

PRIMED

Teacher resource

Year

9



HASS



Teaching guide: Food now and in the future

Resources overview

PRIMED mission

To increase student understanding of agriculture, fisheries, fibre, forestry and food (primary industries) careers to enable Year 7–12 students to make informed career-pathway choices.

About the resource set

These resources provide rich tasks focused on the *Western Australian Curriculum* within a primary industries context.

This series of activities challenges students to explore primary industries and the production of food and fibre commodities in Western Australia (WA).

Curriculum links

This resource is designed as a learning pathway for Year 9 Humanities and Social Science students to develop their understanding of the *Western Australian Curriculum* HASS content descriptions:

HASS Knowledge and understandings:

- Australia's interdependence with other economies, such as trade and tourism, trade links with partners in the Asia region, and the goods and services traded (ACHEK038)
- Why and how participants in the global economy are dependent on each other, including the activities of transnational corporations in the supply chains and the impact of global events on the Australian economy (ACHEK039)
- The distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivity (ACHGK060)
- The ways that humans in the production of food and fibre have altered some biomes (e.g. through vegetation clearance, drainage, terracing, irrigation) (ACHGK061)
- The environmental, economic and technological factors that influence crop yields in Australia and across the world (e.g. climate, soils, landforms, water resources, irrigation, accessibility, labour supply, agricultural technologies) (ACHGK062)
- The challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change for Australia and the world (ACHGK063)
- The effects of anticipated future population growth on global food production and security; the capacity for Australia and the world to achieve food security; the implications for agriculture, agricultural innovation and environmental sustainability (ACHGK064)



HASS skills

Questioning and researching

- Identify current personal knowledge, gaps, misconceptions, currency of information, personal perspective and possible perspectives of others (WAHASS79)
- Use a range of methods to collect, select, record and organise relevant and reliable information and/or data from multiple sources that reflects the type of analysis of information that is needed (e.g. questionnaires, surveys, emails, discussion lists, tables, field sketches, annotated diagrams), with and without the use of digital and spatial technologies (WAHASS82)

Analysing

- Analyse information and/or data in different formats (e.g. to explain cause and effect relationships, comparisons, categories and subcategories, change over time) (WAHASS86)
- Account for different interpretations and points of view/perspectives in information and/or data (e.g. from tables, statistics, graphs, models, cartoons, maps, timelines, newspapers) (WAHASS87)
- Analyse the 'big picture' (e.g. put information and/or data into different contexts, reconstruct information by identifying new relationships, identify missing viewpoints or gaps in knowledge) (WAHASS88)
- Apply subject-specific skills and concepts in familiar, new and hypothetical situations (WAHASS89)

Evaluating

- Critically evaluate information and/or data and ideas from a range of sources to make generalisations and inferences; propose explanations for patterns, trends, relationships and anomalies; predict outcomes (WAHASS91)

Communicating and reflecting

- Select a range of appropriate formats based on their effectiveness to suit audience and purpose, using relevant digital technologies as appropriate (WAHASS92)
- Deconstruct and reconstruct the collected information and/or data into a form that identifies the relationship between the information and the hypothesis, using subject-specific conventions, terminology and concepts (WAHASS94)

Resource set structure

The resource set is structured around constructivist learning principles using the 5E model: engage, explore, explain, elaborate and evaluate. It is designed to be flexible so that teachers can use all or parts of the resource that they consider appropriate for their students.

With this combined approach:

1. Students' interest and minds are **engaged** by exploring the region where they live and the interdependence between local, regional and global activities.
2. Students **explore** what they know about primary industry in WA. They compare different regional growing zones and explore the different food and fibre production that takes place in WA.
3. Students **explain** the impact of altering biomes that support food and fibre production, working in agricultural industries and how the government supports primary industry.
4. Students **elaborate** on a range of concepts, such as: biomes that support food and fibre production, supply chains and industry snapshots.
5. Students **evaluate** their learning identifying changes to biomes, summarising key points from a variety of sources and considering future scenarios.

Infographic 1: Spotlight on Western Australia – Biomes

Curriculum link:

- The ways that humans, in the production of food and fibre, have altered biomes.

Includes:

- Climate zones for Australia
- Pre-European vegetation of WA
- WA soils
- Land use map of WA
- An example of the consequence of altering biomes – salinity
- An example of a successful industry established due to favourable biomes – the Truffle Industry

Educational process	Teaching and learning focus	Resources
<p>Engage</p> <p>Engage students and elicit prior knowledge.</p>	<p>Module 1:</p> <p>Students describe the place where they live and construct a map to identify local biomes.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 1: Spotlight on Western Australia – Biomes. <p>Other resources</p> <ul style="list-style-type: none"> • Climate Data Online • Information sheet How to draw a climate graph with BOM data • https://www.theguardian.com/lifeandstyle/gallery/2013/may/06/hungry-planet-what-world-eats
<p>Explore</p> <p>Find out more about the topic, concept or idea.</p>	<p>Module 2:</p> <p>Students investigate the major land use for each biome.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 1: Spotlight on Western Australia – Biomes.
<p>Explain</p> <p>Use a variety of methods to collect relevant information and/or data from a range of appropriate sources, such as print, digital, audio, visual and fieldwork.</p>	<p>Module 3:</p> <p>Students will explain the impact of altering biomes for food production.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 1: Spotlight on Western Australia – Biomes. <p>Other resources</p> <ul style="list-style-type: none"> • Dryland salinity in Western Australia • Dryland salinity science • Student worksheet 3.1 Cooperative learning jigsaw template • National Landcare Program Bush Tucker Project • Student worksheet 3.2 Saline Bush Tucker • Information sheet Managing dryland salinity
<p>Elaborate</p> <p>Extend understanding to a new context or make connections to additional</p>	<p>Module 4:</p> <p>Students investigate biomes that support particular food production.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 1: Spotlight on Western Australia – Biomes. <p>Other resources</p>

concepts through a student planned investigation.		<ul style="list-style-type: none"> • Student worksheet 4.1: Truffle industry compass • The truffle industry in Western Australia
<p>Evaluate</p> <p>Students re-represent their understanding and reflect on their learning journey, and teachers collect evidence about the achievement of outcomes.</p>	<p>Module 5:</p> <p>Students consider the changes made to biomes due to the production of food and fibre.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 1: Spotlight on Western Australia – Biomes. <p>Other resources</p> <ul style="list-style-type: none"> • Student worksheet 5.1 Altered biomes

Learning resources and sequence

Module 1:

(approximately 1 lesson)



Learning intentions

Students will be able to:

- Describe the distribution of biomes in WA.
- Describe the characteristics of the biome where they live.

Background information

Infographic 1: Spotlight on WA - Biomes includes information regarding climate, natural vegetation and soils for WA. Students will use this information to develop an understanding of the suitability of their region for food production.

The following link: [Australian Climate Influences](#) provides an overview of influences on the Australian climate using diagrams and text.

The following link: [Regional Weather and Climate Guides](#) provides regional weather and climate guides providing a summary of the last 30 years, the region at a glance, a guide to weather and climate, annual rainfall graphs, rainfall reliability, rainfall timing, evaporation and temperature graphs. There are multiple opportunities for interpreting data on each of these guides.

Pattern, Quantify, Exceptions (PQE) method to analyse maps:

P: describe the pattern or general trend found on the map.

Q: quantify the patterns. Use the information in the key/legend to name the features of the pattern and provide specifics.

E: exceptions are the outliers or elements that do not fit the pattern. Exceptions also need to be named and explained.

For further information and examples, see: [Reading and interpreting visual resources in Geography](#)

Salinity is one consequence of biomes being altered due to agriculture. Other issues to consider include loss of habitats, run-off of fertilisers or pesticides, production of greenhouse gases, using water for irrigation or overfishing. Select an example that suits your region. Horticulture in the Kimberley and Gascoyne regions are also examples of biomes being suitable for particular foods and could be investigated as an alternative to the truffle case study.

Resources and equipment

Teaching resource

- Infographic 1: Spotlight on Western Australia – Biomes

Other resources:

- [Climate Data Online](#)
- Information sheet How to draw a climate graph with BOM data
- <https://www.theguardian.com/lifeandstyle/gallery/2013/may/06/hungry-planet-what-world-eats>

Instructions for suggested activities

(Before looking at the infographic)

Working in groups or individually:

- 1) **Describe** the place where you live.
Include information about:
 - Weather/climate
 - Landscape/natural vegetation
 - The soil
 - Land use
- 2) **Share** descriptions in a format that suits the cohort. Students to modify their descriptions as required. Based on the descriptions, **discuss** how biomes influence land use in their area and, possibly, the food that they eat.

Additional activity suggestion:

The following article <https://www.theguardian.com/lifeandstyle/gallery/2013/may/06/hungry-planet-what-world-eats> presents images from the book 'Hungry Planet', use to discuss 'WHAT THE WORLD EATS'. Link to the biomes of the area and the UN SDG's.

Teacher to share the infographic with the class. Briefly consider the entire contents or focus on the relevant figures for each activity.

- 3) **Discuss** the contents of Figures 1, 2 and 4 using a format suitable for the cohort, for example, the PQE method, and **describe** the distribution patterns for each element. If applicable, **compare** the biomes of WA with the rest of Australia or the world. **Discuss** factors that affect climate (for example, latitude, altitude, pressure systems, prevailing winds, ocean currents and distance from sea) and the influence of climate on soils and vegetation.
- 4) Use Figures 1, 2 and 4 to **annotate** a map of your region. Students will need to determine a suitable method for recording all the information. An overlay map may be the best method. Students will also need to devise a suitable legend to accompany the map.
- 5) Use the Bureau of Meteorology (BOM) website to **create** climate graphs for the major centres in your region. Add the climate graphs to the map created in the previous activity.
- 6) **Discuss** 'Does the information on the map and climate graphs support the description written at the beginning of the lesson?' What could be added, modified or discarded?
- 7) Possible questions to conclude the lesson:
 - Are there any other areas in Australia or the world that have a similar biome to where you live? Where are they located?
 - Figure 2 shows Pre-European Vegetation of Western Australia. How does the vegetation in your area compare to that shown on the map?
 - How does climate impact soil and vegetation?
 - What did you discover on the BOM website regarding weather and climate in your town/region?

Module 2:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Locate food production areas within WA.

Background information

The idea for this activity was adapted from the following websites:

Oxfam Australia (n.d.), viewed 14 June 2021 Oxfam Australia: Which biomes are able to produce food? <<https://www.oxfam.org.au/get-involved/how-schools-can-get-involved/classroom-resources/food-4-thought-2/food-4-thought-geography/worksheet-2-which-biomes-are-able-to-produce-food/>> (If this link does not work, try copying the link into the address bar of your browser.)

[Cotton Australia Resources – Primary](#)

Resources and equipment

Teaching resource

- Infographic 1: Spotlight on Western Australia – Biomes.

Instructions for suggested activities

- 1) **List** the major biomes found in WA (based on climate/vegetation: Mediterranean forest, grasslands, desert and tropical).
- 2) Using the information on Figures 1 and 3, **answer** the following questions:
 - Which biomes are used for cattle rangelands?
 - Which biomes are used for sheep rangelands?
 - Which biomes are used for broadacre farming?
 - Where is irrigated horticulture located?
 - Which biome is most suitable for viticulture?
- 3) Possible discussion questions to conclude the lesson: (include reference to Figures 2 and 4).
 - How are biomes connected?
 - What are the similarities and differences between land use in each biome?
 - How might a changing climate affect the biomes?
 - How are the biomes affected by food and fibre production?
 - What are people doing to improve or maintain these biomes?
 - Why is the majority of food and fibre production located in the South-West of WA?
 - Discuss competing land use throughout WA and how this affects primary industry.

(Teachers modify questions as required)

Extension activity:

Investigate the Indigenous food and fibre available in each biome.

The following video from ABC Splash has some useful chapters regarding biomes.
[Taming the Australian desert - Geography, The Arts, History \(7,8,9,10\) \(abc.net.au\)](#)

- 4) **Describe** where food and fibre production occur in WA.

Module 3:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Discuss the consequences of altering biomes in order to produce food and fibre.

Background information

The impacts of food and farming production on biomes is a broad topic and could include many examples. The activities in this section focus on a WA example. As stated on the Department of Primary Industry and Regional Development (DPIRD) website:

Dryland salinity (salinity on non-irrigated land) is one of the greatest environmental threats facing Western Australia's agricultural land, water, biodiversity and infrastructure. It's commonly defined as salinity at or near the soil surface causing reduced plant growth, reduced water quality and damage to infrastructure.

Primary salinity develops naturally, mainly in areas where rainfall is insufficient to leach salts from the soil profile and evaporation is high. It occurs throughout the world in arid climates, including about 29 million hectares in Australia – 14 million hectares of salt marshes, salt lakes and salt flats, and 15 million hectares of naturally saline subsoils that have no groundwater or perched water to take the salts to the surface. Moist and wet primary saline areas have very high natural diversity in WA, and are at risk from increased flooding, waterlogging and increasing salinisation. Natural salt lake chains in WA follow ancient drainage lines.

Secondary salinity develops as a result of changed land use and management. In Australia, clearing for agriculture has been the major driver of this change, because deep-rooted, perennial native vegetation has been replaced with shallow-rooted annual crops and pastures, and this change allows more groundwater recharge.

The following links provides information regarding dryland salinity in the south-west of WA:

[Dryland salinity in Western Australia](#)

[Dryland salinity science](#)

There are several farmer case studies from WA, YouTube videos and print, provided by DPIRD that outline the solutions implemented to overcome salinity in various rainfall zones. They may be useful for your cohort.

[Managing dryland salinity - farmer case studies from Western Australia](#)

Resources and equipment

Teaching resource

- Infographic 1: Spotlight on Western Australia – Biomes

Student resource

- Information sheet Managing dryland salinity in South-West Western Australia
- Student worksheet 3.1 Cooperative learning jigsaw template
- [National Landcare Program Bush Tucker Project](#)
- Student worksheet 3.2 Saline bush tucker

Instructions for suggested activities

- 1) Using Figure 5 on the infographic, **explain** salinity. The image is an example of secondary salinity that is a result of changed land use and management. If appropriate, discuss primary salinity.
- 2) Using Figures 1 and 2, students **describe** the impacts of salinity.
- 3) Working in small groups, students **investigate** salinity management options as outlined on the DPIRD website.

An option for this activity

Using [Information sheet 3.3 Managing dryland salinity](#) and the [Student Worksheet 3.1 Cooperative learning jigsaw template](#), divide students into groups of six. Number them 1,2 3, 4, 5 and 6. Form expert groups to investigate options and then return to original groups to share findings. Students will create a summary of six possible solutions.

- 4) Case study – National Landcare Program and Bush Tucker Project
Students **read** the [Bush Tucker Project - Katanning Landcare](#) example and complete Student worksheet 3.2 Saline bush tucker. Conduct a class discussion based on the question provided on the worksheet.
- 5) **Investigate** an environmental issue (in your local area if possible) that has emerged due to food and fibre production and the solutions that have been adopted.

Module 4:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Recognise that the type of food and fibre produced in a region/biome is influenced by the predominant climate, soil and availability of water.

Background information

Truffle production is an example of a successful primary industry based on suitable environmental and economic conditions. The climate required includes warm summer temperatures (average 20°C) and cool winter temperatures (average 5°C) and approximately 700 mm of rainfall per annum. Originally truffles grew in forests growing on limestone soils.

The biomes of the south-west of WA, particularly near Manjimup and Pemberton, are similar to areas of France, Spain and Italy where truffles grow and have been used to successfully develop the truffle industry in WA.

Truffle production is dependent on oak or hazelnut trees and inoculated trees have been planted in Perth Hills, Toodyay, Margaret River, Busselton, Nannup, Donnybrook, Bridgetown, Walpole and Denmark.

For more information: [The truffle industry in Western Australia](#)

Resources and equipment

Teaching resource

- Infographic 1: Spotlight on Western Australia – Biomes.

Student resource

- Student worksheet 4.1 Truffle industry compass

Instructions for suggested activities

- 1) **Discuss** the truffle case study presented on the infographic.
(questions to consider)
 - Who has tried truffles? What do they taste like?
 - Where are they grown in the world?
 - How are they harvested?
 - When are they in season?
 - Why are they so expensive?
- 2) Students to **investigate** the truffle industry in more detail.
Distribute Student worksheet 4.1: Truffle industry compass. Students research how environmental, social, economic and political factors influence the biomes where truffles are grown in the south-west of WA and make notes on the 'compass'. (note: the NE, SE, SW and NW points can be used to discuss the overlap between factors. For example, how economic decisions (business profit) might impact people's lives or the natural environment).
- 3) Students **share** and **discuss** ideas either in small groups or as a class.

Alternative activity: Use an example from your local region eg tropical fruits in the Kimberley, Horticulture in the Gascoyne, grain in the south-west. This also presents an opportunity to discuss innovations in agriculture and the impact on yields.

Module 5:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Identify the changes made to biomes due to the production of food and fibre.

Background information

On the worksheet provided, the Kimberley and Gascoyne examples demonstrate modification to the biome due to irrigation and changes to the water supply while the Pilbara example demonstrates land clearing. The Pilbara example is fodder for animals, an indirect link to human food consumption.

The truffle and salinity examples from previous lessons are both south-west examples that could be discussed if the school is located in that region.

Resources and equipment

Teaching resource

- Infographic 1: Spotlight on Western Australia – Biomes

Other resources

- Student Worksheet 5.1 Altered biomes

Instructions for suggested activities

- 1) **Revise** the main points from the sequence of lessons ie location of major biomes in WA, food production areas in WA and the consequences of modifying biomes.
- 2) Distribute Student worksheet 5.1: Altered biomes and **discuss** the changes that are evident in each biome. There are two alternatives provided or alter to suit your cohort.
- 3) Using the information from Modules 1 to 4 and Student worksheet 5.1: Altered biomes, conclude the lesson with a Plus Minus Interesting (PMI) chart (or similar summary graphic organiser), mind map or written task to **address**:

The ways that humans, in the production of food and fibre, have altered biomes.

Alternatively, **discuss** the statement with respect to the geographical concepts: space, place, interconnections, change, sustainability and scale.

Infographic 2: Spotlight on Western Australia – the production of food and fibre

Curriculum links:

- Why and how participants in the global economy are dependent on each other.

Includes:

- WA
- WA – Outback (North)
- Working in agriculture
- Working in forestry

Educational process	Teaching and learning focus	Resources
<p>Engage</p> <p>Engage students and elicit prior knowledge.</p>	<p>Module 6:</p> <p>Students explore three regions within WA to determine the food and fibre produced and the contribution they make to the state's economy.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 2 <p>Other resources</p> <ul style="list-style-type: none"> • About my region • Student worksheet 6.1: Food and fibres in Western Australia
<p>Explore</p> <p>Find out more about the topic, concept or idea.</p>	<p>Module 7:</p> <p>Students examine the food industry supply chain.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 2 <p>Other resources</p> <ul style="list-style-type: none"> • Updated supply chain figures • Trade profile – imports
<p>Explain</p> <p>Use a variety of methods to collect relevant information and/or data from a range of appropriate sources, such as print, digital, audio, visual and fieldwork.</p>	<p>Module 8:</p> <p>Students investigate working in the agricultural industry to produce the raw materials exported or processed.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 2 <p>Other resources</p> <ul style="list-style-type: none"> • #Workandwander • Visible Farmer
<p>Elaborate</p> <p>Extend understanding to a new context or make connections to additional concepts through a student planned investigation.</p>	<p>Module 9:</p> <p>Students create a supply chain diagram to demonstrate the contribution of forestry industry to the Western Australian economy.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 2
<p>Evaluate</p> <p>Students re-represent their understanding and reflect on their learning journey, and teachers collect evidence about the achievement of outcomes.</p>	<p>Module 10:</p> <p>Students prepare a report on one Western Australia's regions highlighting food and fibre production.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 2 • One pager information

Learning resources and sequence

Module 6:

(approximately 1 lesson)



Learning intentions

Students will be able to:

- Discuss where the production of food and fibre occurs in WA.

Background information

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) has produced a series of individual profiles of the agricultural, forestry and fisheries industries in your region. Based on the regional boundaries set by the Australian Bureau of Statistics, each regional profile presents an overview of the agriculture, fisheries and forestry sectors in the region and the recent financial performance of the broadacre and, where relevant, dairy and vegetable industries.

Figure 1 on Infographic 2 shows the total value of agricultural production for WA and can be used as an example to introduce the variety of products available in WA.

The WA Open for Business has similar information, however, the regions are based on WA criteria and the information is set out differently. Use the website that suits your cohort and change the worksheet as required. The WA Open for Business webpage does not include information about the Perth region.

Resources and equipment

Teaching resources

- Infographic 2: Spotlight on Western Australia – The production of food and fibre
- [About my region - Department of Agriculture](#)
- [WA Open for Business](#)

Student resource

- Student Worksheet 6.1: Food and Fibre in Western Australia

Instructions for suggested activities

- 1) **Brainstorm** – What do your students already know about food and fibre production in WA? Think of products, location, value to the economy and job opportunities. Include headings such as:
 - Agriculture
 - Horticulture
 - Fisheries
 - Forestry
 - Other land uses

If suitable for your cohort, **complete** column two My Region (region 1) on Student worksheet 6.1: Food and fibre in Western Australia

- 2) **Preview** infographic 2 and **briefly outline** the information included. The regions used in Figure 1 are based on census data. Visit [About my region](#) and add any extra information to column two on worksheet 6.1.
- 3) **Read** the information in Figure 2 (extra detail can be found on the website) and **complete** column three on Student worksheet 6.1: Food and Fibre in Western Australia (If you live in the Kimberley region you may like to change column two to WA as a whole and column three to your region or just choose a different region).
- 4) Students **choose** a third region to **complete** column four on Student worksheet 6.1.
- 5) In small groups or whole class, **discuss** the similarities and differences between regions and suggest reasons why they occur.
- 6) Students to **complete** 'three things I have learnt' and 'three questions I now have' on the bottom of Student worksheet 6.1.

Module 7:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Explain the supply chain for the food industry in WA.

Background information

The image and information are taken from the following report [Plan to support Food Industry Development 2009-2012](#) and although the figures are dated (an update in excel provided), the format of the diagram is still useful.

Included in these resources is a word document that lists 16 import trade profiles for use as you require. These could be used to discuss the INPUT phase of the supply chain. The information was taken from the [Economic and trade profiles for WA](#), a link to the WA government publications site. The publications are update regularly and at the time of writing (April 2021) was the most current. The original document has a range of information regarding imports and exports.

Resources and equipment

Teaching resource

- Infographic 2: Spotlight on Western Australia – The production of food and fibre
- [Western Australia's economy and international trade](#)

Instructions for suggested activities

- 1) Refer students to Figure 3 on infographic 2 and complete a **see, think, wonder** graphic organiser. Discussion may include some of the following (example only):

SEE	THINK	WONDER
<ul style="list-style-type: none"> • WA input • Imports • Value of food industry • Where the raw materials go • Value of manufacturing food • WA exports • Value of retail industry • Five sectors in retail • Food can be processed or unprocessed 	<ul style="list-style-type: none"> • There are a lot of businesses in the food industry. • WA cannot produce everything it needs in terms of raw materials. • WA could generate more income. • Major supermarkets make a lot of money. 	<ul style="list-style-type: none"> • Where do the imported raw materials come from? • Why does WA need to import raw materials? • What does WA export? • Which food export generates the most income? • Does the processed food go to the eastern states and then return in the major supermarkets? • How many people are employed in retail food businesses?

- 2) Using a format that suits your cohort, **discuss** the following scenarios and record student responses.

What would happen to the supply chain if...

- a) a pandemic occurred?
- b) a natural disaster wiped out crops?
- c) there was a conflict between WA and a trading partner?
- d) transport distributions occurred in WA?
- e) there was a biosecurity breach?

- 3) **Label** the ideas as economic, social, environmental or political consequences.
- 4) Ask students what they would **add to, subtract from or modify** on the supply chain diagram to make it more informative.

Note: Infographic 3 looks at trade in more detail and could be linked to the supply chain graphic.

Module 8:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Explain the skills and knowledge required to be a primary producer in WA.

Background information

The Visible Farmer videos showcase women in primary industry throughout Australia. Season 1 focuses on WA and there are 15 options to consider. The link will open the 'watch' page, previews of each episode are on the 'Our Women' page. Choose examples that suit your cohort.

The second link provides three examples of 'A Day on a Farm'. These are promotional videos for the Wander Out Yonder campaign but are still useful to show the processes involved and the work that is done.

Resources and equipment

Teaching resources

- Infographic 2: Spotlight on Western Australia – The production of food and fibre
- [Visible Farmer](#)
- [#Workandwander](#)

Instructions for suggested activities

- 1) Before looking at Figure 4 of Infographic 2, **Brainstorm** - what does the class already know about the skills and knowledge required to work on a farm? Share ideas and discuss. Collate information in a format that suits your cohort.
- 2) Select and view a range of videos from the two links. While the students are viewing, they can **annotate** their notes. For example, tick any points mentioned in the discussion, add information in a different colour or a X next to anything that they have misrepresented.
- 3) Students use the notes to **prepare** a written explanation of the skills and knowledge required to work in agriculture. Choose a format that suits the cohort, for example, a diary entry, a narrative, persuasive or factual response.

Module 9:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Create a supply chain diagram representing the Forestry Industry.

Background information

The Western Australia's Agrifood, Fibre, Fisheries and Forestry Industries 2018 PDF, Forest Industries Federation WA (FIFWA) Home page and Forest Products Commission website all have information regarding the forestry industry. Choose the format that suits your cohort.

Resources and equipment

Teaching resource

- Infographic 2: Production of food and fibre in WA
- [Forest Products Commission](#)
- [FIFWA Infographic](#)
- [South West native forests](#)

Instructions for suggested activities

- 1) **Discuss** and **list** the elements required for a supply chain diagram.
- 2) Students **research** and collect relevant information, for each element, regarding the forestry industry in WA.
- 3) Students use their notes to **create** a supply chain diagram for the Forestry Industry.
- 4) Students **compare** their diagrams with the supply chain for WA food and note any similarities and differences.

Teachers may like to extend this module by discussing/comparing profit margins and/or marketing strategies used within each industry.

Module 10:**(approximately 2 lessons)****Learning intentions**

Students will be able to:

- Summarise and present key information

Background information

Research has shown that processing information using words and images supports learners understanding and retention. A 'one pager' allows students to select important information to include as a summary of their learning.

Resources and equipment

Teaching resource

- Infographic 2: Spotlight on Western Australia – The production of food and fibre

Other resources

- 'One pager' notes

Instructions for suggested activities

- 1) **Brainstorm** – What have students learnt in this series of lessons? Link to the theme of interconnections – how are participants in the global economy interdependent? For example, supply chain, producers of food and fibre, food manufacturers and retail outlets.
- 2) Teacher to **introduce** the concept of a 'one pager' to students and explain the format required. Discuss what needs to be included. Students complete a 'one pager' summarising what they have learnt in the four previous modules. The information sheet provides examples of technological and non-technological alternatives for students.
- 3) Conduct a **gallery walk** for students to see other examples. This can be extended by allowing students to make comments or ask questions.

Infographic 3: Spotlight on Western Australia

Curriculum links:

- Australia's interdependence with other economies, such as trade and tourism, trade links with partners in the Asia region, and the goods and services traded.

Includes:

- Trade analysis for WA
- WA's Top 10 trading partners
- WA's export markets
- Gross value of production for WA's exports
- Investment and trade plan for WA
- Industry snapshots

Educational process	Teaching and learning focus	Resources
<p>Engage Engage students and elicit prior knowledge.</p>	<p>Module 11: Students name the main trading partners for WA.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 3 • Trade profiles – Western Australian imports
<p>Explore Find out more about the topic, concept or idea.</p>	<p>Module 12: Students investigate the contribution primary Industry makes to exports.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 3
<p>Explain Use a variety of methods to collect relevant information and/or data from a range of appropriate sources, such as print, digital, audio, visual and fieldwork.</p>	<p>Module 13: Students consider the Western Australian Government's agenda and support for development of primary industry.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 3 <p>Other resources</p> <ul style="list-style-type: none"> • Diversify WA economic development framework and summary sheet • Asian Engagement Strategy and summary sheet
<p>Elaborate Extend understanding to a new context or make connections to additional concepts through a student planned investigation.</p>	<p>Module 14: Students summarise and share information from the industry snapshots.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 3 <p>Other resources</p> <ul style="list-style-type: none"> • Industry snapshots
<p>Evaluate Students re-represent their understanding and reflect on their learning journey, and teachers collect evidence about the achievement of outcomes.</p>	<p>Module 15: Students discuss WA's interdependence with other economies using the 'micro lab protocol'.</p>	<p>Teaching resource</p> <ul style="list-style-type: none"> • Infographic 3 <p>Other resources</p> <ul style="list-style-type: none"> • Micro lab protocol instructions

Learning resources and sequence

Module 11:

(approximately 1 lesson)



Learning intentions

Students will be able to:

- Name the main imports, exports and countries associated with WA trade.

Background information

Most of the information regarding trade highlights the contribution from mining. The [Western Australia's economy and international trade](#) page provides economic and trade profiles for WA. The versions available at the time of writing were May 2021 and April 2021 respectively. There is limited information regarding the export of primary products, however, there is some data regarding imports.

Resources and equipment

Teaching resource

- Infographic 3: Spotlight on Western Australia – Trade
- Trade profiles – Western Australian Imports

Instructions for suggested activities

- 1) Students to **brainstorm** what they know about WA trade. Prompts may include; what do we export/import? Which countries do we trade with? Are exports or imports greater? What is the value of exports/imports?
The Treasury Corporation Economic Analysis examples provided on Infographic 3 give an overview for December 2020 and April 2021. The website provides updated reports on a monthly basis. (Change as required). Possible activities include: comparing data, graphing data and predicting changes.
- 2) Students to **list** who they think are the top 10 nations (based on value) we export to and import from. Use tables provided under the heading 'Western Australia's Top 10 trading partners' on infographic 3, and the link provided, to check answers.
- 3) Possible activities: map the countries, determine distance from ports in WA, compare the value of imports/exports for each country, research trade agreements between Australia and these countries. If necessary, refer to land use map on Infographic 1 to point out food production areas and ports.

Module 12:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Identify the primary industries that contribute to WA's economic performance.

Background information

As stated in the Primary Industry Plan 2020-2024:

The objectives of the Primary Industries Plan ('the Plan') are to set clear priorities for investment and to establish a platform for strengthened collaboration between government and primary industries.

It sets out how the Department of Primary Industries and Regional Development (DPIRD) and other Western Australian Government agencies, Commonwealth Government, industry, communities, and other stakeholders will work together to sustain the prosperity of the State's primary industries.

A key purpose of the Plan is to give effect to the State's broader economic development policy. Together with other economic development initiatives, the Plan will contribute to the State Government's priorities of creating jobs, strengthening and diversifying the economy and creating stronger regions.

The State's primary industries are well-placed to expand and diversify the regional Western Australian economy. The Plan reflects and supports the State's economic development framework, Diversify WA. To align itself with the framework, the Plan will regularly report on the diversification of the primary industries sector.

We will report our progress in delivering the Plan's outcomes, including trends in:

- *employment*
- *primary production*
- *food and beverage manufacturing*
- *export market distribution.*

The overall success of the Plan will be evaluated in 2024 and a new plan developed for the next five years.

To be implemented over the period 2020 to 2024, this Plan will enable the Government, industry, and communities to more effectively collaborate to support Western Australia's primary industries. As lead agency, DPIRD will oversee the implementation of the Plan in consultation with primary industries.

We will:

- *Actively engage and partner with industry at enterprise, industry and representative organisation level, and support the strengthening of industry leadership.*
- *Play a lead role within Government to advocate for the regulatory, policy and program support required to implement the Plan.*
- *Work closely with relevant government agencies at State and Commonwealth level to deliver outcomes for industry.*
- *Directly deliver programs including coordinating and participating in the delivery of foundational research and development activities.*
- *Work with industry to understand the impact of COVID-19 on primary industries and assess the direction of the Plan in light of these evolving conditions.*

Implementation will be focused through reporting on progress on each of the Strategic Initiatives identified in the Plan.

Resources and equipment

Teaching resource

- Infographic 3: Spotlight on Western Australia – Trade

Instructions for suggested activities

- 1) **Read** the information regarding the Primary Industry Plan. **Define** any words/terms that are unfamiliar to the students.
- 2) Students to use a Venn diagram to **compare** Figures 1 and 2. **Discuss** the purpose and usefulness of each figure. Students decide which figure they think provides the most useful data, and why.
- 3) **Create** a PMI chart based on the information in Figures 1 and 2.

For example:

Plus	Minus	Interesting
WA earns \$11.7 billion from primary industry.	High reliance on grains/cereal for export income	More than half our exports are purchased by Asian countries
There are a range of industries that contribute to exports	We rely on China for approximately 25% of our income	Livestock accounts for only 15% of export income

Module 13:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Explain how the Western Australian Government influences trade with Asia.

Background information

The Diversify WA and Asian Engagement Documents outline the strategic planning of the government.

- [Western Australia's Asian Engagement Strategy 2019 - 2030 - Our future with Asia](#)
- [Diversify WA economic development](#)

The full documents and a summary sheet are available.

Resources and equipment

Teaching resource

- Infographic 3: Spotlight on Western Australia - Trade

Other resources

- Diversify WA economic development framework summary
- Asian Engagement Strategy summary

(If suitable, present the full reports to your cohort/class)

Instructions for suggested activities

- 1) **Discuss** Figure 3.3 on Infographic 3. The figure highlights how the Primary Industry Plan contributes to the governments overarching goals.
- 2) Distribute summary documents to students – students **select** the key points from the summary documents to develop an understanding of the government’s agenda and the interdependence of stakeholders involved in trade. (Students could work in pairs or small groups to select information from one of the documents and then share.)
- 3) Students **complete** a Pros, Cons, Questions (PCQ) graphic organiser (or something similar) after considering both summaries.

Alternative teaching strategy: [3 2 1 Bridge](#)

Module 14:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Investigate the exports produced by primary industries in the Western Australian economy.

Background information

The Department of Primary Industry and Regional Development (DPIRD) conducted research to determine demand for Western Australian products and the capability of production in WA. The Target Market Opportunities Report identified 20 high growth, high value premium opportunities at the intersection between what Asian consumers want and what WA can produce. See the link below for details and a copy of the report. There are a variety of graphs and figures that could be utilised to develop HASS skills.

[Target Market Opportunities Report](#)

Linked to this are the Primary Industry snapshots that provide details of seven industries.

[Western Australian Industry Snapshots](#)**Resources and equipment**

Teaching resource

- Infographic 3: Spotlight on Western Australia - Trade
- [Western Australian Industry Snapshots](#)

Instructions for suggested activities

- 1) Teacher to provide some background information regarding the industries that have a high export demand and why the government is interested in investing in them. **Discuss** WA's interdependence with other countries in terms of trade.
- 2) Students **investigate** one of the industry snapshots and summarise the main points. Some of the information is common to all the snapshots. (The Cooperative learning jigsaw template could be used as an option for this activity).
- 3) Choose a suitable format for students to **compare** the information they have found. For example, Inside-Outside circle, presentations, give one - get one.

Module 15:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Discuss WA's interdependence with other economies, for example, trade and trade links with partners in the Asia region, and the goods and services traded.

Background information

The thinking routine selected for this activity is designed to encourage equal participation and contribution during a discussion.

Resources and equipment

Teaching resource

- Infographic 3
- TR_The_Micro_Lab_Protocol.pdf

Instructions for suggested activities

- 1) Teacher to explain the micro lab protocol to students.
- 2) Present the discussion topic to students. Students **free write** for a specified time (5-10 minutes) in response to the discussion topic stated above.
- 3) Students move into groups of three and follow the steps for **discussion** and sharing ideas:
 - Share
 - Pause
 - Repeat
 - Discuss
 - Share the thinking
- 4) One person from each group to **report** main points to the class.

Infographic 4: Future food security

Curriculum links:

- The effects of anticipated future population growth on global food production and security; the capacity for Australia and the world to achieve food security; the implications for agricultural innovation and environmental sustainability.

Includes:

- Predicted population for WA
- The water situation in WA
- WA Food Security Plan
- Case study – Qfly
- Regenerative agriculture
- Future foods
- GM crops
- Aquaculture.

Educational process	Teaching and learning focus	Resources
Engage Engage students and elicit prior knowledge.	Module 16: Students investigate the population statistics for WA.	Teaching resource <ul style="list-style-type: none"> • Infographic 4 Other resources <ul style="list-style-type: none"> • Story map WA population: WA Tomorrow
Explore Find out more about the topic, concept or idea.	Module 17: Students read and summarise the WA Food Security Plan	Teaching resource <ul style="list-style-type: none"> • Infographic 4
Explain Use a variety of methods to collect relevant information and/or data from a range of appropriate sources, such as print, digital, audio, visual and fieldwork.	Module 18: Students investigate the climate change data for Western Australian regions.	Teaching resource <ul style="list-style-type: none"> • Infographic 4 Other resources <ul style="list-style-type: none"> • Regional Weather and Climate Guides
Elaborate Extend understanding to a new context or make connections to additional concepts through a student planned investigation.	Module 19: Students will research an aspect of Future Food Security and present findings to class.	Teaching resource <ul style="list-style-type: none"> • Infographic 4 Other resources <ul style="list-style-type: none"> • Student Worksheet 19.1: Message Box • Information sheet Qfly
Evaluate Students re-represent their understanding and reflect on their learning journey, and teachers collect evidence about the achievement of outcomes.	Module 20: Students reflect on their learning.	Teaching resource <ul style="list-style-type: none"> • Infographic 4 Other resources <ul style="list-style-type: none"> • Student worksheet 20.1: Three Ws

Learning resources and sequence

Module 16:

(approximately 1 lesson)



Learning intentions

Students will be able to:

- Discuss how WA can ensure food security for a growing population.

Background information

The WA Tomorrow story map from the Department of Planning, Lands and Heritage is a visual, engaging tool to use in class. At the end of the story there is an interactive section showing the data in more detail and, on page 4, you can access your region/location using ABS data to investigate the population trends relevant to your cohort.

Resources and equipment

Teaching resource

- Infographic 4: Future food security
- [Story Map WA population: WA Tomorrow](#)

Instructions for suggested activities

- 1) **Discuss** with the class the statistics in the Population Growth box. If appropriate for your cohort, **compare** data with Australia and/or world trends.
- 2) **Create** a cause and effect diagram listing the implications of population growth and an aging population.
- 3) **Share** and discuss diagrams, create a mind map from the ideas generated. Include the need for food security and how WA can contribute.

Module 17:

(approximately 1 lesson)



Learning intentions

Students will be able to:

- Explain the factors that impact food security in WA.

Background information

The Food and Agriculture Organization of the United Nations (FAO) states, “Food security exists when all people, at all times, have physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle”.

FAO identified the following as some of the trends and challenges for the future of agriculture and food:

Trends	Challenges
<ul style="list-style-type: none"> • Population growth, urbanisation and ageing • Global economic growth, investment, trade and food prices • Climate change • Agricultural productivity and innovation • Pests and diseases • Changing food systems • Food losses and waste • Development finance 	<ul style="list-style-type: none"> • Sustainable agricultural • Sustainable natural resource base • Intensification of natural disasters • Eradicating extreme poverty and inequality • Ending hunger and malnutrition • Efficient food systems • Addressing earning opportunities and the causes of migration • Building resilience • national and international governance

[FAO Homepage](#) The ‘Resources’ tab has a number of useful infographics and interactive stories.

Resources and equipment

Teaching resource

- Infographic 4: Future food security
- [Food Security Plan for Western Australia](#)

Instructions for suggested activities

- 1) **Discuss (or revise)** the trends and challenges suggested by FOA regarding future food security. Highlight those that may impact WA.
- 2) The ‘Food Security Plan for Western Australia: Situation report’ lists 10 factors impacting WA food security. **Summarise** the factors using a format that suits your cohort. For example, retrieval chart, give one get one or jigsaw.
- 3) **Discuss** the ways in which the plan addresses the UN SDG’s.
- 4) **Rank** the factors from highest impact to lowest impact based on class vote – reasons must be provided by students.

Module 18:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Discuss climate trends in their region as an example of a factor impacting food security in WA.

Background information

The BOM has a number of climate guides available for WA at [Regional Weather and Climate Guides](#). There are a range of maps and graphs on each guide that present multiple opportunities for geography skill development.

Resources and equipment

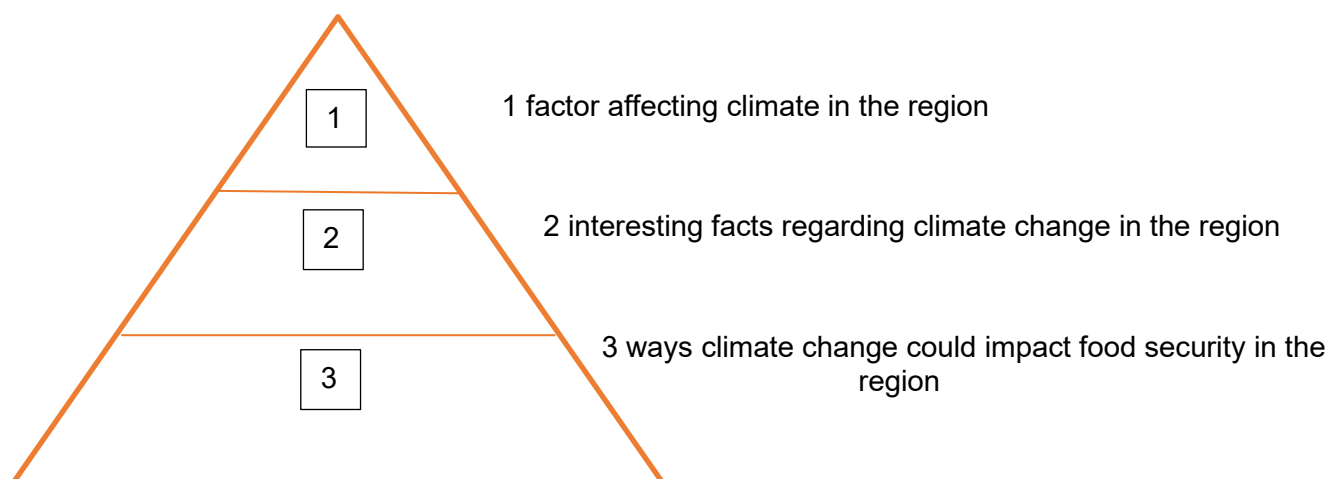
Teaching resource

- Infographic 4: Future food security
- [Regional Weather and Climate Guides](#)
- [Climate spirals](#) (global climate indicators)

Instructions for suggested activities

- 1) **Recap** the factors that impact food security and introduce climate change as an example. Consider in terms of global, national and local scale.
- 2) Students **read** the information in the climate guides. Select the appropriate content and format for your class/cohort.
- 3) Students **summarise** the information in a 3-2-1 graphic organiser.

For example:



If suitable for your class/cohort, distribute the guides for all the regions and **compare** the findings.

Module 19:**(approximately 2-3 lessons)****Learning intentions**

Students will be able to:

- Explain an example of an activity that is either impacting or contributing to future food security.

Background information

There are many examples of trends and challenges impacting food security and the possible solutions. Therefore, the suggested activity for this module is individual or small group research and presentations. Alternatively, use the examples on Infographic 4 to conduct a teacher-led investigation.

Resources and equipment

Teaching resource

- Infographic 4: Future food security
- Information sheet Qfly
- Video: Biosecurity
- [Grains research facilities: New Genes for New Environments](#) (GM)
- [Tackling Australia's food waste](#)
- [Indian Ocean Sea Vegetables - 2020](#)
- [Edible insects: the future of food?](#) (note: 2015)
- [Bitten by the Bug - Paula Pownall, insect farmer, Grubs Up, Coolup](#) – WA example
- [Grubs are up this Christmas](#) (same company as YouTube clip)
- Student worksheet 19.1: Message Box

Instructions for suggested activities

- 1) **Discuss** the examples on Infographic 4 as threats to food security (water supply and Queensland Fruit Fly) and possible solutions (alternative food supplies, GM crops, Aquaculture and regenerative farming techniques) found in WA.

If appropriate, share the following with your class/cohort: the FAO conducts a World Food Day (16 October 2021) - the following link [World Food Day](#) provides information on a 'global' scale. It could be useful for setting the scene prior to research.

- 2) Students to **research** one of the threats or solutions to future food security (choose one from Infographic 4 or allow students to locate another example) and present their findings to the class as a speech.

Provide as scaffolding as required for your class/cohort.

- Distribute Student worksheet 19.1: Message Box and allocate topics. Teachers can decide on the 'audience' for the speeches.
- Students carry out research and take notes in the 'Message box'
- Students use the notes to prepare a speech.
- Conduct speeches in class.

Alternative/extension activity

The following link [On the farm in 70 years-farmer predictions](#) provides the personal opinions of 52 farmers, 11 of which are located in WA, who describe their connection to the land, highlight the biggest change they have seen in farming and imagine food production in the future.

Some suggested activities:

- 1) Summarise the answers from Western Australian farmers.
- 2) Compare responses from farmers.
- 3) Classify predictions as economic, social, environmental or political impacts.
- 4) Map the location of the Western Australian farms, link to biomes.
- 5) Students answer the questions (if appropriate to your location).
- 6) Interview farmers in your location (if possible).

The Western Australian farmers are:

Pennie Patane, Spike Dessert, Mel Gray, Oscar Negus, Jason Stokes,
Colin Brierly, Ashley Sparkman, Steve Tonkin, Gemma Walker, Shayne Smith, Margaret Murray.

Module 20:**(approximately 1 lesson)****Learning intentions**

Students will be able to:

- Consider how future population growth will impact global food production and security and suggest what can be done at various levels in the economy.

Resources and equipment

Teaching resource

- Infographic 4

Student resource

- Student Worksheet 20.1: Three Ws

Instructions for suggested activities

- 1) **Revise** the main points from previous four modules.
- 2) **Distribute** Student worksheet 20.1: Three Ws. Students to complete, discuss with partner or small group.
- 3) Class **discussion** of main points.

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