Exploring the impact of climate change on food security in Australia

Year Level:	9	**Subject:**	Geography	**Topic:**	Food security
Duration:	2-3 x 50 minute lessons **Lesson 1/2-** Research focus **Lesson 2-** Collating **Lesson 3-** Presenting and knowledge sharing	**Australian Curriculum:**	**Achievement standards:** • 2, 3, 4, 5, 6, 9, 11 **Content description codes:** • **AC9HG9K03:** the environmental, economic and technological factors that impact agricultural productivity, in Australia and a country in Asia • **AC9HG9K04:** challenges to sustainable food production and food security in Australia and appropriate management strategies • **AC9HG9S05:** develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impacts • **AC9HG9S06:** create descriptions, explanations and responses, using geographical knowledge and geographical tools as appropriate, and concepts and terms that incorporate and acknowledge research findings	**Climate Topic(s):**	• Climate change risks • Extreme weather • Sustainability

Brief Overview

This lesson explores the relationship between environmental factors and food security, with a focus on Australia's unique challenges and opportunities. Students will investigate how climate change impacts Australia's food production and security, examining both current trends and future risks. By conducting state based research and collaborating in groups, students will develop a comprehensive understanding of why protecting the environment is essential for ensuring Australia's food security, and learn to effectively communicate these complex issues to a broad audience.

Learning outcomes
Learning Intention Students will be able to identify the climate change risks and ways to ensure Australia's food security. **Success Criteria** ● Describe how climate change will impact extreme weather and resources ● Apply these changes to the agriculture sector ● Examine these impacts on a state scale ● Identify potential solutions to climate risks

Introduced climate science concepts:	Presumed knowledge:
● Climate risks ● Extreme weather events and climate change ● Sustainable solutions (e.g. renewable energy) ● Climate change impacts (environmental, economic, and social)	● **AC9HG7K0:** classification of environmental resources and the way that water connects and changes places as it moves through environments ● **AC9HG7K02:** the location and distribution of water resources in Australia, their implications, and strategies to manage the sustainability of water ● **AC9HG8K02:** the location and distribution of Australia's distinctive landscapes and significant landforms ● **AC9HG8K05:** the causes and impacts of a geomorphological hazard on people, places and environments, and the effects of responses

Teaching resources				
Tool ID	**Type of Tool**	**Name and web link**	**Overview**	**Credits**
R1	Teacher resource	Glossary of climate terms	This document provides teachers with a glossary of key terms relevant to this lesson plan. It is important that students are familiar with the meaning of these terms so they can complete the class activities.	Monash Climate Change Communications Research Hub
R2	Teacher resource	Lesson Powerpoint	This powerpoint follows the 5Es pedagogy and provides the entire lesson structure, including speaker notes which the teacher should review prior to delivery.	Monash Climate Change Communications Research Hub
R3	Teacher + Student resource	State/Territory climate impacts information resource	This PDF has summary pages of VIC (pages 1-2), QLD (pages 3-5), NSW (pages 6-7), TAS (8-13), SA (14-16) and WA (17-21) climate change impacts and solutions. These pages can be used as a starting point for independent research by students.	Climate Commission

Lesson activities				
	Teacher activities	**Student Tasks**	**Tool ID**	**Time**
ENGAGE **Introduction discussion**	*Ppt Slides 1-4* Slide 4 - See, think, wonder: Empty supermarket shelves image	Students can write or pair up to complete their see, think, wonder. Share in class discussion. *Differentiation strategy:* call on hesitant sharers to discuss the 'see' portion, and call on extension students for the 'wonder' portion.	R2	2-5 mins

EXPLORE **Australian crops and environmental factors**	*Ppt Slides 5-7* Slide 5 for the first part of the task: the class discussion. Slide 6 is a list of 10 crops in a random order, with following slide 7 being the correct ranked order.	Students to participate in a popcorn discussion naming different crops grown in Australia. *Differentiation strategy: call on hesitant sharers first to be able to name easier crops, and call on extension students when obvious ones have already been said.* Next, working off slide 6 (which lists 10 crops grown in Australia), students are to re-order and write them down from the highest to lowest quantity produced per year. Student should consider and explain why some crops may be more productive than others (eg. climate hot vs cold, soil, location, water).	R2	10-15 mins
EXPLAIN **Food security**	*Ppt Slides 8-11* Teacher to explain slides (speaker notes included in the notes section below slides)	Students to take their own notes.	R2	10 mins
ELABORATE **Part 1: Research**	*PptSlide 12-13* Jigsaw activity part 1: Split students into 'expert groups', assigning each one of the food security topics below. Case studies and research presented through this task are encouraged to come from the state/territory where the school is based. E.g. if you are based in Victoria, research/case studies from Victoria are most relevant. Topics are as follows: • Impact of climate change and extreme	**Lesson 1/2** In their 'expert groups', students should sit together and research their assigned topic. The group should use each person's research and come to a consensus to make sure they have covered all points and ideas, and have a shared understanding. **R3** pages relevant to your state or territory, can be distributed as a starting point with students able to springboard off into independent research.	R2, R3	30 mins

	weather on food growth (eg. wiping out crops, damaging land fertility) • Impact of climate change and extreme weather on the economy, producers and consumers (eg. farmers incomes, higher food prices) • Impact of climate change and extreme weather on society/communities (eg. reduced nutrition, limited access to food) • Land and water focused solutions to maximise food security under climate change (eg. solar panels, crop planting orientation, rainwater storage, smart irrigation) *Differentiation strategy:* *Easier topics for more challenged learners -* *Climate risks and environmental impact* *Land focused solutions* *Harder topic for advanced learners -* *Land and water focused solutions*			
ELABORATE **Part 2: Compiling and creating**	*Ppt Slide 15 (can refer back to slide 13)* Jigsaw activity part 2: Students in their groups are to prepare posters to present. These can be hand drawn on butcher's or poster paper, or can be done with digital and printed elements depending on device and internet availability.	**Lesson 2-** Using their research, students should work together in their 'expert groups' to combine and summarise their findings into a poster to showcase and present with the class. These can be formatted and created however they wish but must clearly have the content that addresses their assignment topic.	R2, R3	25–30 min

ELABORATE **Part 3: Knowledge sharing**	*PptSlide 16-17* Jigsaw activity part 3: Joining back together as a class, students are to present their expert group's topic and poster. Allocate 3-5 minutes for each group to present and set a timer to ensure teams stay on track.	**Lesson 3/Final lesson-** Each 'expert group' has a 3-5 minutes to present their topic and poster to their peers. Students should create a table in their books as shown on slide 17. As one group presents, the other students should take notes and populate their individual tables with information on the other topics.	R2, R3	30–40 mins
EVALUATE **Student Self assessment** **+ Teacher informal assessment**	*Lesson 1 + 2 slide 14* *Lesson 3 slide 18* Teacher to ask for students to complete following informal assessments.	**Lesson 1-** Students to 'fist to five' with the number representing how close to complete they feel their research is. **Lesson 2-** Students to 'fist to five' with the number representing how close to complete they feel their poster presentation is. **Lesson 3-** Students to write their name and one risk and one solution to food security on a post-it note and hand it to the teacher on the way out of class.	R2	2-5 mins
Extension opportunity	Not a required assignment. Students interested in further extension are encouraged to explore and compare how Asia's climate risks and food security differ to Australia's as explored in these lessons.	Students to write a 250-350 word response to the following prompt: *"Compare and contrast 2-3 climate risks to food security between Australia and Asia."*		