



Department of
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Australian Hamburgers

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Area of Study - Agriculture and Food Technologies



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Supporting document - Answer guide

NSW DPI Schools Program

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Australian Hamburgers- Answer guide, Edition 2- updated 2024

Contents

Australian Hamburgers unit- ANSWER GUIDE.....	4
Agriculture in Australia learning activities.....	4
The value of agriculture learning activities.....	5
Wheat learning activities.....	6
Beef learning activities.....	7
Dairy learning activities.....	8
Pork learning activities.....	10
Sheep learning activities.....	11
Poultry learning activities.....	12
Horticulture learning activities.....	14

Australian Hamburgers unit- ANSWER GUIDE

Sample answers have been provided for learning activities where applicable for this document. The following suggested answers should be used as a guide. Note that these are suggested answers only, and not necessarily the very best answer, nor are they the only possible answers.

Agriculture in Australia learning activities

- Define agriculture.
Agriculture is the science of growing rearing and producing food, fibre, timber and fuel.
- List 5 agriculture products that you have used today. For each, give an example of an industry that produced it. For example, toast for breakfast is made from flour from processed wheat that was grown through cropping.
Answers will vary.
- Use research to complete the table to identify what each of the following industry sector produces and give an example of raw products. The first example has been given to you.

Industry sector	Production purpose	Main products
Dairy	Growing dairy cattle breeds to supply milk	Milk
Beef	Growing carcass cattle breeds to supply beef	Beef
Sheep meat and wool	Growing sheep for fibre and carcasses	Wool and lamb/mutton
Cropping	Growing plants for food, fibre or fuel production	Cereals, grain, pulses, oilseeds, hay, sugarcane; fibre e.g. cotton and hemp; grain for biofuels
Viticulture	Growing grapes	Wine grapes
Aquaculture	Growing freshwater or marine aquatic plants and animals	Seafood, fish, crustaceans, algae, kelp
Poultry	Growing of domesticated bird species for carcasses/ meat and eggs. Bird include chickens, duck, geese, turkeys, pheasants, pigeons etc.	Meat and eggs
Horticulture	Growing plants for food, fibre, medicine, pesticides, landscapes and aesthetic purposes	Fruits, vegetables, flowers, nursery plants, medicinal plants (Echinacea), oils (lavender and citronella)
Pastures	Growing plant species for fodder to support livestock production	Fodders including hay, silage or pasture
Forestry	Growing plant species for food, fibre, timber	Timber
Apiculture	Growing livestock, bees commercially	Honey, royal jelly, bees wax

- Use research to investigate the following people and the impact they had on historical Australian agricultural. For each innovator include the year/s of their work and briefly explain the invention or technology they developed.
 - James Ruse in 1790 James Ruse became the first European farmer to produce enough food to feed his family and have excess food. He showed people that you could successfully farm the Australian land and not rely on the government for food.
 - John and Elizabeth Macarthur- 1794 John and Elizabeth were among the founders of the Australian wool industry. They used crossbreeding to develop sheep with high wool growth and eventually imported Spanish merino sheep which they used to breed and develop an Australian line which was better adapted to Australian conditions along with having very high quality (low micron) fine wool. They also developed the export market for Australian wool in England and Europe which was very important

for the Australian economy. The Macarthurs' merino breed produced high quality fine wool, but was a small framed animal not well suited to the dry climate and inland environment.

- Maria Anne 'Granny' Smith (1868-78). Maria is attributed to developing the green, cooking 'Granny Smith' apple cultivar from growing trees from seeds of a French crab apple.
- Samuel McCaughey, (1880-1900s) introduced the 'wrinkled' bloodline into the Australian merino breed using American bloodlines (Rambouillet and Vermont lines), to produce sheep with higher wool yield. The wrinkled skin has a greater surface area for wool to grow on therefore increased yield. Unfortunately, the sheep were neither drought tolerant or easy to shear and had issues with flystrike because the extra wrinkles provide the perfect environment for flies to lay eggs.
- John Ridley. In the 1840s John Ridley invented a mechanised, horse drawn stripper and harvester for harvesting wheat crops. The invention sped up harvesting which prior to then, occurred by hand.
- Professor William Lowrie. Professor William Lowrie was an agriculture educationalist and scientist in South Australia. Throughout 1880-1890 he carried out research into Australian soils, especially the need for phosphate fertilisers (superphosphate) to increase the soil's nutrient value and increase plant growth and yield. He also conducted research into the benefits of 'fallowing' which is a management practice whereby soils are not over-cultivated.
- William Farrer. William Farrer used selective breeding to develop a wheat cultivar called 'Federation'. Federation wheat was distributed around the country in 1903. The Federation variety had been selectively bred as a disease (rust) resistant, early maturing variety that was productive in dry Australian soils. The new variety overcame many of the problems with wheat production until this time. Federation wheat allowed for expansion of wheat growing into areas previously unsuited to growing wheat.
- George and William Peppin- Throughout 1850- 1870, the Peppin brothers developed a Merino strain which revolutionised the Australian Merino industry. The Peppin merino was a large-framed sheep with high quality and high yield wool. The animals were bred to survive well in the hot and dry inland of Australia.

The value of agriculture learning activities

1. Define food security.

Food security is having year-round access to nutritious, affordable and sustainable food for an active and healthy lifestyle.

2. Use Figure 2 to list the top 10 contributors to NSW Primary Industries 2016-2017 GVP.

The top 10 contributors are wheat, beef cattle, horticulture, cotton, wool, poultry, sheep/goat, pulses, milk and barley.

3. Use Figure 3 to identify 5 export destinations for NSW crops

Export destinations are Pakistan, Bangladesh, India, Indonesia, Vietnam, Italy and China. Answers include any combination.

4. Use Figure 3 to identify 5 export destinations for NSW livestock

Export destinations are United States of America, Italy, China, South Korea, Japan, Indonesia. Answers include any combination.

5. Use Figure 3 to identify the major export destination for NSW fisheries and aquaculture products.

The major export destination is China.

6. Identify a global area or continent that is essential for the NSW primary industries export market. Explain why you think that area consumes vast amounts of NSW primary industries products.

Asia. The Asian continent is a major export market and destination of NSW products. The export markets have been secured for a variety of reasons including:

- NSW and Australian agriculture produces high quality products that are free from most pests and diseases.
- Australia is geographically close to these destinations, which reduces costs involved with transport and also reduces time in transport which allows fresh, high quality produce to be available quickly.
- The Australian government has developed trade agreements to secure export markets with countries in this region to assist our farmers and the Australian economy.

Wheat learning activities

Follow this link to the [AgriFutures Wheat](#) factsheet to complete activities 1-3.

1. List the main production areas for Australian wheat.

The main production areas are Western Australia, New South Wales, New South Wales, Victoria and Queensland. This production area is called the sheep/wheat belt.

2. List the main export markets for Australian wheat.

Main export destination markets for wheat are Asia, the Middle East, Indonesia, Japan, South Korea, Malaysia, Vietnam and Sudan.

3. Identify and explain the different uses for wheat.

Wheat grain is a staple food used to make flour for breads, baked goods, breakfast cereal, pasta and noodles; and for fermentation to make beer and other alcoholic beverages. Wheat is the leading source of vegetable protein in human food, having a higher protein content than other major cereals, maize (corn) and rice.

Wheat grain is also used as stock feed. The use of wheat straw for bioenergy production is also being investigated.

Follow this link to the [Eatforhealth.gov.au Grains and cereals page](#) to complete activities 4-6

4. Identify and explain the healthier option between refined grain and wholegrain products

Wholemeal products are healthier than refined grain products. Cereal grain seeds contain bran and germ which contain high levels of fibre, vitamins, minerals, protein and antioxidants and the inner endosperm layer which has a high carbohydrate (starch) content. Through the refining process to create products such as white flour the outer grain layers are removed which also removes much of the nutritional value of the cereal grain. To maintain a balanced and healthy diet, wholemeal or whole grain products should be substituted for highly refined grain products whenever possible.













5. Complete the table to identify what a standard serve of grain or cereal is equivalent to

Grain type	Serving size and weight
Bread	1 slice (40g)
Cooked rice	½ cup (75-120g)
Cooked pasta	½ cup (75-120g)
Cooked porridge	½ cup (120g)
Breakfast cereal	2/3 cup (30g)
English muffin or scone	1 small (35g)

6. Complete the table to identify how many serves children and adolescents should have of grain cereals each day

Age Group (years old)	Serving of wholemeal grains	
	Boys	Girls
1-2	4	4
4-8	4	4
12-13	6	5
14-18	7	7

1. The following table has images of some common cereal grains used by humans. Go to [NSW DPI Agricultural crops and pastures of NSW](#) to complete the table. Name the plant and list examples of products made from the grain. The first has been given to you.

Name	Plant	Grain	Product/s
Wheat			Pasta, bread, flour, biscuits, noodles
Barley			Breakfast cereals, beer, barley pearls for breads, noodles, biscuits
Oats			Oat milk, porridge, oatmeal, muesli, granola
Maize (corn)			Popcorn, corn flakes, oil, starch food sweeteners, corn syrup, corn meal, bread, chips, tacos, fuel-ethanol
Triticale			Noodles, malting and brewing, whole grain products- breads, muffins, flour etc.
Cereal rye			Bread, flour and baked goods, whiskey

Beef learning activities

- How many head of cattle were in Australia and NSW in 2016-17?
In 2016-17 there were 25 million head of cattle in Australia and 5 million head in NSW.
- In 2016-17 how much beef and veal did Australia export and to how many countries?
In 2016-17, Australia exported 68% of its total beef and veal production to 77 countries.
- List the 4 major export destinations for Australian beef.
Japan 29%; USA 21.7%; Korea 16.8% and China 10.1%.
- Fill the spaces to complete the sentence. "Australia produces 3% of the worlds beef supply and is the third largest beef exporter in the world."
Follow this link to investigate The Conversation article '[Organic, grass fed and hormone-free: does this make red meat any healthier?](#)' Use your findings here to answer questions 5-10
- Explain the nutritional difference between organic and non-organic red meat.
There is little to no nutritional difference between the two products. An assumption is that organically produced red meat has been grass fed which may result in higher omega-3 levels than grain fed animals. However, there is little evidence to prove this.
- How much beef would an Australian have to eat from a hormone treated animal to get the same level of naturally occurring oestrogen found in an egg?
An Australian would have to eat 77 kg of beef to have consumed the same levels of naturally occurring oestrogen found in an egg.
- What does grass fed meat mean?
The meat has come from animals that have only grazed grass.
- What does grain-fed meat mean?
Grain-fed meat comes from animals that are fed grass for part of their lives (variable duration) and then given a grain-based diet for the remainder, depending on market requirements and seasonal conditions. This is also referred to as "grain finishing".
- List four reasons for grain feeding animals.
 - To maintain a consistent supply of meat for consumers
 - To meet market demand for marbled meat
 - To increase the animal's size and amount of meat it produces
 - To provide sufficient feed when pasture is limited by conditions such as drought.
- Identify and explain what Wagyu beef is
Wagyu is a breed of cattle which originated in Japan, known for its highly marbled meat. Marbling is fat found inside the muscle. The intramuscular fat gives the meat a marbled look. Marbled meat is highly desired for its flavour and tenderness.

Dairy learning activities

- Define value adding and give an example of a value added dairy product.
Value adding is a process whereby a raw material is processed to increase its market value to the consumer. In the case of dairy production and value adding: liquid milk is the raw product and value added products include milk powder, yoghurt, custard, ice cream, cream, butter and cheese.
- How often are cows milked?
Cows are milked at least twice per day throughout their entire lactation.

Follow this link to investigate to the '[AgriFutures Dairy](#)' page to answer 3-4.
- List 4 export destinations for Australian dairy products.
Four export destinations are Japan, China, Indonesia and Malaysia.

4. Explain why you think there is no or little dairy production carried out in the Northern Territory?
There is little to no dairy production carried out in the Northern Territory for a number of reasons including:

- Temperature- the temperature and climate and rainfall frequency is unsuitable to grow the productive pastures to support dairy production. Also the breeds of cows primarily used in Australian dairy are not suitable for production in the NT as they cannot handle the heat and humidity.
- Facilities and transport- there are no milk processing facilities or the infrastructure for milk transport.
- Population of NT is small compared to surrounding states and territories. The population and demand for fresh dairy production in the state is not large enough for infrastructure investment and industry start up for milk processing and distribution. As a result, fresh milk and dairy products are transported in from other states.

Follow this link to investigate to the 'Eatforhealth.gov.au Milk, yoghurt, cheese and alternatives page' to answer 5-6.

5. Complete the table to identify what a standard serve of dairy is equivalent to

Dairy Product	Serving size
UHT long life, reconstituted powdered milk or buttermilk	1 cup (250mL)
Evaporated milk	½ cup (120mL)
Hard cheese such as cheddar	2 slices (40g)
Ricotta cheese	½ cup (120g)
Yoghurt	¾ cup (200g)
Fresh milk	1 cup (250mL)

6. Complete the table to identify how many serves children and adolescents should have of dairy each day?

Age Group (years old)	Serving of lean red meat	
	Male	Female
1-2	1.5	1.5
4-8	2	1.5
12-13	3.5	3.5
19-50	2.5	2.5
70+	3.5	4

Pork learning activities

- Explain why it is important to buy Australian made, grown and produced food and fibre products.
Buying products that have been made or grown in Australia ensures that the products are safe, fresh and made to Australia's high standards. It also helps to support local businesses and jobs. Buying the produce of Australian farmers helps them keep their jobs, just as you are helping factory workers keep their jobs when you buy the things they make. Food and products that are produced and sold locally use far less energy to reach their destination than imported products. This is better for the environment.
- What should you look for on the packaging to help you choose Australian products.
Read packaging to determine where the product was grown and manufactured. Look for the



Use the internet and carry out research to answer questions 3-6. A great site to start your research at is Australian Pork factsheet '[Get the Facts on your pork industry](#)'

- Describe the characteristics of the Australian pig farming method of indoor housing systems
Indoor housing systems are used for pigs from birth through to finisher animals (for sale or slaughter) as well as lactating and weaned sows. This type of housing protects the animals from climate variations, predators and sunburn and can accommodate pigs of similar age and size to be housed together in small, medium and large groups.
- Describe the characteristics of the Australian pig farming method of deep litter systems
Deep litter housing systems are usually large open-sided sheds or hoop-like structures with deep litter flooring (rice hulls, straw, sawdust). These systems are used extensively for growing pigs and for group housing of dry sows.
- Describe the characteristics of the Australian pig farming method of free range systems
APIQ free range means that pigs are kept permanently outdoors for their entire lives with shelter provided from the elements, and suitable bedding available. All paddocks should include areas for grazing, as well as areas for wallows. All free range pigs should have access to paddocks at all times of their lives.
- Describe the characteristics of the Australian pig farming method of outdoor bred systems
APIQ outdoor bred means that adult breeding sows live in open spaces with free access to paddocks for their entire adult life, with grazing areas, wallows where conditions and local regulations allow. Bedded shelter, adequate feed and water are provided. The piglets from

these sows are born and raised under these conditions until weaning. At weaning the piglets can be moved to indoor grow-out housing until sale or slaughter; usually these are deep litter.

Follow this link to the [Eatforhealth.gov.au Lean meat](http://Eatforhealth.gov.au/Lean%20meat) page to complete activities 7-10

7. What is the maximum amount of serves you should have of lean red meat in a week for a balanced healthy diet?

Maximum should be seven serves.

8. Complete the table to identify what a standard serve of lean red meat is equivalent to

Lean red meat raw	Serving size and weight
Beef (90 g)	65 g
Lamb (90 g)	65 g
Veal (90 g)	65 g
Pork (90 g)	65 g
Goat (90 g)	65 g
Kangaroo (90 g)	65 g

9. Complete the table to identify how many serves children and adolescents should have of Lean meat and poultry, fish, eggs, nuts and seeds, and legumes/beans each day?

Age Group (years old)	Serving of lean red meat	
	Male	Female
1-2	1	1
4-8	1.5	1.5
12-13	2.5	3.5
19-50	3	2.5
70+	2.5	2

10. List high protein food sources that could be substituted for lean red meat?

Examples could include: cooked lean poultry, cooked fish, legumes such as beans, lentils and chickpeas, tofu and eggs.

Sheep learning activities

1. Explain the difference between lamb and mutton.

A sheep in its first year is called a lamb, and its meat is also called lamb. The meat from an adult animal is called mutton. Lamb is higher quality, being more tender and juicy compared to mutton.

2. Explain the difference between export markets sheep meat and live animal export.

Sheep meat products are meat and value added lamb and mutton products or carcasses that have been processed and packaged in Australia. Live export market involves live animals being shipped to the export destination.

The NSW Department of Primary Industries (NSW DPI) is responsible for ensuring good animal welfare outcomes.

Follow this link to the [NSW DPI Animal Welfare](http://NSW%20DPI%20Animal%20Welfare) page to answer question 3.

3. List the three pieces of legislation that NSW DPI administers

NSW DPI administers the *Prevention of Cruelty to Animals Act 1979*, the *Exhibited Animals Protection Act 1986* and the *Animal Research Act 1985*.

There has been much media coverage surrounding poor animal welfare associated with the live animal export trade. Follow this link to [The Conversation article Why Australia banning live sheep exports may be a net loss for animal welfare](#) to answer questions 4-8.

- List the 10 largest exporters of live animals in 2022.

France, Netherlands, Canada, Germany, Denmark, United States, Australia, United Kingdom, Belgium and Spain.

- Identify the major live export market (country) for Australian cattle.

Asia (Indonesia)

- Identify the major live export market (country) for Australian sheep.

Middle East

- Explain why these markets (countries) demand live animals?

These markets either lack reliable refrigeration and cold-chain facilities for processed meat or have a cultural preference for freshly slaughtered meat adhering to specific practices, like halal. They cannot produce enough stock to meet their domestic demand, so they import animals from other countries such as Australia.

- Australia can boast it leads the world in animal welfare practices. It is the only country that safeguards the welfare of animals every step along the supply chain, from the paddock to point of slaughter in other countries. Identify the two Australian laws which regulate export animal welfare.

The Australian Standards for the Export of Livestock regulates welfare from farmgate to the ship and Exporter supply chain assurance system (ESCAS) which regulates welfare and animal treatment in the importing country.

Poultry learning activities

- Compare a broiler vs layer chickens

A broiler is a breed of chicken grown for meat production; a layer is a breed of chicken grown to produce eggs for the layer industry.

- Give an opinion on which production system you think is best for animal welfare? Explain your answer using facts to back your opinion.

Answers will vary

- Explain the difference between red and white meat

The difference in meat colour is due to the presence of myoglobin. These are cells which transport oxygen to the blood. Myoglobin content is higher in muscle tissue which is used frequently such as in legs. Cattle, sheep and pigs have higher myoglobin content than fish and chickens, and therefore have darker meat. The second difference is that red meat contains higher levels of saturated fat, but also contains higher levels of vitamins like iron, zinc and B vitamins.

- A vegan or vegetarian consumes a diet containing no animal proteins. What are these diets low in and could there be health issues if the person's diet is not managed properly?

A vegetarian or vegan diet includes no animal proteins. These diets lack the protein, full range of amino acids, unsaturated fatty acids including omega-3 fatty acids, vitamins (especially B vitamins) and minerals including iron, iodine, zinc, phosphorous and potassium sourced from animal proteins. If not managed properly, health issues include deficiency in B vitamins, iron, protein and all the above-mentioned necessary nutrients. Health issues could include problems with the immune system function, poor growth and development, muscle dystrophy, lack of brain development and function, iron deficiencies, lack of energy and brittle bones and teeth.

The following table is created from the [Australian Chicken Meat Federation Nutritional Database comparison tool](#). Analyse the table to complete activities 5-7.

Chicken cut (100g)	Energy	Protein	Saturated	Total
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	(kJ)	(g)	fat (g)	Fat (g)
Breast, lean, baked	637	29	1.2	3.9
Breast, lean, grilled	598	29.8	0.8	2.5
Breast, lean, casseroled	596	27	1.2	3.7
Breast, lean, stir fry without oil	681	35	0.6	2
Chicken nugget, purchased from take away fried in canola oil	1089	12.8	15.6	2.3
Breast, lean, raw	438	22.3	0.5	1.6
Drumstick lean, skin and fat raw	645	17.6	2.8	9.3
Drumstick, lean, raw	492	18.5	1.4	4.8
Thigh, lean, raw	496	18.3	1.5	5
Thigh, lean, skin and fat, raw	940	15.5	5.6	18.3
Wing, lean, raw	470	18.7	1.2	4.1

5. Rank the cooking methods in terms of apparent healthiest to least healthy, based on saturated fat content.

Healthiest					Least healthy
Stir fry without oil	Grill	Baked	Casserole	Fried	

6. List other healthy cooking methods.
Answers will vary, could include poach, boil, barbecue, braise, sear and steam.
7. Foods with high saturated fat contents should be consumed in moderation. According to the table, which type of chicken cut and cooking technique should be consumed in moderation?
Takeaway chicken nuggets fried in canola oil.

Go to the [Australian Chicken Meat Federation Nutritional Database](#) and explore the online meat comparison tool to complete activities 8-15.

Meat type	Meat cut (100g)	Energy (kJ)	Protein (g)	Saturated fat (g)	Total Fat (g)	Iron (mg)	Potassium (mg)	Niacin (B3) (mg)	Cholesterol (mg)
Chicken	Raw lean breast	438	22.3	0.5	1.6	0.4	300	16.15	59
Beef	Raw fillet steak, fully trimmed	608	22	2.4	6.3	2.18	376	9.93	58
Duck	Lean raw whole	506	17.8	1.7	5.5	1.8	270	8.32	110
Lamb	Raw loin chop, fully trimmed	737	27.9	2.8	7.1	1.84	320	11.25	73
Mutton	Raw leg roast, fully trimmed	582	21.1	2.2	6	4.17	332	11.03	57
Pork	Raw medallion or loin steak, separable fat,	469	24.1	0.5	1.6	0.54	420	13.42	48
Turkey	Raw, lean breast	490	21.6	0.9	3.3	0.4	370	12.54	45
Veal	Raw loin chop, fully trimmed	461	22.5	0.8	2.1	1.21	319	18.84	82

8. Are all these meats healthy? Explain your answer.
Yes, all these meats are healthy because they are lean, trimmed cuts.
9. Do you think that the cooking method has a big impact on nutritional value of food? Explain your answer.
Cooking method definitely has an impact on the nutritional content of the food. Generally, foods cooked with or in oils increase the energy content and increase the saturated fat content.
10. A person has high cholesterol. Which type of meat should they consume in moderation?
This person should consume duck in moderation.
11. A person has an iron deficiency. Which type of meat should they plan to include in their diet?
This person could consume more mutton in their diet as a meat source.
12. Which meat has the highest potassium content?
The pork medallions have the highest potassium content.
13. Which meat has the highest niacin content?
The veal loin chops have the highest niacin content.
14. Which meat has the lowest saturated fat content?
The chicken breast and pork medallions have the lowest saturated fat contents.
15. Does total fat content indicate how healthy the food is? What should you look at as well?
Total fat content is not a nutritional indicator of healthiness of a food. Fats are an important part of a healthy diet, and should be consumed in moderation. They provide essential fatty acids, keep our skin soft, deliver fat-soluble vitamins, and are a great source of energizing fuel. Fats or fatty acids can be broken down into many different types, some good and some bad. Unsaturated fats include polyunsaturated and monounsaturated fats, which are good fats, essential to healthy body function. The bad fats are saturated or Trans fatty acids. Most foods contain a combination of fats but are classified according to the dominant fat. You should therefore look at the types of fats present, the content of saturated fat as compared to total fat as well, which will allow you to determine the dominant fat present. You should limit consuming foods high in saturated fat and substitute these with foods with higher unsaturated fatty acid contents.

Horticulture learning activities

Extension activity: investigate specific horticultural plants and products from each growing area.

Banana, pineapple, mandarin, avocado, mango, fresh tomato, capsicum, and zucchini production is concentrated in Queensland; stone fruit, oranges, blueberries, and grapes in New South Wales, Victoria; potatoes, nuts, citrus, stone fruit and grapes in South Australia; processing potatoes in Tasmania; fresh pears, canning fruit and processing tomatoes in Victoria; and apples and fresh vegetables in all states.

Australia has a significant tropical horticultural industry including large irrigation schemes in the Ord River in Western Australia and the Burdekin River in Queensland. Bananas, mangoes, avocados, papaya, lychees, cucurbits (rockmelons, watermelons, pumpkins) together with tropical nursery plants and vegetables are important industries. There is also a growing 'rare and exotic fruit' industry producing fruits such as [abiu](#), [carambola](#), [durian](#), [jackfruit](#), [mangosteen](#), [pitaya](#), [rambutan](#), and [tamarillo](#).

Nursery production generally occurs close to the capital cities. Some horticultural produce from the southern states is directed to processing. Queensland vegetables typically supply the southern states with fresh produce during the cooler June to October period.

Trees producing nuts are grown throughout Australia and include almonds, cashews, chestnuts, hazelnuts, macadamias, peanuts, pecans, pistachios and walnuts.

The Riverina and Northern Rivers regions of New South Wales, supplying water for irrigation, are major producers of almonds, chestnuts, hazelnuts, macadamias, pecans and walnuts. In Victoria, the Sunraysia, Swan Hill, central west and north eastern regions of Victoria produce almonds, chestnuts, hazelnuts and pistachios. Mount Hotham in Victoria produces a small amount of pine nuts. The Riverland and Adelaide Hills regions of South Australia produce chestnuts, walnuts and some pistachios. Queensland produces macadamias, pecan and cashews. The Swan Valley region of Western Australia produces almonds, chestnuts, and hazelnuts. Tasmania produces a small amount of hazelnuts and walnuts.

1. Explain why you cannot successfully grow bananas, avocado and mangoes in much of NSW? Every plant has a specific set of environmental requirements for growth including temperature range, pH, hours of darkness, hours of cold temperature, moisture etc. Tropical and sub-tropical plants cannot grow in much of NSW because the temperature range does not allow or promote growth; as well frosts may kill the plant.

2. For the following list of horticultural products identify what part of the plant is consumed.

Product	Plant part consumed	Product	Plant part consumed
Apple	Fruit	Chickpea	Seeds
Potato	Tuber (modified underground stem)	Onion	Bulb (modified underground plant stem)
Peanut	Seeds	Carrot	Root
Leek	Leaves and stem	Pak Choy	Leaves and stem
Brussel sprout	Buds/sprouts	Basil	Leaves and stem
Pumpkin	Fruit	Mango	Fruit
Tomato	Fruit	Cashew	Seeds
Snow pea	Seeds and seed casing or seed pod	Spinach	Leaves and stem
Celery	Stem	Orange	Fruit
Broccoli	Flower	Cauliflower	Flower
Strawberry	Fruit	Blueberry	Fruit
Lettuce	Leaves	Radish	Root
Beetroot	Root	Corn	Seeds

3. List 6 types of specific environmental plant requirements which determine where plants can be grown in Australia.

Every plant has specific environmental requirements for moisture, soil type, pH, temperature ranges, amount of light and cold temperature. These determine where plants can be successfully grown around Australia.

Fruit and Vegetable Nutritional value

Follow this link to the Eatforhealth.gov.au to answer activities 4-5 using information from the Fruits and Vegetables information pages.

4. Complete the table to identify what a standard serve of fruit is equivalent to

Fresh or processed fruit	Serving size
Medium apple, banana or pear	1 or approx. 150g
Diced or canned fruit (no added sugar)	1 or approx. 150g
small apricot, kiwi fruit, or plum	2 or approx. 150g
Fruit juice (no added sugar)	125 ml or ½ cup
Dried fruit for example, 4 dried apricot halves, 1 ½ tablespoons of sultanas	30 g

5. Complete the table to identify what a standard serve of vegetables is equivalent to

Fresh or processed vegetables	Serving size
Cooked green or orange vegetables for example broccoli, spinach, carrots, or pumpkin	½ cup
Cooked, dried or canned beans, peas or lentils	½ cup
Green leafy or raw salad vegetables	1 cup
Sweet corn	½ cup
Potato or other high starch vegetables for example, sweet potato, taro or cassava	½ medium
Tomato	1 medium

6. Are all vegetables and fruits nutritionally the same? Use research to give a specific example comparing a fruit and a vegetable

Fruit and vegetable all have different nutritional values. Characteristically fruits are higher in sugar than vegetables. This varies between plants. Examples: brussel sprouts are rich in vitamin C and K, folic acid, and dietary fibre. They are high in protein compared to many other vegetables. Blueberries are high in fibre, potassium and Vitamins C, B6 and K. They are also high in antioxidants.

7. Explain the benefits of eating fresh produce compared to processed food products?
 Fresh produce has many nutritional and flavour benefits compared to processed foods because through the manufacturing and preservation process nutritional qualities and flavour can be decreased. As well through manufacturing, additives such as salt, sugar, artificial colours and preservatives can be added which can reduce the nutritional value of the product.