Government of **Western Australia**
School Curriculum and Standards Authority

Humanities and Social Sciences: Geography

Teaching, learning and assessment exemplar

Year 9

Biomes and food security

Acknowledgement of Country

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

Background

This teaching, learning and assessment exemplar (the exemplar) has been developed by the School Curriculum and Standards Authority (the Authority) as part of the *School Education Act Employees (Teachers and Administrators) General Agreement 2017* (Clause 61.1–61.3).

Disclaimer

Any resources such as texts, websites and so on that may be referred to in this document are provided as examples of resources that teachers can use to support their learning programs. Their inclusion does not imply that they are mandatory or that they are the only resources relevant to the course. Teachers must exercise their professional judgement as to the appropriateness of any they may wish to use.

This resource utilises electronic web-based resources, such as videos and image galleries. Teachers should be present while an electronic resource is in use and close links immediately after a resource, such as a video has played to prevent default 'auto play' of additional videos. Where resources are referred for home study, they should be uploaded through Connect, or an equivalent system, that filters advertising content.

Contents

The Western Australian Curriculum

The *Western Australian Curriculum and Assessment Outline* (the *Outline* – https://k10outline.scsa.wa.edu.au/) sets out the mandated curriculum, guiding principles for teaching, learning and assessment, and support for teachers in their assessment and reporting of student achievement. The *Outline* recognises that all students in Australian schools, or international schools implementing the Western Australian curriculum, are entitled to be given access to the eight learning areas described in the *Alice Springs* (*Mparntwe*) *Education Declaration*, December 2019.

The Humanities and Social Sciences curriculum

The mandated curriculum is presented in the year level syllabus documents.

The Humanities and Social Sciences curriculum delivers a sequential and age-appropriate progression of learning with the following key elements:

- a year level description that provides an overview of the context for teaching and learning in the year
- a series of content descriptions, populated through strands and sub-strands, that sets out the knowledge, understanding and skills that teachers are expected to teach and students are expected to learn
- an achievement standard that describes an expected level that the majority of students are achieving by the end of a given year of schooling. An achievement standard describes the quality of learning (e.g. the depth of conceptual understanding and the sophistication of skills) that would indicate the student is well placed to commence the learning required in the next year.

This exemplar

This Humanities and Social Sciences exemplar articulates the content in the *Outline* and approaches to teaching, learning and assessment reflective of the Principles of Teaching, Learning and Assessment. This exemplar demonstrates a sequence of teaching and learning, including suggested assessment points, for 16 lessons.

Catering for diversity

This exemplar provides a suggested approach for the delivery of the curriculum and reflects the rationale, aims and content structure of the learning area. When planning the learning experiences, consideration has been given to ensuring that they are inclusive and can be used in, or adapted for, individual circumstances. It is the classroom teacher who is best placed to consider and respond to (accommodate) the diversity of their students. Reflecting on the learning experiences offered in this exemplar will enable teachers to make appropriate adjustments (where applicable) to better cater for students' gender, personal interests, achievement levels, socio-economic, cultural and language backgrounds, experiences and local area contexts.

Using this exemplar

This teaching, learning and assessment exemplar provides suggestions to support the delivery of the mandated curriculum content. The exemplar provides:

- a teaching and learning sequence
- the mandated curriculum content to be taught at each point of the teaching and learning sequence, suggested resources, a sample assessment task and marking key
- the number of lessons to deliver the teaching and learning experiences
- learning intentions and support notes that may provide focus questions and additional information and/or examples to assist with the interpretation of curriculum content
- support notes to assist teachers to unpack the content and support teaching and learning experiences
- teaching and learning experiences that outline the structure of the lesson. These explicitly state each activity that the lesson will progress through and the key focus area for that activity.

Links to electronic resources

This sequence of lessons may utilise electronic web-based resources, such as videos and image galleries. Teachers should be present while an electronic resource is in use and close links immediately after a resource, such as a video, has played to prevent default 'auto play' of additional videos. Where resources are referred for home study, they should be uploaded through Connect, or an equivalent system, that filters advertising content.

Resources legend

The following symbols are used in this teaching, learning and assessment exemplar to provide teachers with information on the nature of the resources included in the lesson sequence.

Symbol	Name	Description	Examples of use
	Multimedia	Video or audio materials to be shown to the class	• YouTube clips • documentary • podcasts
	Webpage	Online information source	• news article • museum website • government website
	Student resource	Resource that students need to access for learning	• student worksheets • graphic organiser template • interactive webpage
	Lesson materials	Materials that require teacher preparation prior to lesson	• collection of images • card-sort activities • materials for practical activities
	Teacher support resource	Additional information to support teachers in the suggested lesson	• thinking routine instructions • example of completed graphic organisers • additional information on topic

Best practice

Teaching and learning

The teaching and learning opportunities offered in this exemplar are not exhaustive. Thus, teachers are encouraged to make professional decisions about which learning experiences, and the sequence in which they are delivered, are best suited to their classroom context, taking into account the availability of resources and student ability.

This sample may prove a useful starting point for amplifying creativity in the classroom, while presenting the embedded expectations of the Western Australian Curriculum: Humanities and Social Sciences.

Teachers may find opportunities to incorporate the General Capabilities and the Cross-curriculum Priorities into the teaching and learning program.

Ways of teaching – teachers can locate additional information on the Ways of teaching from the School Curriculum and Standards Authority (the Authority) website https://k10outline.scsa.wa.edu.au/home/wa-curriculum/learning-areas/humanities-and-social-sciences/overview/humanities-and-social-sciences-ways-of-teaching.

Assessing

Assessment, both formative and summative, is an integral part of teaching and learning. Assessment should arise naturally out of the learning experiences provided to students. In addition, assessment should provide regular opportunities for teachers to reflect on student achievement and progress. As part of the support it provides for teachers, this exemplar includes suggested assessment points. It is the teacher's role to consider the contexts of their classroom and students, the range of assessments required, and the sampling of content descriptions selected to allow their students the opportunity to demonstrate achievement in relation to the year level achievement standard. Teachers are best placed to make decisions about whether the suggested assessment/s are used as formative or summative assessment and/or for moderation purposes.

Ways of assessing – a range of assessment strategies that can enable teachers to understand where students are in their learning is available on the Authority website https://k10outline.scsa.wa.edu.au/home/wa-curriculum/learning-areas/humanities-and-social-sciences/overview/humanities-and-social-sciences-ways-of-assessing.

Reflecting

Reflective practice involves a cyclic process during which teachers continually review the effects of their teaching and make appropriate adjustments to their planning. The cycle involves planning, teaching, observing, reflecting and replanning.

This exemplar supports reflective practice and provides flexibility for teachers in their planning. The exemplar shows how content can be combined and revisited throughout the year. Teachers will choose to expand or contract the amount of time spent on developing the required understandings and skills according to their reflective processes and professional judgements about their students' evolving learning needs.

Biomes and food security

This exemplar can be used to develop students' understanding of key geographical concepts and skills as they apply to food security. This includes factors that impact levels of food security, challenges of food production for Australia and the world, effects of anticipated future population growth on global food production, and the security and capacity for Australia and the world to achieve food security.

If the suggested learning experiences and the relevant syllabus content for this unit have been studied, students will be well positioned to address the requirements of the assessment task to the best of their ability. The assessment task requires students to write an essay addressing the challenges to food production and evaluate a strategy to improve food security.

Year level description

In the middle adolescence phase of schooling, teaching and learning programs encourage students to develop an open and questioning view of themselves as active participants in their society and the world.

In Humanities and Social Sciences students, build on their understanding of important concepts and continue to develop their awareness of the complexity of the natural environment, social issues and the impact of technological advances. Students consider how the relationship between knowledge, technology and values influences their own role within society.

In Year 9, students develop increasing independence in critical thinking and skill application, which includes questioning, researching, analysing, evaluating, communicating and reflecting. They apply these skills to investigate events, developments, issues and phenomena, both historical and contemporary.

Students continue to build on their understanding of the concepts of the Westminster system, democracy, democratic values, justice and participation. They examine the role of political parties and independent representatives, and the way citizens' decisions are shaped during an election campaign. Students investigate how Australia's court system works in support of a democratic and just society.

Students are introduced to the concepts of specialisation and trade while continuing to further their understanding of the key concepts of scarcity, making choices, interdependence, and allocation and markets. They examine the connections between households and businesses, and the financial, government and overseas sectors through the flow of goods, services and resources in a global economy. Students develop an understanding of the risks and rewards involved in investing money and explore ways to practise financial management.

The concepts of place, space, environment, interconnection, sustainability and change continue to be developed as a way of thinking, which enable students to inquire into the production of food and fibre, the role of the biotic environment and to explore how people, through their choices and actions, are connected to places in a variety of ways. Students apply this understanding to a wide range of places and environments at a range of scales, from local to global, and in a range of locations.

Students develop their historical understanding through key concepts, including evidence, continuity and change, cause and effect, perspectives, empathy, significance and contestability. These concepts are investigated within the historical context of Australia's colonial history and World War I. They consider how the experiences of people and groups reflected the attitudes of these time periods, and the significance of both colonisation and World War I.

Achievement standard

By the end of the year:

Students construct a range of questions and hypotheses involving cause and effect, patterns and trends, and different perspectives. They use a range of methods to select, record and organise relevant information and/or data from multiple sources. When interpreting sources, students identify their origin and purpose, and draw conclusions about their usefulness. They examine sources to compare different points of view/perspectives and describe different interpretations. Students analyse information and/or data to identify simple patterns, trends, relationships and/or change over time. They draw evidence-based conclusions, using information and/or data to consider multiple perspectives and/or to propose action in response to contemporary challenges. Students develop a range of texts appropriate to the type of discussion and/or explanation required. They use subject-specific terminology and concepts, and provide evidence from a range of sources to support conclusions, and acknowledge these sources.

Students describe some ways individuals and political parties participate within the electoral system in Australia's democracy and how their voting preferences can be shaped by external influences. They describe Australia's court system and how the courts resolve disputes. Students identify the principles of justice and the threats to these principles.

Students explain the interdependence between Australia and other economies by identifying Australia's trading partners and describe how specialisation results in the exchange of goods and services between countries. They describe the risks and rewards that result from making consumer and financial choices.

Students explain the spatial variation and characteristics of biomes and the interconnections between people, places and environments. They identify the cause and effect of these interconnections, and predict possible implications for people, places and natural environments, now and in the future. Students make inferences about the spatial outcomes of the interconnections between people, places and environments.

Students explain the different experiences of Australia's colonial history, and the causes and effects of World War I over both the short and long term, including its significance. Students use evidence to explain patterns of change and continuity over time and identify the motives and actions of the individuals and groups at that time.

Lessons 1–16

Lessons 1–2

The Western Australian Curriculum content addressed in these lessons is below.

Biomes and food security

- The characteristics and spatial distribution of biomes as regions with distinctive climates, soils and vegetation

Questioning and researching

- 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 with and without the use of digital and spatial technologies

Communicating and reflecting

- Select a range of appropriate formats based on their effectiveness to suit audience and purpose, using relevant digital technologies as appropriate

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Resources

Frank Gregorio – *Introduction to Biomes*
https://www.youtube.com/watch?v=hIy0ZlyPPDg

the teacher toolkit – *Gallery Walk*
https://www.theteachertoolkit.com/index.php/tool/gallery-walk

teacherhead – *10 Techniques for Retrieval Practice*
https://teacherhead.com/2019/03/03/10-techniques-for-retrieval-practice

Materials to create a poster

Teacher information

The *10 Techniques for Retrieval Practice* instructions are provided for teacher support and are not referenced in the lesson outline.

Lesson outline

Learning intention/s	Success criteria
Students will: • explore the characteristics of different biomes.	Students can: • identify and describe key features of a biome, including climate, soil and vegetation • present their findings through a poster with a map and detailed information about their biome.

Introduction

- Show students the *Introduction to Biomes* video. Have students note down three things they have learned, two interesting facts and one question they still have.

Main activity

- Provide students with the materials to create a poster and allocate a different biome to each group of students.
- In groups of three or four, students complete research and create a poster about their allocated biome. Posters must include:
  - a map showing the location of the biome (including the latitudes of the biome)
  - the climate characteristics
  - the soil characteristics
  - the vegetation found in the biome
  - at least one other characteristic of the biome (e.g. fauna, human use of the biome).

Review of learning

- Students complete the *Gallery Walk* instructional strategy to fill in a retrieval chart about the characteristics of each of the biomes.

Lesson 3

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

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

Evaluating

- Critically evaluate information and/or data and ideas from a range of sources

Resources

Department of Agriculture, Fisheries and Forestry – Snapshot of Australian Agriculture 2025
https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australian-agriculture#agricultural-production-is-growing

Appendix A: Food Production in Australia

Project Zero: Harvard Graduate School of Education – I used to think…Now I think…
https://pz.harvard.edu/resources/i-used-to-think-now-i-think

Lesson outline

Learning intention/s	Success criteria
Students will: • investigate patterns and trends in Australian food production and their implications.	Students can: • analyse data on Australian food production and identify patterns and trends.

Introduction

- Have students brainstorm the different crops that are grown in Australia.
- Show students Figure 3 from the *Snapshot of Australian Agriculture 2025* webpage and update their brainstorm.

Main activity

- Distribute a copy of *Food Production in Australia* (Appendix A) to each student.
- Discuss the sources featured and support students to identify patterns, trends and draw conclusions from the data provided.
- Analyse the data on the worksheet and complete all task questions in full sentences.

Review of learning

- Complete a *I used to think…Now I think…* thinking routine for food production in Australia.

Lesson 4

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

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

Analysing

- Apply subject-specific skills and concepts in familiar, new and hypothetical situations

Resources

Appendix A: Alterations to Biomes broadsheet

NSW Government: Education – Conducting a field sketch video
https://education.nsw.gov.au/teaching-and-learning/curriculum/hsie/hsie-curriculum-resources-k-12/hsie-7-10-curriculum-resources/conducting-a-field-sketch

NSW Government: Education – Field sketches, geography 7–10
https://education.nsw.gov.au/teaching-and-learning/curriculum/hsie/hsie-curriculum-resources-k-12/hsie-7-10-curriculum-resources/geography-7-10-field-sketches

Teacher information

Field sketches are simplified, hand-drawn illustrations of observations made by geographers to record landscapes and landforms, vegetation, settlements and infrastructure without the need for photographs. The *Conducting a field sketch video* instructions and *Field sketches,* geo*graphy 7–10* instructions webpages are provided as support for teachers and are not referenced in the lesson outline.

Lesson outline

Learning intention/s	Success criteria
Students will: • explore key processes of biome alteration and their environmental impacts.	Students can: • identify and annotate evidence of biome alteration processes • create an accurate field sketch.

Introduction

- Define and discuss key terms and processes associated with the topic of biome alteration:
  - vegetation clearance and deforestation
  - drainage
  - terracing
  - irrigation.

Main activities

- Provide each student with a copy of the *Alterations to Biomes* broadsheet (Appendix A).
- Students identify evidence of the above processes by annotating this on the images provided, in addition to suggesting what impacts these changes would have on the natural environment.
- Using Source 1 of the broadsheet, model a field sketch on the board, using the instructions provided on the broadsheet.
- Students follow these steps to construct their own field sketch of Source 1.

Review of learning

- Students create a mnemonic to help them remember the steps to create a field sketch.

Lesson 5

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

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

Communicating and reflecting

- Reflect on why all findings are tentative

Resources

Ms Ferrer – (2016) Firestick Farming – Stage 3 Geography video
https://www.youtube.com/watch?v=sfRjHTqn7mc

K20 Learn – Think-Pair-Share
https://learn.k20center.ou.edu/strategy/139

SBS – Firestick farming: how traditional Indigenous burning protected the bush by Nicola Heath
https://www.sbs.com.au/topics/voices/culture/article/2021/03/17/firestick-farming-how-traditional-indigenous-burning-protected-bush

Lesson outline

Learning intention/s	Success criteria
Students will: • investigate the role of firestick farming in altering Australian biomes.	Students can: • explain the purposes and environmental benefits of firestick farming • compare firestick farming to another method of biome alteration.

Introduction

- As a class, watch the *Firestick Farming – Stage 3 Geography* video to introduce Aboriginal and Torres Strait Islander peoples' alteration of Australian biomes.
- Conduct the *Think-Pair-Share* instructional strategy using the following questions:
  - How did firestick farming change the landscape/biomes of Australia?
  - What benefits did firestick farming provide for Aboriginal and Torres Strait Islander peoples, prior to European settlement?
  - Why were Aboriginal and Torres Strait Islander Strait peoples careful and strategic in where and when they burnt areas of land?

Main activity

- Direct students to the *Firestick farming: how traditional Indigenous burning protected the bush* webpage.
- Students read the article, and use the information to answer the following questions:
  - List the reasons Aboriginal and Torres Strait Islander peoples used fire.
  - In what ways could the use of fire by Aboriginal and Torres Strait Islander peoples be described as sophisticated?
  - Describe how firestick burning helps to reduce the impacts of bushfires.
  - Explain why the European's use of land was at odds with Aboriginal and Torres Strait Islander peoples' methods.
- Conduct a class discussion with students sharing their answers.

Review of learning

- Students write a one sentence summary comparing firestick farming to one other way humans in the production of food and fibre have altered some biomes from Lesson 4.

Lesson 6

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

- The effects of world population growth on global food security; the solutions for Australia and the world to achieve food security; and the implications for environmental sustainability

Communicating and reflecting

- Generate a range of viable options in response to an issue or event to recommend and justify a course of action, and predict the potential consequences of the proposed action

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Resources

OECD Development – Food insecurity: global challenges and calls to action
https://youtu.be/FVe3Pskr-ag

Peace Corps – Food Security Game
https://www.peacecorps.gov/educators-and-students/educators/resources/food-security-game/

Food Security Game – Card Texts

Project Zero: Harvard Graduate School of Education – (2015) Circle of Viewpoints (thinking routine) https://pz.harvard.edu/resources/circle-of-viewpoints

Lesson outline

Learning intention/s	Success criteria
Students will: • investigate different perspectives on food security and the challenges faced in achieving it.	Students can: • explain factors that impact an individual's access to food.

Introduction

- Students view the *Food insecurity: global challenges and calls to action* video to introduce some of the topics covered in this lesson.

Main activity

- Give each student a profile from the *Food Security Game – Card Texts* instructions.
- Complete the *Food Security Game* as per the instructions on the resource.
- Conduct a class discussion using the discussion questions. Students may write their answers individually before the class discussion.

Review of learning

- Students complete the *Circle of Viewpoints* thinking routine for food security from the perspective of the role they undertook in the *Food Security Game*.

Lesson 7

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

- The effects of world population growth on global food security; the solutions for Australia and the world to achieve food security; and the implications for environmental sustainability

Evaluating

- Draw evidence-based conclusions by evaluating information and/or data, taking into account ambiguities and multiple perspectives; negotiate and resolve contentious issues; propose individual and collective action in response to contemporary events, challenges, developments, issues, problems and/or phenomena

Resources

Food and Agriculture Organization of the United Nations – FAO Food Insecurity Map
https://www.fao.org/fileadmin/templates/SOFI/2022/docs/map-fies-print.pdf

Geography Teachers Association of NSW – Spiral of Skills 7–10 instructions (p. 43)
https://www.gtansw.org.au/wp-content/uploads/2023/10/11_GTA-Geography-Bulletin-Issue-3-2023_Spiral-of-Skills-7-10.pdf

Atlases

Teacher information

The PQE method refers to three steps in analysing data particularly in maps:

1. Pattern – describe the pattern referring to specific places and using geographical terminology
2. Quantify – provide specific data for countries and places to support a description of the pattern
3. Exceptions – identify any exceptions to the pattern described.

Food security is the state of having reliable access to a sufficient quantity of affordable, nutritious food. Some factors that affect food security include climate, culture, level of development, human modification of environments, soil fertility, landforms, technology, labour and population size.

The *Spiral of Skills 7–10 instructions* (p. 43) are provided for teacher support and are not referenced in the lesson outline.

Lesson outline

Learning intention/s	Success criteria
Students will: • explore global patterns of food security and factors influencing undernourishment.	Students can: • interpret the 2024 Global Hunger Index and describe the spatial distribution of food insecurity.

Introduction

- To introduce the concept of food security, ask students to individually list five countries where they think the whole population has enough to eat, and five countries where they feel people lack sufficient food.
- Students to compare their list with a partner and discuss why they have selected these countries.

Main activity

- Display the *FAO Food Insecurity Map* webpage.
- Ask students to write answers to the following questions:
  - On what basis did you select the countries you thought were food secure or food insecure?
  - Were these assumptions accurate?
  - What are some characteristics of the countries which are not food secure? (Think about their economic, social, political, and environmental situations.)
- Using the *FAO Food Insecurity Map* webpage, describe the spatial distribution of undernourishment around the world. This should be completed using the PQE method.
- As a class, construct some criteria for evaluating the PQE response, such as naming specific countries or regions or using accurate data to represent the patterns.

Review of learning

- Students complete a self-assessment of their PQE response based on the criteria developed as a class.

Lesson 8

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

- The challenges to food production, including climate change and at least **one** other of the following: land and water degradation, shortage of fresh water, competing land uses in Australia and the world

Evaluating

- Draw evidence-based conclusions by evaluating information and/or data, taking into account ambiguities and multiple perspectives; negotiate and resolve contentious issues; propose individual and collective action in response to contemporary events, challenges, developments, issues, problems and/or phenomena

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Resources

Earthday.org – Climate Change Quiz
https://www.earthday.org/the-climate-change-quiz/

Institute for Environmental Research and Education – How Climate Change Affects Food Production? – https://iere.org/how-climate-change-affects-food-production/

Mind maps Unleashed – Impacts mind map
https://mindmapsunleashed.com/wp-content/uploads/2012/07/impacts-mindmap.jpg

Project Zero: Harvard Graduate School of Education – The 3 Whys
https://pz.harvard.edu/resources/the-3-whys

Teacher Toolkit – Exit Ticket
https://www.theteachertoolkit.com/index.php/tool/exit-ticket

Lesson outline

Learning intention/s:	Success criteria
Students will: • investigate how climate change impacts food production.	Students can: • use case studies to discuss the ways climate change contributes to food insecurity.

Introduction

- Have students complete the *Climate Change Quiz* online activity to provide some background on the concept of climate change.

Main activity

- Students read the *How Climate Change Affects Food Production*? webpage and develop a mind map illustrating the relationship between climate change and food production using the information provided.
- Using *The 3 Whys* thinking routine, students discuss the impact of climate change on food production at a personal, national and international level.

Review of learning

- Students complete an Exit Ticket explaining how they think climate change is contributing to food insecurity.

Lesson 9

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

- The challenges to food production, including climate change and at least **one** other of the following: land and water degradation, shortage of fresh water, competing land uses in Australia and the world

Evaluating

- Draw evidence-based conclusions by evaluating information and/or data, taking into account ambiguities and multiple perspectives; negotiate and resolve contentious issues; propose individual and collective action in response to contemporary events, challenges, developments, issues, problems and/or phenomena

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Resources

Project Zero: Harvard Graduate School of Education – Looking: Ten Times Two
https://pz.harvard.edu/resources/looking-ten-times-two

English Plus Podcast – Climate Change FAQs: Answers to Your Burning Questions
https://englishpluspodcast.com/climate-change-faqs-answers-to-your-burning-questions/

ABC News – Fears natural disasters are driving away farmers in Queensland's Lockyer Valley
https://www.abc.net.au/news/2024-07-18/farmers-lockyer-valley-natural-disasters/104076700

Thoughtful Learning – Asking and Answering the 5W's and H Questions
https://k12.thoughtfullearning.com/minilesson/asking-and-answering-5-ws-and-h-questions

K20 Learn – (2020) Looks Like, Sounds Like, Feels Like (instructional strategy)
https://learn.k20center.ou.edu/strategy/88

Lesson outline

Learning intention/s	Success criteria
Students will: • explore the impact of climate change on food production.	Students can: • identify and explain the impacts of climate change on the Lockyer Valley • summarise the effects of climate change on food production.

Introduction

- Show students the image at the top of the *Climate Change FAQs: Answers to Your Burning Questions* webpage and complete the *Look: Ten Times Two thinking* routine.
- Students share their lists of words and phrases with the class.

Main activity

- Provide students with a copy of the *Fears natural disasters are driving away farmers in Queensland's Lockyer Valley* online article and show the *Stateline* video embedded in the article.
- Read through the article and complete the *5Ws and H Questions* instructional strategy about the ways the Lockyer Valley is being impacted by climate change.

Review of learning

- Students complete the *Looks Like, Sounds Like, Feels Like* instructional strategy for the impacts of climate change on food production.

Lesson 10

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

- The challenges to food production, including climate change and at least **one** other of the following: land and water degradation, shortage of fresh water, competing land uses in Australia and the world

Communicating and reflecting

- Develop texts, particularly explanations and discussions, using evidence from a range of sources to support conclusions and/or arguments

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Resources

Behind the News – Palm Oil Problem – Behind the News
https://www.youtube.com/watch?v=koDWaIW9CMs

World Wildlife Fund – Sustainable Agriculture
https://www.worldwildlife.org/industries/sustainable-agriculture

Lesson outline

Learning intention/s	Success criteria
Students will: • explore the impacts of competing land uses on food production.	Students can: • identify the positive and negative social, environmental and economic impacts of an agricultural commodity • compare challenges to food production between different commodities, noting similarities and differences.

Introduction

- Show students the *Palm Oil Problem – Behind the News* video. Have students note down the scale of palm oil plantations and the impacts that they have on the environment.

Main activity

- Students access the *Sustainable Agriculture* website and select one of the priority commodities to research in more detail.
- For the chosen commodity, students complete a *T-chart* showing the positive and negative impacts of that commodity. Students should attempt to find information about the social, environmental and economic impacts of their commodity.
- From their *T-charts*, students identify and highlight the challenges to food production that are impacting on the industry and/or the challenges to food security the commodity is contributing to.

Review of learning

- Students share their *T-charts* with another member of the class and note down two things that are similar and two things that are different between the challenges to food production for the two commodities.

Lesson 11

The Western Australian Curriculum content addressed in this lesson is below.

Biomes and food security

- The effects of world population growth on global food security; the solutions for Australia and the world to achieve food security; and the implications for environmental sustainability

Communicating and reflecting

- Compare evidence to substantiate judgements

Resources

Our World in Data – Population Growth
https://ourworldindata.org/population-growth

Project Zero: Harvard Graduate School of Education – See, Think, Wonder
https://pz.harvard.edu/resources/see-think-wonder

Gapminder – Gapminder Tools
https://www.gapminder.org/tools/

Project Zero: Harvard Graduate School of Education – Headlines
https://pz.harvard.edu/resources/Headlines

Teacher information

A cartogram is a type of map in which the size of geographic regions, such as countries or continents, is distorted in proportion to a particular statistic or data point, rather than their actual land area. The purpose of a cartogram is to visually represent how different areas compare in terms of a specific variable, such as population size.

Gapminder is a data visualisation tool that provides interactive tools and resources to help users explore and understand global trends related to social, economic and environmental data. The *Gapminder Tools* website allows users to explore a variety of indicators, such as life expectancy, income, population growth and many other global development metrics. The tools present this data using visualisations, such as bubble charts, that allow users to compare countries or regions over time. It is recommended that teachers are familiar with how to use this resource before the lesson.

Lesson outline

Learning intention/s	Success criteria
Students will: • investigate the relationship between population growth and food insecurity across different regions.	Students can: • describe the relationship between population growth and food insecurity.

Introduction

- Show students the world population cartogram from the *Population Growth* resource. Students complete the *See, Think, Wonder* thinking routine, framing their 'wonder' around food production and food security.

Input

- Using the *Gapminder Tools* webpage, set up a scatter graph showing prevalence of moderate or severe food security (min 2, max 89) on the X-axis and population growth (min –2, max 5) on the Y-axis.
- Discuss what the graph shows.

Student activity

- Students select one country from each continent and describe the trend in the relationship between population growth and food insecurity from 2015 to 2021.
- Students view the graph in its totality and comment on whether there are any worldwide or continental trends that can be identified.

Review of learning

- Students complete the *Headlines* thinking routine to summarise what they have learned during this lesson.

Lessons 12–13

The Western Australian Curriculum content addressed in these lessons is below.

Biomes and food security

- The effects of world population growth on global food security; the solutions for Australia and the world to achieve food security; and the implications for environmental sustainability

Questioning and researching

- 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 with and without the use of digital and spatial technologies

Communicating and reflecting

- Select a range of appropriate formats based on their effectiveness to suit audience and purpose, using relevant digital technologies as appropriate

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Resources

Institute for Environmental Research and Education – How Climate Change Affects Food Production? – https://iere.org/how-climate-change-affects-food-production/

Appendix A: Solutions to food insecurity

Materials for information campaign

Teacher information

In the context of these lessons, mitigation refers to actions designed to reduce or prevent the causes of food insecurity, whereas adaptation refers to adjusting to the impacts caused by food insecurity to ensure that communities can handle and recover from issues such as climate change and population growth.

Suggested statements for introduction activity:

1) Reducing greenhouse gas emissions from agriculture (mitigation)
2) Investing in local and regional food production to reduce dependency on imported food (mitigation)
3) Investing in food storage, including industrial cold storage (adaptation)
4) Building the resilience of communities through disaster preparedness (adaptation)
5) Restoring degraded land and improving soil health (mitigation)

Lesson outline

Learning intention/s	Success criteria
Students will: • explore strategies for achieving food security in the future and evaluate their sustainability.	Students can: • describe solutions to food insecurity • evaluate a range of solutions to food insecurity.

Input

- As an entry ticket, students write down a definition of food security based on their prior learning. Students then share their definition with the class.
- Provide students with the definition for mitigation and adaptation strategies in the context of food insecurity.
- Students classify the list of strategies provided in the teacher information section of these lessons under the heading 'mitigation strategy' or 'adaptation strategy'. Review the responses as a class.

Main activity

- Using the *Solutions to food insecurity* (Appendix A) retrieval chart, students research a combination of mitigation and adaptation strategies, recording a description, a case study and an evaluation of the strategy.
- Have a class discussion on:
  - the advantages and disadvantages of each solution
  - whether these solutions are sustainable (consider environmental, economic and social factors).
- Students design an information campaign, such as a pamphlet or poster, explaining one of the strategies from the summary table.

Review of learning

- Ask students to cast a vote for the solution they consider to be the most effective at addressing food insecurity, and to justify their choice.

Lessons 14–16 Assessment

See Appendix B: Assessment task – Essay

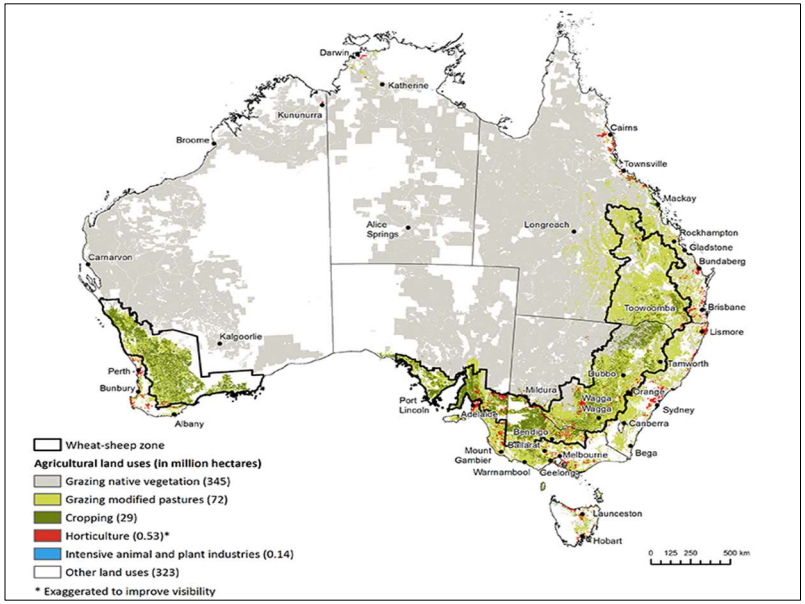
Appendix A

Resources

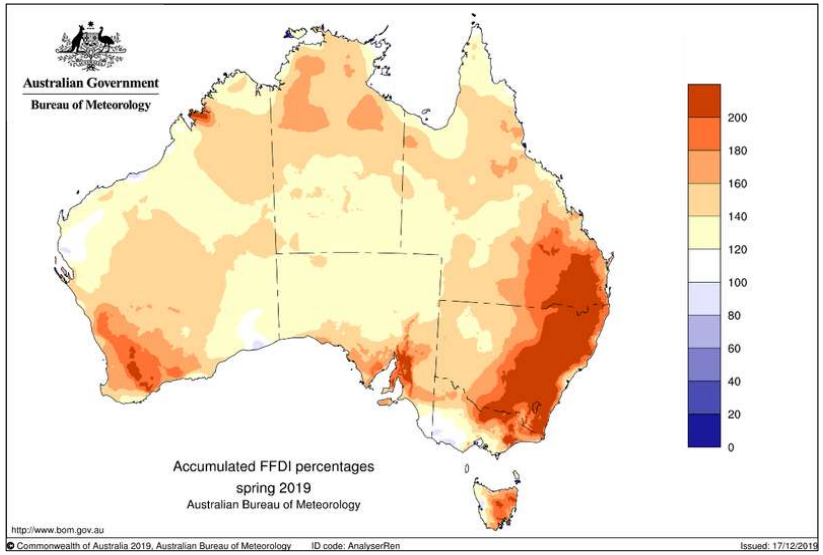
Lesson 3: Food production in Australia

Task one: Examine and compare Sources 1–5, then answer the questions below in full sentences, on lined paper.

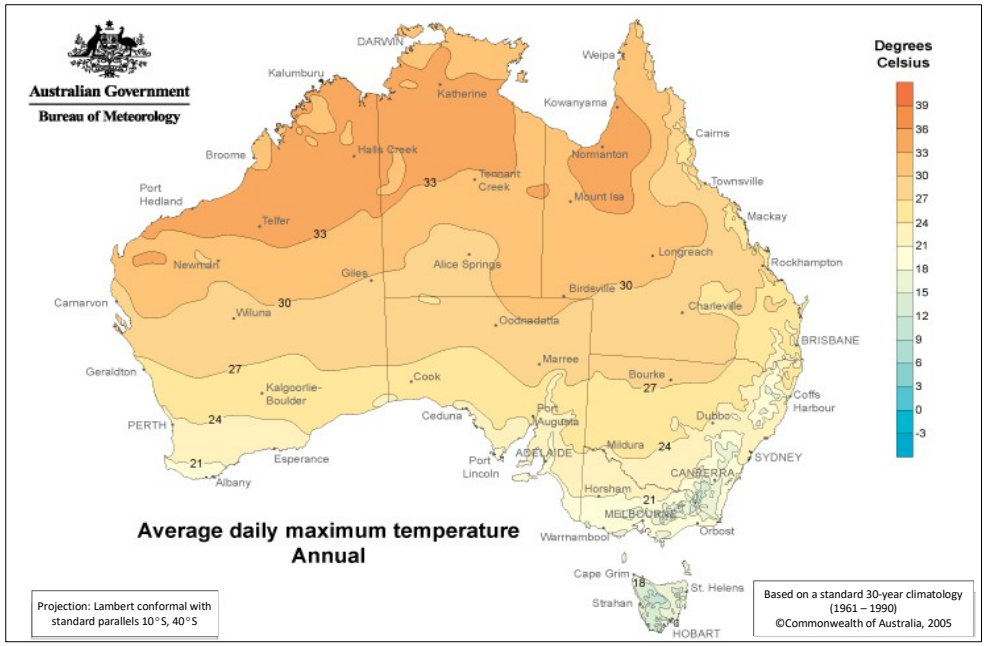
- Describe the spatial distribution of grazing modified pastures. What climate characteristics do these areas have?
- Which forms of agriculture are most at risk from bushfire in Australia?
- In what parts of Australia is horticulture located? Why do you think it would be located there?
- Suggest reasons why agricultural land use generally decreases as you move further inland.
- With reference to Source 5, identify one trend for Meat & live animals production.
- With reference to Source 5, identify which area of production has shown a downward trend.



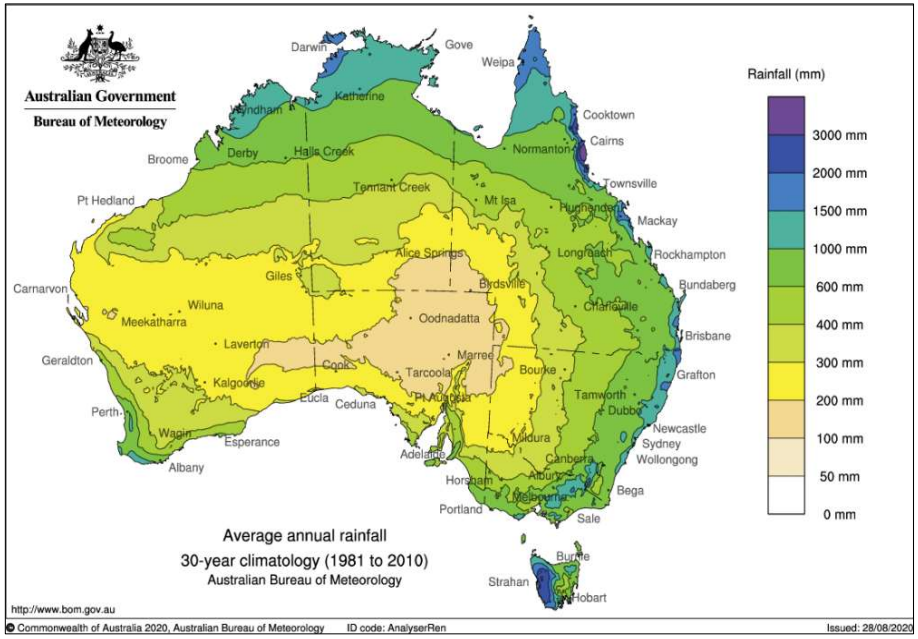
Source 1



Source 2 Australia FFDI (Forest Fire Danger Index), Spring 2019

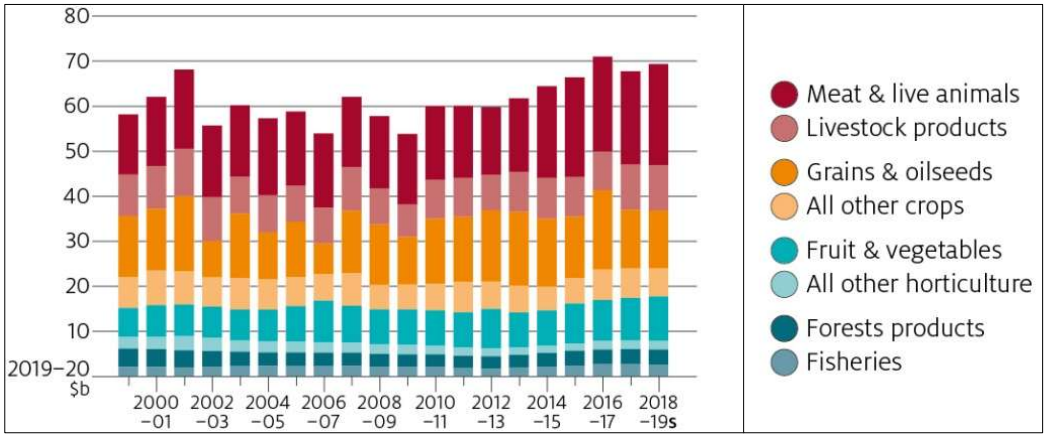


Source 3 Adapted version of: Agriculture, fisheries and forestry production, 1999–2000 to 2018–19



Source 4

Agriculture, fisheries and forestry production, 1999–2000 to 2018–19



Source 5 Adapted version of: Agriculture, fisheries and forestry production, 1999–2000 to 2018–19

Lesson 4: Alterations to biomes broadsheet

Source 1 Rice fields in Vietnam
https://commons.wikimedia.org/wiki/File:Terraced_fields_Sa_Pa_4.jpg

Source 2 Circular sprinkler system in Cuba
https://commons.wikimedia.org/wiki/File:Sistema_de_regadio_circular_en_toda_su_magnitud.jpg

Source 3 Burning of an Agricultural Plot, Central Africa
https://commons.wikimedia.org/wiki/File:Burning_of_an_agricultural_plot_(32714109054).jpg

Image cannot be displayed for copyright reasons.
Teachers can find this image using the link below.

Source 4 Aerial view of farming in Minnesota, USA
https://commons.wikimedia.org/wiki/File:Precision_Farming_in_Minnesota_-_Natural_Colour_(part).jpg

Source 5 Cattle standing in shade, Australia
https://commons.wikimedia.org/wiki/File:Cows_in_shade.jpg

Constructing an annotated field sketch

Geographers use field sketches as a quick way of showing the main or specific feature at a particular location. They are most commonly used in Geography while completing fieldwork. Geographers also create sketch maps from photographs. You can use the same process for constructing a sketch map using a photograph or when you are out on a fieldtrip. Use a lead pencil to complete your field sketch by following this process:

- using a ruler, construct a border of the shape of the photograph you are sketching; add a title (normally the location and/or the topic shown in the sketch) and the date of when you completed your sketch
- draw in the shape or lines of the main landscape features, including the skyline/horizon, making sure to consider the correct positioning according to your photograph
- add any specific features and/or details as required to your sketch
- annotate or label those features of the scene that relate to the topic you are focusing on
- use different colour pencils and shading to highlight important features.

Activity (in the space to the left):

Complete a field sketch of Source 1. On your sketch, label key **natural** and **cultural** (made by humans) features of the environment, and describe the possible impacts of the cultural changes.

Lessons 12–13: Solutions to food insecurity

Solution to food security (mitigation and adaptation strategies)	Description of what the strategy involves	Outline a specific example or case study	Effectiveness in Australia (1 = not effective, 5= highly effective)	Justification for effectiveness score
1.				
2.				
3.				

4.				
5.				

Appendix B

Assessment task

Essay

Task details

Title	Essay
Description	Students identify the challenges relating to food security globally and evaluate possible solutions. Students use this information to write an extended response.
Way of assessing	Written work
Evidence to be collected	Extended response
Suggested time	Two lessons to prepare notes (Lessons 14–15) and one lesson to write extended response (Lesson 16)
Differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment tasks.

Content descriptions

Knowledge and understanding

- The challenges to food production, including climate change and at least **one** other of the following: land and water degradation, shortage of fresh water, competing land uses in Australia and the world
- The effects of world population growth on global food security; the solutions for Australia and the world to achieve food security; and the implications for environmental sustainability

Humanities and Social Sciences skills

Questioning and researching

- 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, with and without the use of digital and spatial technologies

Analysing

- Analyse information and/or data in different formats

Evaluating

- Critically evaluate information and/or data and ideas from a range of sources

Communicating and reflecting

- Develop texts, particularly explanations and discussions, using evidence from a range of sources to support conclusions and/or arguments
- Generate a range of viable options in response to an issue or event to recommend and justify a course of action, and predict the potential consequences of the proposed action

Key concepts

Place, environment, sustainability, change.

Instructions to students

Solutions to food insecurity

This food security assessment is an essay task. You will have two lessons in which to research and consolidate your knowledge. The third lesson will be used to write your essay response to the seen question below.

Collect and summarise your note-taking in the template below to prepare for this assessment. You should refer to your notes from previous lessons, in addition to conducting your own research, where necessary.

Extended answer question

Discuss **two** challenges to food security and assess the sustainability of **one** possible strategy to improve food security.

Test conditions

- You will be allowed 45 minutes writing time.
- You will be allowed to refer to your completed note-taking template of no more than 300 words to assist you with your response.
- Essay structure is expected, and you should allow for planning time in your research periods.

What to include

In your response, you should:

- define the term food security
- explain global patterns of food security
- discuss **two** factors, in detail, which are challenging food security in Australia and different locations in the world (e.g. population growth, land and water degradation, climate change, conflict etc.)
- include specific examples/statistics
- assess **one** proposed or already implemented strategy to address the issue of food security in Australia and/or the world
- describe the challenges this strategy faces and list the pros/cons
- predict the overall future sustainability of this strategy, considering social, economic and environmental factors.

In-class note-taking template

Research inquiry	Note-taking
Introduction Definition of food security Global pattern of food security	
Paragraph one One factor challenging food security (include examples and statistics)	
Paragraph two One factor challenging food security (include examples and statistics)	

Paragraph three Strategy to improve food security (what the strategy involves)	
Paragraph four Strategy to improve food security (pros and cons)	
Conclusion Strategy to improve food security (sustainability)	

Marking key

Description	Marks
Analysing: Definition and global patterns	
Correctly defines the term food security using relevant geographical terminology	2
Makes a generalised statement about food security	1
Subtotal	**/2**
Explains global patterns of food security	3
Describes global patterns of food security	2
Makes generalised statements about the global patterns of food security	1
Subtotal	**/3**
Analysing and evaluating: Two factors challenging food security (2 x 5 marks)	
Discusses a factor which is challenging food security in Australia and/or different locations in the world (e.g. population growth, land and water degradation, climate change, conflict etc.)	5
Explains a factor which is challenging food security in Australia and/or different locations in the world (e.g. population growth, land and water degradation, climate change, conflict etc.)	4
Describes a factor which is challenging food security in Australia and/or different locations in the world (e.g. population growth, land and water degradation, climate change, conflict etc.)	3
Outlines a factor which is challenging food security in Australia and/or different locations in the world (e.g. population growth, land and water degradation, climate change, conflict etc.)	2
Makes broad unsubstantiated statements about a factor which is challenging food security in Australia and/or different locations in the world (e.g. population growth, land and water degradation, climate change, conflict etc.)	1
Subtotal	**/10**
Evaluating: Strategy	
Assesses one proposed or already implemented strategy being used to address the issue of food security in Australia and the world Describes, in detail, the challenges this strategy faces (pros/cons) Predicts the sustainability of the strategy, making reference to economic, environmental and social factors	9–10
Attempts to assess one proposed or already implemented strategy being used to address the issue of food security in Australia and the world Describes briefly the challenges this strategy faces (pros/cons) Predicts the sustainability of the strategy, making reference to economic, environmental and social factors	7–8
Discusses one proposed or already implemented strategy being used to address the issue of food security in Australia or the world Outlines some of the challenges this strategy faces Comments on the sustainability of the strategy, making some reference to economic, environmental or social factors	5–6

Description	Marks
Describes one proposed or already implemented strategy being used to address the issue of food security in Australia or the world States a challenge this strategy faces Makes a generalised statement on the sustainability of the strategy, making limited reference to economic, environmental or social factors	3–4
Makes broad generalised statements about a strategy being used to address the issue of food security in Australia or the world	1–2
Subtotal	**/10**
Communicating and reflecting	
Consistently uses relevant geographical terminology and concepts Provides a range of specific and relevant examples and statistics from evidence to support essay	5
Uses relevant geographical terminology and concepts Provides a range of relevant examples and statistics from evidence to support explanation	4
Uses some relevant geographical terminology and concepts Provides some relevant examples and statistics from evidence to support description	3
Uses limited relevant geographical terminology and/or concepts Provides limited examples and statistics from evidence to support outline	2
Provides limited evidence and/or geographical terminology	1
Subtotal	**/5**
Total	**/30**

Acknowledgements

Appendix A: Lesson 3 Food production in Australia

Source 1 adapted from: Department of Agriculture, Fisheries and Forestry. (2025, February). Australian Agricultural Land use (Fig. 2) [Diagram]. *ABARES Insights: Snapshot of Australia Agriculture 2025* (p. 2). Retrieved May, 2025, from https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australian-agriculture
Used under a Creative Commons Attribution 4.0 International licence.

Source 2 from: Bureau of Meteorology. (2019, December 18). Accumulated FFDI percentages for spring 2019 compared to the long-term mean for 1950–2018 9 (Fig. 10) [Diagram]. *Special Climate Statement 72–Dangerous Bushfire Weather in Spring 2019*, p. 11. Retrieved May, 2025, from http://www.bom.gov.au/climate/current/statements/
Used under a Creative Commons Attribution 3.0 Australia licence.

Source 3 from: Bureau of Meteorology. (2005). *Average Daily Maximum Temperature Annual* [Diagram]. Retrieved May, 2025, from http://www.bom.gov.au/jsp/ncc/climate_averages/temperature/index.jsp
Used under a Creative Commons Attribution 3.0 Australia licence.

Source 4 from: Bureau of Meteorology. (2020). *Average Annual Rainfall 30-year Climatology (1981 to 2010)* [Diagram]. Retrieved June, 2021, from http://www.bom.gov.au/jsp/ncc/climate_averages/rainfall/index.jsp
User under a Creative Commons Attribution 3.0 Australia licence.

Source 5 from: Jackson, T., Zammit, K., & Hatfield-Dodds, S. (2020). Agriculture, Fisheries and Forestry Production, 1999–2000 to 2018–19s (Fig. 4). *ABARES Insights: Snapshot of Australian Agriculture 2020* (p. 3). Retrieved May, 2025, from https://daff.ent.sirsidynix.net.au/client/en_AU/search/asset/1029981/0
Used under a Creative Commons Attribution 4.0 International licence.

Appendix B: Lesson 4 Alterations to Biomes broadsheet

Source 1 from: Alonso, P. (2011). *Terraced Fields Sa Pa 4* [Photograph]. Retrieved May, 2025, from https://commons.wikimedia.org/wiki/File:Terraced_fields_Sa_Pa_4.jpg
Used under a Creative Commons Attribution 2.0 Generic licence.

Source 2 from: Ivan2010. (2013). *Sistema de Regadio Circular en Toda su Magnitude* [Photograph]. Retrieved May, 2025, from https://commons.wikimedia.org/wiki/File:Sistema_de_regadio_circular_en_toda_su_magnitud.jpg
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Source 3 from: -JvL-. (2016). *Burning of an Agricultural Plot (32714109054)* [Photograph]. Retrieved May, 2025, from https://commons.wikimedia.org/wiki/File:Burning_of_an_agricultural_plot_(32714109054).jpg
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Source 5 from: A1162285. (2012). *Cows in Shade* [Photograph]. Retrieved May, 2025, from https://commons.wikimedia.org/wiki/File:Cows_in_shade.jpg
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