season which is defined by daylight length, but on average they lay five eggs a week.

The chickens at the Coal Loader are maintained by volunteers from the Community Garden group who are rewarded daily with fresh eggs. The high fence is effective in keeping foxes away from the chickens, and as an extra precaution the chickens are always closed in the coop at night. As egg production is the outcome at the Coal Loader, roosters are not needed in the management process, so crowing is not an issue. In fact North Sydney Council has a Rooster Policy which forbids the keeping of roosters in the municipality.

The Coal Loader chickens are housed in what was once an old shed, so even the chicken coop at the Coal Loader follows adaptive reuse principles!

North Sydney Council has guidelines to assist in keeping chickens in the backyard or school — *https://www.northsydney.nsw.gov.au/animals-1/keeping-chickens*

Activity 1 – Student Worksheet
An investigation into the Coal Loader Centre's sustainable gardens. *continued*

Name .....

Location – Coal Loader Community Garden (between the Caretaker's cottage and the CL Platform).

Introduction

The Coal Loader Centre's sustainable gardens showcase what it means to garden and produce food in a sustainable way. Sustainable gardening involves growing plants for food, and, capturing water, waste, nutrients, plants and seeds to provide all, or most of the inputs the garden needs.

Sustainable gardening requires the recycling and reuse of many inputs and outputs, so that nothing (or very little) is required from other shops or businesses and there is no pollution or landfill produced.

The Coal Loader Centre's sustainable gardens are made up of features such as the Caretaker's cottage community garden, the community plots on the Platform, the chicken coop, the compost bins, the worm farm, the rainwater tanks, aquaponics, and the native bee hive.

Location – Outside the Caretaker's cottage, in the community garden.

1. Start discussion with students based around Inquiry questions, that is,
   - What are some features of Coal Loader Centre's sustainable gardens?
   - How do the Coal Loader Centre's gardens operate sustainably?
2. Draw your sketch of the sustainable community garden in the frame below.
   - Make sure you include all/most of the features in the WORD BANK below and
   - label your diagram with these terms.

Word Bank:

Shrubs, trees, plants, flowers, groundcover, garden bed, soil, garden pot, mulch, sun, hose, rainwater tank, compost bin, worm farm, native bee hive.

My sketch of the community garden with labels.

Activity 1 – Student Worksheet
An investigation into the Coal Loader Centre's sustainable gardens. *continued*

There are three main layers in the sustainable garden, these are the groundcovers, the shrubs/plants and the trees. All layers provide:

- Food and nectar for eg, insects, birds, possums, people.
- Shade for plants and soil.
- Nutrients for the soil from eg, decaying leaves, stems, flowers
- Pollen for pollinators like bees, moths, wasps.

2. a. Name a tree in the garden

_____

b. What do you think the trees provide/or do in the garden ?

_____

c. Name a plant or a shrub in the garden

_____

d. What do you think the plants and shrubs provide/or do in the garden?

_____

e. Name a ground cover in the garden

_____

d. What do you think groundcovers provide/or do in the garden?

_____

3. What are the features of the sustainable garden and where are they located?
Location: Outside Caretaker's cottage in the community garden

Teacher to guide students around the Coal Loader's caretaker's cottage community gardens, chicken coop and the Coal Loader platform.

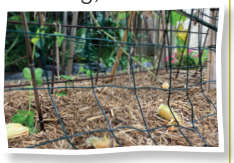
Use the map on the next page, diagram X to mark the start of your sustainable gardens trail.

As students walk around the area add each feature to the map, by writing the number onto the correct location on the map.

Start outside the Caretaker's cottage and discuss.

a. For each of the sustainable garden features listed in the table, tick when you see it ✓ and write down what this feature does or how it helps the garden be sustainable. (Some have been been done for you)
b. As you walk to each feature, **write** the number on the **map** on the next page.

Activity 1 – Student Worksheet
An investigation into the Coal Loader Centre's sustainable gardens. *continued*

Sustainable garden Features OR Process	Tick ✓	What does this feature do or how is it sustainable?
1. Compost 	✓	Food scraps are broken down into nutrients for the soil.
2. Worm Farm 		
3. Fruit tree eg, lemon		Provides shade, and lemons for cooking.
4. Tree		
5. Herbs, eg, parsley		Provides shade for soil, and parsley for cooking.
6. Shrub eg, rosemary		Provides shade for soil, and rosemary for cooking.
7. Flowering plant, eg, daisy 		Provides pollen and nectar for bees.
8. Ground cover, eg, oregano		Covers the soil to prevent water loss and provides oregano for cooking.
9. Garden soil		Made up of compost and soil mixed together for plants.
10. Mulch eg, straw 		Covers the soil to prevent water loss (evaporation).
11. Garden pot		Holds soil and special plants that often need extra care.
12. Raised bed 		Holds soil and many plants often with the same needs.
13. Frog pond		Frogs are a part of the food chain. Help eat insects.

Activity 1 – Student Worksheet
An investigation into the Coal Loader Centre's sustainable gardens. *continued*

14. Native bee hive 		Provides a home to native bees, which help pollination.
15. Vertical garden made from old guttering 		Strawberries are grown in old gutters which capture overflowing water.
16. Rainwater garden 		Water from the gutters is reused and flows through the garden.
17. Rainwater tank 		
18. Hose		Reuses rainwater from a tank to water the garden.
19. Chickens eat food scraps 		
20. Community plots on Platform 		Provides pods which individuals can hire and grow their own food.
21. Aquaponics		Waste water from fish, plus bacteria, provide nutrients for plants.

Activity 1 – Student Worksheet
An investigation into the Coal Loader Centre's sustainable gardens. *continued*

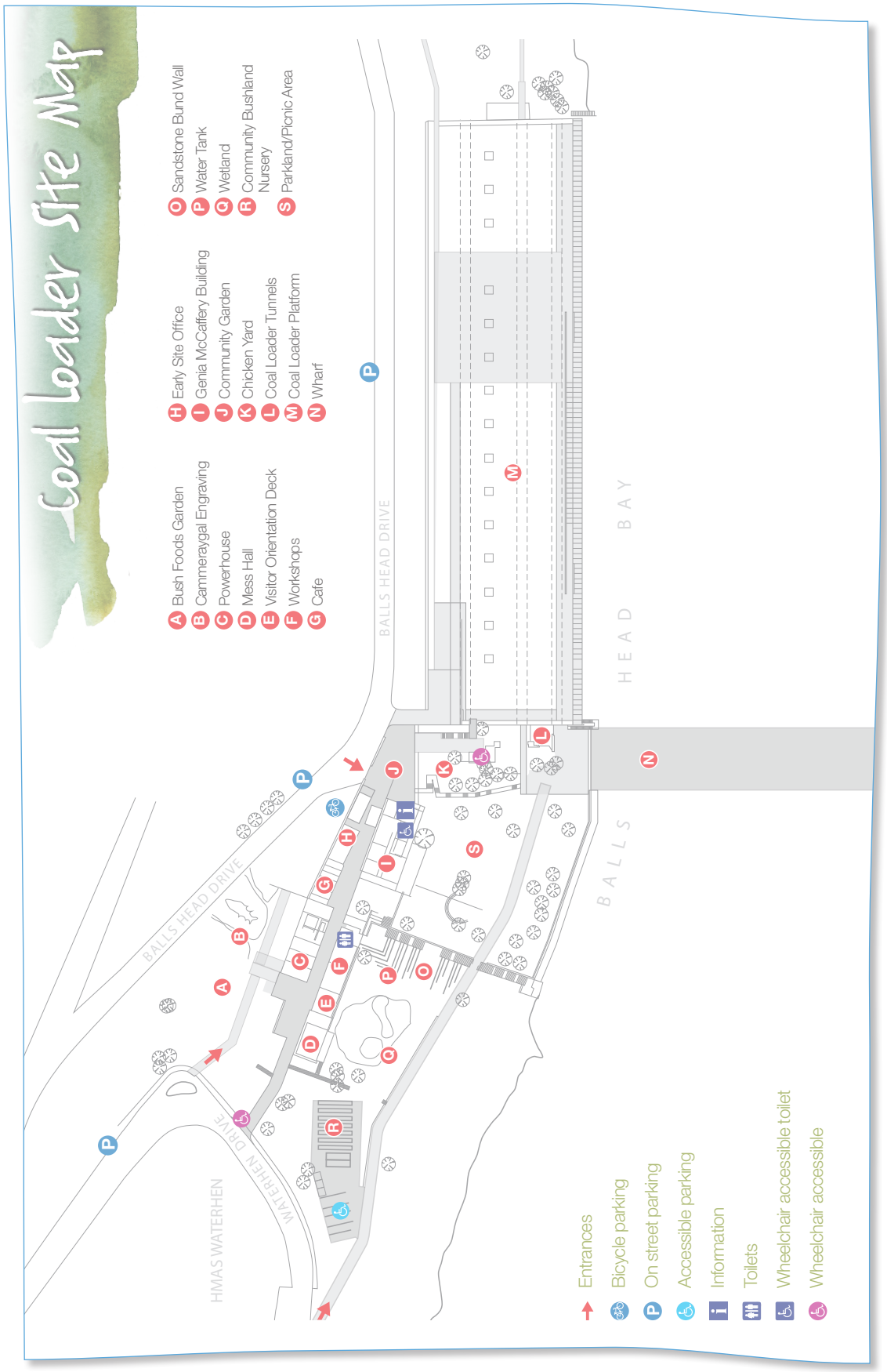


Diagram X – Sustainable gardens map

Activity 2 – Student Worksheet
An investigation into the Coal Loader's community gardens.

Name .....

Activity Summary:

Students will investigate how the Coal Loader Centre's sustainable gardens and community plots operate as community gardens.

Inquiry questions:

1. How did the community garden begin and develop?
2. What activities do the community volunteers complete at the Coal Loader Centre's sustainable gardens?
3. What are the benefits of community gardens and sustainable food?

Syllabus Outcomes :

- Describes the ways people,places and environments interact. GE-2
- Explains interactions and connections between people, places and environments. GE3-4
- Discusses management of places and environments for their sustainability. GE4-5
- Identifies how plants and animals are used for food and fibre. ST1-5LW-T
- Explains how food and fibre are produced sustainably in managed environments for health and nutrition. ST3-5LW-T
- Investigates how food and fibre are produced in managed environments.TE4-5AG

Materials and preparation:

- Each student will need a clipboard and writing equipment.
- Each student will need a copy of the student worksheet.
- Each student should be given, on the day, a copy of the laminated posters 'The Coal Loader Community Garden' and 'Community Gardens – A place to grow'.
- A4 Coal Loader Map.

Activity 2 – Student Worksheet
An investigation into the Coal Loader's community gardens. *continued*

Name .....

Location – Outside the Caretaker's cottage, in the community garden.

Introduction:

The Coal Loader Community Garden is a wonderful tool to showcase what it means to live a sustainable life, to learn how to care for the earth, to learn how to work with others in the garden and finding ways to share the harvest.

In the community garden general activities include planting, watering, weeding, fertilising, mulching, seed saving, tending to the worm farm, composting, pest management and harvesting. The Coal Loader Community Garden Group meets every Wednesday between 10am and 12pm. The Group also look after the Coal Loader chooks, who provide fresh eggs daily.

Activity 2 – Student Worksheet
An investigation into the Coal Loader's community gardens. *continued*

Activity

1. Read the poster and look at the pictures on the poster titled 'The Coal Loader Community Garden – One paver at a time' and answer these questions.

a. Who came together to build the garden and why?

b. What work had to be done first before a sustainable garden could be built?

c. Turn the page over. How does a community garden help residents of a community?

2. Read the poster and look at the pictures on the poster titled 'Community Gardens – A place to grow'.

d. Describe what community gardening is

e. Describe the fruit and vegetables that are produced at this community garden

f. Name two fruit and two veggies that are or have been produced at this community garden

g. Turn the reference poster over. What can you learn at a community garden?

3. Below is a list of activities undertaken in the Community Garden. Why are they important for the running of the garden?

Gardening Job	Why this is important
Planting	
Crop rotation	
Watering	
Weeding	
Fertilising	
Mulching	
Seed saving	
Worm farm maintenance	

Activity 2 – Student Worksheet
An investigation into the Coal Loader's community gardens. *continued*

Composting	
Pest management	
Harvesting	

4. List the plants that are ready for harvest at the moment.

Did you know?

Fruits and vegetables are classified from both a botanical (science) and culinary (cooking) point of view. Botanically, fruits and vegetables are classified depending on which part of the plant they come from. A fruit develops from the flower of a plant. A vegetable develops on other parts of the plant.

When cooking, we categorise fruits and veggies based mainly on sweetness and our traditions.

5. Can you see any flowers at the moment? If we are thinking from a culinary (cooking) viewpoint, name any fruit or vegetables that may develop from these flowers?

6. Find the four different gardening styles at the Centre.

Garden style	Features	How is it sustainable?
Raised bed		
Vertical Garden		
Pots		

7. How many different ways can scraps be composted at the Coal Loader?

Activity 2 – Student Worksheet
An investigation into the Coal Loader's community gardens. *continued*

8. Do you have any of these compost systems at school?

_____

If so, describe where they are and how they are looked after.

_____

_____

Activity 3 – Student Worksheet
An investigation into keeping chickens at the Coal Loader.

Name .....

Activity Summary:

Students will investigate how the Coal Loader Centre's chickens are kept and looked after by community volunteers. Students will improve their understanding of the rules and standards which are set for keeping chickens in North Sydney. Using the knowledge gained from observing the chickens at the Coal Loader, students may develop a chicken management program at school.

Inquiry questions:

1. What do chickens need so that they are raised and looked after humanely?
2. What activities do the community volunteers complete to manage the chickens?
3. How can keeping chickens assist sustainable gardens?

Syllabus Outcomes:

- Explains interactions and connections between people, places and environments. GE3-4
- Discusses management of places and environments for their sustainability. GE4-5
- Identifies how plants and animals are used for food and fibre. ST1-5LW-T
- Explains how food and fibre are produced sustainably in managed environments for health and nutrition. ST3-5LW-T

Materials and preparation:

1. Each student will need a clipboard and writing equipment.
2. Each student will need a copy of the student worksheet.
3. Students should participate in a pre-excursion class brainstorming session or discussion around the inquiry question, should we keep and manage chickens at school?

Activity 3 – Student Worksheet Keeping Chickens.

Name .....

Background Information:

The benefits of keeping chickens include providing regular supply of fresh eggs, recycling food waste, making excellent pets, helping aerate garden soil, managing insect pests, and providing the garden with fertiliser.

Raising and keeping chickens provides a great way to teach us about responsibility and how to care for living things. They also provide an experience in small animal farming and egg hatching if eggs are fertile.

Chickens can be fed food scraps, including waste that cannot be composted such as the remains of dishes that incorporate meat, pasta, rice and bread. Hens need to have a secure, warm, and safe environment in which to lay their eggs. If their environment is conducive to production, one hen can lay an egg a day in the laying season which is defined by daylight length, but on average they lay five eggs a week.

The chickens at the Coal Loader are maintained by volunteers from the Community Garden group who are rewarded daily with fresh eggs. The high fence is effective in keeping foxes away from the chickens, and as an extra precaution the chickens are always closed in the coop at night. As egg production is the outcome at the Coal Loader, roosters are not needed in the management process, so crowing is not an issue. In fact North Sydney Council has a Rooster Policy which forbids the keeping of roosters in the municipality.

The Coal Loader chickens are housed in what was once an old shed, so even the chicken coop at the Coal Loader follows adaptive reuse principles!

North Sydney Council has guidelines to assist in keeping chickens in the backyard or school — *www.northsydney.nsw.gov.au/*

1. Start discussion with students based around the background information, and the facts and figures about keeping chickens eg,
   - What are some of the benefits of keeping chickens?
   - What are some of the rules around keeping chickens?

Activity 3 – Student Worksheet Keeping Chickens. *continued*

Facts and Figures about keeping chickens in NSW and North Sydney Council area.

"Keeping chickens in your backyard is legal in NSW but there are regulations to keep in mind, including a limit of up to 10 chickens, and no roosters in residential areas.

You can't install a chicken coop if your property is a heritage item or your land is in a foreshore area.

The most important part of keeping chickens is the chicken coop. Only one coop is allowed on each property and it must be:

- limited to a floor area of 15 square metres
- a maximum height of 3 metres above ground level
- located in the rear yard
- 3 metres distance from the boundary
- located at least 4.5 metres from any dwelling, public hall, school or premises used for the manufacture, preparation, sale or storage of food
- made of materials that blend with the environment and be non-reflective
- adequately drained
- paved with concrete or mineral asphalt, or have clean sand underneath the roosts or perches
- occupied by no more than 10 fowls or poultry.

The coop and poultry yard must also be kept clean and free from offensive odours."

(Source: northsydney.nsw.gov.au/animals/keeping chickens)

Activity 3 – Student Worksheet Keeping Chickens. *continued*

Location – View the chicken coop and then sit comfortably in the Community gardens to complete these questions.

Refer to the Background information and Facts and Figures to answer these questions.

To be free or not to be free. That is the question!

Eggs in Australia can be labelled organic, free range, organic free range, green, or eco, which can be confusing for us as consumers. This is because there is no single standard in Australia for organic or free-range products and anyone can use those terms. The RSPCA standards for free range are:

- ✓ Hens are housed in sheds and can go outside by choice.
- ✓ Within a shed there are a maximum of nine hens per square metre.
- ✓ Outside there are a maximum of 1500 hens per hectare.

1. Are the Coal Loader chickens 'free range' according to the RSPCA standards? Yes / No (circle answer). Why?

_____

_____

Be a Council Environmental Health Inspector for a day:

Every local government has a team of environmental health officers who oversee certain policies, rules and regulations including keeping chickens.

2. Does the chicken enclosure at the Coal Loader meet North Sydney Council requirements? Yes / No (circle answer) Why?

_____

_____

3. What is one management intervention that you can see has been done by the community gardeners to ensure the well-being of the chickens?

_____

_____

Chicken management at the Coal Loader:

Having chickens at school is a great way to learn about where our food comes from, and the school canteen can benefit as well. Make some observations to take back to your school about the chicken program at the Coal Loader.

4. Sit and observe the chickens for five minutes:

a. What did they eat?

_____

b. What sounds did they make?

_____

c. Was there a bossy chook?

_____

d. What is their main activity?

_____

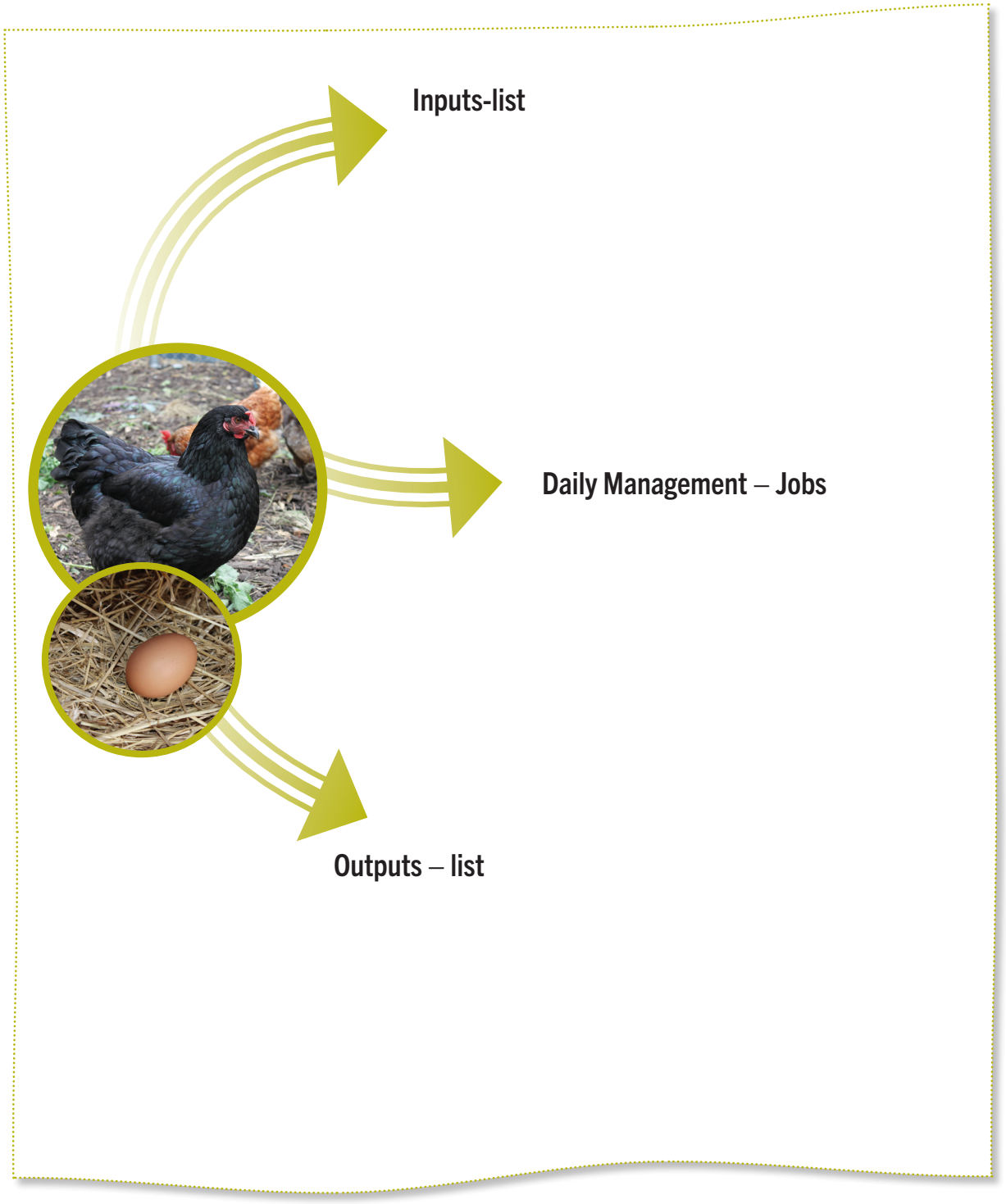
5. On the Poultry System diagram below, list the following:

a. What are the inputs to ensure the chickens are well managed?

b. What are the outputs that occur with running chickens at the Coal Loader?

c. What are the management jobs that the community gardeners need to do daily?

Poultry System diagram



Activity 3 – Student Worksheet Keeping Chickens. *continued*

Chicken Production at the Coal Loader:

6. If each chicken laid an egg a day what would be the weekly production?

_____

7. What would be the yearly production?

_____

8. Hens don't lay an egg every day of the year. What is one reason for this?

_____

9. Using the 'Facts and figures about keeping chooks in NSW' information, plan where a chicken coop could be set up in your school. Is your space close to water? Does it have some shade and enough room to store food? List what you need to make a chicken program a success at your school.

Activity 4 – Student Worksheet Calculating Food Footprints.

Pre and post activities and resources – for home or back at school

Activity Summary:

Students will participate in a pre-excursion class discussion with their teacher using the information provided. After undertaking Activities 1 and 2, students will complete the food footprints activity. They will be extended to think about their food miles and that of food in the school canteen.

Inquiry Questions:

1. What is the ecological impact of different foods and different choices?
2. Can our ecological footprint be improved?

Syllabus Outcomes:

- Explains interactions and connections between people, places and environments. GE3-4
- Discusses management of places and environments for their sustainability. GE4-5
- Explains how food and fibre are produced sustainably in managed environments for health and nutrition. ST3-5LW-T
- Assess management strategies of places and environments for their sustainability. GE5-5

Materials and preparation:

1. Students will need a copy of the worksheet and be able to research secondary sources.

Further Information:

- *www.epa.vic.gov.au/about-epa/publications/1113*
- *wwf.org.au/get-involved/ecological-footprint-calculator/*

Activity 4 – Student Worksheet
Calculating Food Footprints. *continued*

Name .....

Introduction

Living sustainably means we all work towards reducing our ecological footprint.

By measuring our ecological footprint, we can each get a measure of the impact we are having on the Earth. Every human activity consumes resources from the planet and produces waste that the planet must then deal with. The Earth has a finite amount of resources and if we are living sustainably we are living within the limits of the Earth's resources. There are different footprint calculators that measure different impacts for example water, carbon and food.

Reducing your food footprint

Tips for reducing your food footprint:

❶ Grow your own food... ❷ Buy food in season... ❸ Eat less processed or packaged food... ❹ Review the transport needed for each food item... ❺ Don't buy too much food... ❻ Compost or use left-over food when cooking... ❼ Eat meat grown on farms that are sustainable... ❽ Use the sustainable fish guide when buying fish... ❾ Avoid bottled water... ❿ Find a local growers market and get to know the farmers.

Activity 4 – Student Worksheet
Calculating Food Footprints. *continued*

1. Calculate your ecological footprint by using wwf-ecological footprint calculator or find another calculator to use.

   _____

2. As a class, conduct a Food Footprint brainstorm/discussion around the ways you can reduce it, using the tips provided and any others tips you may research to think of ways you can reduce your food footprint.
3. As a class take on the challenge to see who can reduce their food footprint.

Step 1 – Undertake a food diary for one week. Here's an example but you can make it a journal.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast							
Snack							
Lunch							
Snack							
Dinner							
Snack							
Exercise (time & type)							
Cups (250ml) of water							

Activity 4 – Student Worksheet Calculating Food Footprints. *continued*

Step 2 – With the results of your food diary, categorise the foods you eat:

- What is the percentage of fresh, organic and processed?

- What other food footprint tips can you incorporate into your food diary to reduce your footprint?

Step 3 – Class find ways to help implement the tips that would help them reduce their footprint.

Step 4 – Take three items of food in your diary and research the food miles. This could be done by reading the labels of various food items and finding out where they have come from.

Step 5 – A history of the future. Imagine a sustainable future and then describe the changes that would allow this sustainable future to occur. Use these changes to demonstrate all the steps that need to occur in the school community to reach a sustainable future.

Step 6 – What is the food footprint of one item of food in your canteen?

- Work with your canteen to look at ways to reduce the overall food footprint of the canteen. Consider issues such as the unsustainable palm oil content of products sold.

Sustainable food scavenger hunt

Walk around the Coal Loader site and find these features:

- Frog pond
- Chicken coop
- Chickens
- Fruit tree
- A bug
- A bird
- Herb plant
- Flower
- Seed
- Fruit
- Shrub/bush