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**food and fibre: years 9 and 10**

The following table identifies how the key aspects of understanding food and fibre production are evident in content descriptions from across the Australian Curriculum Version 9.0. From this information, teachers can develop a sequential program for learning about food and fibre by connecting the key aspects of learning with learning area and subject-specific content descriptions.

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| Years 9 and 10 |
| Key aspect 1: Sustaining life |
| Learning area/subject | Strand/sub-strand | Content descriptions | Content elaborations |
| **Design and Technologies** | **Knowledge and understanding**Technologies context: Food and fibre production | analyse and make judgements on the ethical, secure and sustainable production and marketing of food and fibre enterprises AC9TDE10K04 | * investigating the interdependence of plants and animals and comparing the environmental impacts of intensive and extensive production systems and their contribution to food and fibre production, for example the impact of pesticide use on bee populations or comparing caged and free-range chicken production
* considering the meaning of food and water security and how they may influence design decisions for creating preferred futures, for example using water-efficient irrigation, protected cropping where crops are grown under cover to increase production over a longer period or choosing drought-resistant varieties of plants and animals
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| **Humanities and Social Sciences (HASS) – Geography** **Year 9**  | **Knowledge and understanding** Biomes and food security | the distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivityAC9HG9K01 | * identifying and describing the major aquatic and terrestrial biomes of Australia and other areas of the world, and mapping their distribution
* interpreting and explaining patterns and trends in the productivity of the major aquatic and terrestrial biomes in Australia compared with a country in Asia
* explaining the effects of interconnections between environmental processes (atmosphere, hydrosphere, lithosphere and biosphere) and human activities, such as deforestation, mining and agriculture on the characteristics of biomes
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|  |  | the effects on environments of human alteration of biomes to produce food, industrial materials and fibresAC9HG9K02 | * identifying the biomes in Australia and a country in Asia that produce some of the foods and plant material people consume
* explaining the differences between natural and agricultural ecosystems in flows of nutrients and water, and in biodiversity; for example, the tropical rainforest biome in Indonesia produces food such as fruit, grains, nuts, vegetables and spices, and non-food products such as wood, rubber, coffee, chocolate and palm oil
* explaining how human alteration of biomes (for example, drip irrigation, fertilisers, pesticides, genetically modified seeds, agrobiotics, terracing, and controlling erosion and overgrazing) has increased agricultural productivity in Australia and a country in Asia
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| **Knowledge and understanding** Biomes and food security | the environmental, economic and technological factors that impact agricultural productivity, in Australia and a country in AsiaAC9HG9K03 | * examining how environmental factors, such as climate, soil, landform, water and hazards, support higher agricultural production, such as wheat, rice and maize, in Australia and a country in Asia
* examining how economic factors such as available land, labour, finance and enterprise, and technological factors such as biotechnology and use of Geographical Information Systems (GIS) software, affect agricultural production in Australia and a country in Asia; for example, increased labour supply or access to storage, transportation and markets
* examining how agricultural innovations have reduced environmental limitations on food production in Australia and a country in Asia; for example, increased food production due to research into and development of high-yielding and genetically engineered pest resistant varieties, construction of drip irrigation systems, and the use of stubble mulching, intercropping, agroforestry and crop rotation
* explaining the impact of the interconnections between environmental, economic and technological factors on the yield of a particular crop, such as wheat, rice or maize, in Australia
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|  |  | challenges to sustainable food production and food security in Australia and appropriate management strategiesAC9HG9K04 | * examining environmental impacts of changes to food production causing a decline in the capacity of the land to provide agricultural products; for example, land and water degradation such as soil erosion, salinity and desertification, shortage of fresh water, competing land uses, climate change and pollution contribute to a decrease in food production
* examining economic and social impacts of changes to food production; for example, competing land uses such as urban and industrial uses, and recreation activities
* examining the impacts of modifications to biomes on the productivity and availability of staple resources for First Nations Australians; for example, reduced access to bush food such as myrrnong (yam daisy) in Victoria or cycads, bunya nuts and wongi plums in northern Australia
* examining management strategies that improve food security; for example, efforts to reduce food wastage, government policies or trade barriers
* explaining management strategies that restore the quality or diversity of agriculture in Australia; for example, improving the function of natural biomes and anthropogenic biomes, monitoring land management practices, improving the condition of the soil or building the capability of farmers
* generating ideas for a strategy to expand agricultural production in Australia; for example, market bush food such as herbs and wattle seed, invest in research, support farm innovations or develop the expertise of farmers
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| **Skills**Questioning and researching using geographical methods | develop a range of questions for a geographical inquiry related to a phenomenon or challengeAC9HG9S01 | * developing a range of questions to investigate why a geographical phenomenon has changed or why a challenge may arise; for example, “Why is food security important?”, “What are sources of food in Australia?”, “How are people, places and environments connected?”
* developing and modifying questions to sharpen the focus of an investigation using concepts or scale of study; for example, “Why is the security and sustainability of food production important at the national scale?”, “How can bush food become a sustainable nutritional source of food in Australia?”, “How can connections between people, environments and places affect the sustainability of places at the global scale?”
* planning an investigation of a geographical phenomenon or challenge being studied at a range of scales, using digital tools; for example, the diverse types of biomes modified by humans for food and non-food products at a national and global scale, or the different types of connections between people and places at local, national and global scales.
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|  | collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriateAC9HG9S02 | * identifying primary research methods, including fieldwork, to collect original materials; for example, comparison of aerial photographs or field sketches over time to document the use or alteration of biomes by people, or surveying peers on their use of the internet or other technologies
* collecting relevant secondary research materials online using targeted criteria; for example, "connections between food security and deforestation in Bangladesh”, “the digital divide and its impacts on people and places in North Korea”
* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking on sustainable food production?”) and reliability (for example, “Who is/are the author/s? Does the author reference other experts or reports in the field of environmental management?”)
* creating a presentation of data and information using geospatial technologies; for example, a 3D diagram illustrating interactions between an oil spill in coral reefs and resultant decline in aquatic food production; a flow diagram showing the daily activities of a female subsistence farmer in Africa; or a diagram of a mangrove ecosystem before and after human interactions
* creating visual representations of multi-variable geographical data using digital tools; for example, a table to compare the daily consumption of meat per person in developed and developing countries; a complex graph to illustrate the relationship between temperature, precipitation and biomes; or a cross-section identifying horizons in a soil profile, and the impacts of mining and fracking on agricultural land
* representing spatial distribution of geographical phenomena by constructing special purpose maps that conform to cartographic conventions, for example creating a map to show the relationship between biomes and world food production
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| **Skills**Interpreting and analysing geographical data and information | evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationshipsAC9HG9S03 | * making generalisations about trends; for example, using questionnaires or interviews to identify people’s perspectives on live food fish trade in Australia or people’s access to the internet in the local area
* explaining a pattern; for example, using the current Global Hunger Index and the updated Food and Agricultural Organization’s Low-Income Food-Deficit Countries (LIFDCs) to identify locations of food scarcity and malnutrition, or comparing maps showing transport networks with survey responses on personal mobility
* explaining relationships between causes and impacts of factors represented in data; for example, the impact of the use of Global Positioning System (GPS) and Geographic Information Systems (GIS) on the way farmers control the dispersion of fertilisers and pesticides to produce higher yields and limit run-off, or the effects of the use of GPS to construct maps on how tourists use different transport systems to visits popular places in Australia
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| **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG9S04 | * drawing conclusions about the impact of a geographical challenge on people, places and environments; for example, investigating the causes of a decline in food species, its impacts on food security and the establishment of the Svalbard Global Seed Vault, or the effects of cyberattacks on technological interconnections and implementation of international laws related to cyber security
* justifying conclusions by reflecting on perspectives identified and reasons for these perspectives; for example, considering environmental, economic and social factors when challenging disappearing arable land converted from food production to non-food crops, or promoting ecotourism that impacts on people and places
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| develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG9S05 | * proposing individual action and supporting the proposal with reasons; for example, reducing food wastage or reducing negative environmental impacts when visiting theme parks or national parks
* proposing collective action and supporting the proposal with reasons; for example, organisations that work to end hunger and improve food security, or improve labour practices and increase wages for people working to produce goods exported to other countries
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, examining factors likely to impact on achieving Goal 2 of the Sustainable Development Goals – Ending global hunger by 2030 or monitoring the extent that a management plan for a national park is implemented
* explaining the outcomes and impacts of a strategy, such as providing people with adequate and quality food that is acceptable in different cultures, or reducing the global movement of hazardous waste between countries
* reflecting on the influence of personal values and attitudes on predicted outcomes and impacts; for example, how preferring to buy locally produced food reduces food miles and greenhouse gases, or how reducing, recycling and reusing goods contributes to a more sustainable environment
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| **Humanities and Social Sciences (HASS) – Geography** **Year 10**   | **Knowledge and understanding** Environmental change and management  | the human-induced changes that challenge the sustainability of places and environmentsAC9HG10K01 | * identifying tensions between the conflicting perspectives of individuals, communities and governments on the use of sustainable practices
* explaining the nature of human-induced environmental changes (for example, water and atmospheric pollution; loss of biodiversity; degradation of land and aquatic environments) and the challenge they pose for sustainability
* discussing the concept of sustainability in relation to environmental functions and identifying tensions between the conflicting perspectives of communities, businesses and government
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| First Nations Australians’ approaches to custodial responsibility and environmental management in different regions of AustraliaAC9HG10K03 | * identifying the influence of cultural values on how First Nations Australians manage environments (for example, continuity of cultural practices, management or development of Country/Place, and land tenure systems) and explaining custodial responsibilities for a Country/Place
* explaining First Nations Australians’ models of sustainability, which contribute to broader conservation practices; for example, obligations to Country/Place, land management and care practices such as cleaning up the land and fire management, removal of weeds and rubbish, protection of threatened species, and capacity building within their communities
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| causes and effects of a change in an identified environment at a local, national or global scale, and strategies to manage sustainabilityAC9HG10K04 | * identifying a context to be studied, describing the causes of the environmental change and impacts for the sustainability of its functions (resource, service or spiritual)
* comparing management strategies in Australia with strategies in another country for human-induced environmental change, using criteria; for example, managing waste in Australia compared with India’s rubbish pickers or managing floods in Australia compared to floods in China
* explaining how Traditional Owners, communities, developers, governments and non-government organisations use environmental, economic and social criteria, and consider trade-offs when making decisions
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|  **Humanities and Social Sciences (HASS) – Geography** **Year 10**   | **Knowledge and understanding** Geographies of human wellbeing | the methods used to measure spatial variations in human wellbeing and development, and how these can be applied to determine differences between places at the global scaleAC9HG10K05 | * identifying the United Nations Sustainable Development Goals 2015–2030 relevant to human wellbeing
* comparing different measurements of human wellbeing (for example, comparing rankings of selected indicators such as Gross Domestic Product [GDP], Human Development Index [HDI] and Physical Quality of Life Index [PQLI] for Australia, India and a country in the Pacific) and explaining trends in the different measurements
* interpreting and explaining trends in human wellbeing in a developed country and a developing country over time; for example, Australia compared with a country in Asia or the Pacific
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| reasons for, and consequences of, spatial variations in human wellbeing at a regional and national scale, drawing on studies such as from within India or another country in AsiaAC9HG10K06 | * interpreting and analysing measures of human wellbeing, and identifying and describing the causes and consequences of inequality
* identifying and describing the economic, social, technological, political or environmental causes of variations in human wellbeing within India or another country compared to Australia
* interpreting and analysing spatial data on human wellbeing in India or another country in Asia to identify the regions with high and low levels of human wellbeing, explaining similarities and differences; for example, rural Rajasthan compared to urban Mumbai
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| reasons for, and consequences of, spatial variations in human wellbeing in Australia, including for First Nations AustraliansAC9HG10K07 | * explaining the environmental factors (access to resources – fossil fuels, water, fertile soils), the social factors (adequate food, health and education services), the economic factors (employment, income) and the technological factors (information and communications technology) that influence human wellbeing and development between and within countries
* interpreting and analysing similarities, differences, patterns and trends in human wellbeing data for communities of First Nations Australians compared to non-Indigenous Australians, and explaining the links between human wellbeing and Closing the Gap initiatives
* explaining how a person’s wellbeing is influenced by where they live, with reference to interconnections of environmental, economic, social and technological factors in at least 2 different places in Australia, such as urban and remote places
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| **Humanities and Social Sciences (HASS) – Geography** **Year 10** | **Knowledge and understanding** Geographies of human wellbeing | responses of international and national government and non-government organisations to improve human wellbeing in Australia, within India and another country in the PacificAC9HG10K08 | * identifying and describing a national, state or community program to reduce regional inequalities in human wellbeing in a country such as Papua New Guinea or Indonesia
* explaining the objectives and outcomes of an overseas economic and social development program by the Australian Government (for example, AusAID) or a non-government overseas aid program (for example, World Vision) in India or a country in the Pacific
* identifying and explaining ways to improve the wellbeing of remote communities of First Nations Australians, including ways proposed by the communities
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| **Skills**Questioning and researching using geographical methods | develop a range of questions for a geographical inquiry related to a phenomenon or challengeAC9HG10S01 | * developing a range of relevant questions to investigate why a geographical phenomenon has changed or a challenge may arise; for example, “What is human wellbeing?”, “How has human wellbeing changed over time?”, “How and why should inequality in human wellbeing be reduced?”
* developing and modifying questions to sharpen the focus of an investigation using concepts or scale of study; for example, “How are variations in the spatial distribution of human wellbeing measured at the global scale?”, “Why does human wellbeing vary between and within countries?” (national scale), “How would you measure human wellbeing in the local area?” (local scale)
* planning an investigation of a phenomenon or challenge being studied at a range of scales, using digital tools; for example, investigating the causes of human-induced climate change at the global scale and its impacts on Australia, Bangladesh and/or a Pacific Island country at the national scale
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| collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriateAC9HG10S02 | * identifying primary research methods, including fieldwork, to collect original materials; for example, survey and interviews regarding perspectives on environmental management at the local scale, or strategies to improve human wellbeing of First Nations Australians at the national and local scale
* collecting relevant secondary research materials online using targeted criteria; for example, “allintext: critically endangered list by country” or “allintext: targets for reducing hunger or increasing access to health care”
* identifying and respecting protocols for consultation with communities of First Nations Australians when planning and conducting investigations; for example, acknowledging their earth-centred world view and how their traditional knowledges contribute to environmental management projects, or considering cultural and spiritual wellbeing of First Nations Australians when implementing programs to reduce economic and social inequality
* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking?”), reliability (for example, “Who is/are the author/s? Does the author reference other experts in the field?”) and bias, such as information bias presenting one side of an issue, or selection bias presenting information on the positive aspects of foreign aid with cultural and social issues not considered
* comparing findings from primary research with those from secondary research materials for relevance and reliability; for example, comparing survey data or interviews on attitudes towards environmental management or improving human wellbeing with commentary or reports on peoples’ views on the causes of issues affecting the environment or human wellbeing
* representing multi-variable data using geospatial technologies; for example, using scatterplots to visually represent data for countries to demonstrate the correlation between 2 variables, such as comparing adult literacy with GDP per capita in United Arab Emirates or Bhutan
* representing multi-variable data using digital tools; for example, generating pie graphs showing threats to biodiversity; using digital photographs to indicate differences in material goods between people and places, and the influence of environment, culture and income; using tables to measure and compare wellbeing using different indexes and the world gender equality gap
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|  | **Skills**Interpreting and analysing geographical data and information | evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationshipsAC9HG10S03 | * developing generalisations; for example, critically analysing text and images for their meaning and significance, such as satellite images showing before and after deforestation in the Amazon or contrasting nightlife in North and South Korea
* explaining patterns and trends; for example, explaining why a vegetation corridor for movement of koalas assists them to traverse through the bush and reduce death rates, or whether there has been an increased use of technology such as satellite images, drones and robots during and after a natural disaster to identify the need for aid
* inferring relationships between key environmental indicators and sustainability of places at the national scale; for example, using a geospatial technologies application to create a map of Australia and another country to show measures of environmental change such as air quality, freshwater quality, fish resources, energy use, biodiversity or waste generation
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| **Humanities and Social Sciences (HASS) – Geography** **Year 10** | **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG10S04 | * drawing conclusions using at least 2 concepts, such as place, space, environment, interconnection, sustainability, scale and change as organisers for example discussing the concept of sustainability in relation to human-induced change affecting environments or considering implications of spatial variations in human wellbeing
* examining the reasons given for making a specific decision and explain how these reasons have or have not justified the conclusion reached, such as considering the interconnection of environmental, economic, social, political or technological factors when developing strategies to address sustainable management of environments, or unequal access of people to resources essential for human wellbeing
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|  |  | develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG10S05 | * proposing individual action and supporting the strategy with reasons; for example, reducing their ecological footprint by reducing the amount of food packaging included in a packed lunch, or becoming volunteers for non-government organisations such as the Red Cross or Red Crescent to increase social connectedness
* proposing collective action and evaluation of actions; for example, identifying ways to improve the wellbeing of remote communities of First Nations Australians and evaluating the actions proposed and implemented by the community members
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, reflecting on whether environment degradation has been reduced and human wellbeing improved
* explaining reasons for decisions and choices, such as the traditional use of firestick farming by First Nations Australians to control fires, or grassroots decisions on implementation and effectiveness of aid projects
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| **Humanities and Social Sciences (HASS) – Geography** **Year 10** | **Skills**Communicating  | create descriptions, explanations and responses, using geographical knowledge and geographical tools as appropriate, and concepts and terms that incorporate and acknowledge research findingsAC9HG10S06 | * presenting conclusions using geospatial technologies and digital tools to create representations of data (for example, the trends in Human Development Index [HDI] over time in a selected country or region) and research findings (for example, how a person’s wellbeing is influenced by where they live) to explain causes and effects of a geographical phenomenon or challenge, and reinforcing understanding of the interconnections between people, places and the environment
* developing an explanation, applying tone appropriate to purpose and audience; for example, using an authoritative tone, and referring to representations of data and information when explaining a strategy to improve the sustainability of an identified environment or action to improve human wellbeing
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| Years 9 and 10 |
| Key aspect 2: Valuing resources |
| Learning area/subject | Strand/sub-strand | Content descriptions | Content elaborations |
| **Design and Technologies** | **Knowledge and understanding** Technologies and society | analyse how people in design and technologies occupations consider ethical, security and sustainability factors to innovate and improve products, services and environmentsAC9TDE10K01 | * examining sustainability factors influencing the design and production of a solution developed by First Nations Australians, such as the sustainable production of culturally significant pigments, for example in many places throughout Australia white and red pigments are not freely available and must be manufactured through a complex process of calcination by firing rocks or clays in a kiln
* explaining how product life cycle thinking can influence decision-making related to design and technologies, for example rethinking products to provide for re-use, selecting a material for a product that has a lower carbon footprint
* explaining the consequences of ethical and sustainability decisions for products, services and environments, for example the accessibility of a managed public environment, the design of roads to include aerial bridges for wildlife and signage powered with solar technologies
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| **Knowledge and understanding** Technologies and society | analyse the impact of innovation, enterprise and emerging technologies on designed solutions for global preferred futuresAC9TDE10K02 | * investigating how the knowledges of First Nations Australians have led to the discovery of potential innovative solutions, for example biodegradable polymers using spinifex grass to reduce landfill and strengthen latex, plastics and concrete
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| **Knowledge and understanding**Technologies context: Food and fibre production | analyse and make judgements on the ethical, secure and sustainable production and marketing of food and fibre enterprises AC9TDE10K04 | * analysing grain sources used by First Nations Australians, such as acacia, for their nutrient content, including energy, fat and protein and suitability as a sustainable food source in drought or famine-prone, semi-arid, and tropical regions, as compared with cereal crops such as wheat and rice
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|  | **Knowledge and understanding**Technologies context: Materials and technologies specialisations | analyse and make judgements on how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutionsAC9TDE10K06 | * analysing how First Nations Australians identified the superior thermal properties of possum fur in their development of products such as cloaks and blankets including making judgements on how these fibres are sourced, and how these knowledges continue to be used today as seen in the emerging market of high-performance thermal clothing made from blended possum and wool fibre
* critiquing the design of an existing product to identify environmental consequences of material selection and investigating emerging materials and their impact on design decisions, for example examining the properties of common plastic bags and researching innovative materials that could be used as a sustainable alternative such as bioplastics or renewable materials such as seaweed
* investigating emerging materials and their impact on design decisions, for example researching products such as sustainable bioplastic material made from discarded potato peels which can be used for a variety of applications including buttons and eyeglasses
* investigating fibre-based medical textile products and structures used in a medical environment for treatment of an injury or the clinical treatment of a wound or an illness, for example collagen fibre used as a suture is as strong as silk and biodegradable
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| **Processes and production skills** Generating and designing | apply innovation and enterprise skills to generate, test, iterate and communicate design ideas, processes and solutions, including using digital toolsAC9TDE10P02 | * considering competing variables that may hinder or enhance project development, for example weight, strength and price of materials; laws; sustainability; accessibility; social protocols, user needs and community consultation processes
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|  | **Processes and production skills** Evaluating | develop design criteria independently including sustainability to evaluate design ideas, processes and solutionsAC9TDE10P04 | * responding creatively to evaluation feedback to iterate and modify design ideas and processes to improve sustainability measures, for example considering opportunities to use sustainable materials, such as plant-based timber oils or bioplastics
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| **Science – Year 9** | **Science understanding**Earth and space sciences | represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth’s spheres (the geosphere, biosphere, hydrosphere and atmosphere) AC9S9U03 | * identifying Earth as a system, describing Earth’s spheres and discussing examples of interactions between different spheres
* examining the carbon cycle using diagrams, animations or simulations and explaining the role of photosynthesis and respiration in that cycle
* identifying the impact of combustion reactions as a result of human activity on the carbon cycle
* investigating the greenhouse effect and relating it to the role carbon dioxide plays in maintaining temperatures that support life on Earth
* conducting a field investigation to evaluate carbon sequestration in an ecosystem, such as measuring tree biomass, deadwood, leaf litter and soil depth, and using formulas to calculate approximate carbon storage
* investigating how First Nations Australians use fire-mediated chemical reactions to facilitate energy and nutrient transfer through the practice of firestick farming
* investigating how First Nations Australians are reducing Australia’s greenhouse gas emissions through the reinstatement of traditional fire management regimes
* identifying how carbon dioxide is captured and stored naturally or through the use of technologies
* calculating an individual’s carbon footprint, examining the impact of human activities and suggesting strategies to reduce carbon dioxide emissions
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| **Humanities and Social Sciences (HASS) – Geography** **Year 9**  | **Knowledge and understanding** Biomes and food security | the distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivityAC9HG9K01 | * identifying and describing the major aquatic and terrestrial biomes of Australia and other areas of the world, and mapping their distribution
* interpreting and explaining patterns and trends in the productivity of the major aquatic and terrestrial biomes in Australia compared with a country in Asia
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* explaining how human alteration of biomes (for example, drip irrigation, fertilisers, pesticides, genetically modified seeds, agrobiotics, terracing, and controlling erosion and overgrazing) has increased agricultural productivity in Australia and a country in Asia
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| the environmental, economic and technological factors that impact agricultural productivity, in Australia and a country in AsiaAC9HG9K03 | * examining how environmental factors, such as climate, soil, landform, water and hazards, support higher agricultural production, such as wheat, rice and maize, in Australia and a country in Asia
* examining how economic factors such as available land, labour, finance and enterprise, and technological factors such as biotechnology and use of Geographical Information Systems (GIS) software, affect agricultural production in Australia and a country in Asia; for example, increased labour supply or access to storage, transportation and markets
* examining how agricultural innovations have reduced environmental limitations on food production in Australia and a country in Asia; for example, increased food production due to research into and development of high-yielding and genetically engineered pest resistant varieties, construction of drip irrigation systems, and the use of stubble mulching, intercropping, agroforestry and crop rotation
* explaining the impact of the interconnections between environmental, economic and technological factors on the yield of a particular crop, such as wheat, rice or maize, in Australia
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| challenges to sustainable food production and food security in Australia and appropriate management strategiesAC9HG9K04 | * examining environmental impacts of changes to food production causing a decline in the capacity of the land to provide agricultural products; for example, land and water degradation such as soil erosion, salinity and desertification, shortage of fresh water, competing land uses, climate change and pollution contribute to a decrease in food production
* examining economic and social impacts of changes to food production; for example, competing land uses such as urban and industrial uses, and recreation activities
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* planning an investigation of a geographical phenomenon or challenge being studied at a range of scales, using digital tools; for example, the diverse types of biomes modified by humans for food and non-food products at a national and global scale, or the different types of connections between people and places at local, national and global scales
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* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking on sustainable food production?”) and reliability (for example, “Who is/are the author/s? Does the author reference other experts or reports in the field of environmental management?”)
* creating a presentation of data and information using geospatial technologies; for example, a 3D diagram illustrating interactions between an oil spill in coral reefs and resultant decline in aquatic food production; a flow diagram showing the daily activities of a female subsistence farmer in Africa; or a diagram of a mangrove ecosystem before and after human interactions
* creating visual representations of multi-variable geographical data using digital tools; for example, a table to compare the daily consumption of meat per person in developed and developing countries; a complex graph to illustrate the relationship between temperature, precipitation and biomes; or a cross-section identifying horizons in a soil profile, and the impacts of mining and fracking on agricultural land
* representing spatial distribution of geographical phenomena by constructing special purpose maps that conform to cartographic conventions, for example creating a map to show the relationship between biomes and world food production
 |
| **Skills**Interpreting and analysing geographical data and information | evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationshipsAC9HG9S03 | * making generalisations about trends; for example, using questionnaires or interviews to identify people’s perspectives on live food fish trade in Australia or people’s access to the internet in the local area
* explaining a pattern; for example, using the current Global Hunger Index and the updated Food and Agricultural Organization’s Low-Income Food-Deficit Countries (LIFDCs) to identify locations of food scarcity and malnutrition, or comparing maps showing transport networks with survey responses on personal mobility
* explaining relationships between causes and impacts of factors represented in data; for example, the impact of the use of Global Positioning System (GPS) and Geographic Information Systems (GIS) on the way farmers control the dispersion of fertilisers and pesticides to produce higher yields and limit run-off, or the effects of the use of GPS to construct maps on how tourists use different transport systems to visits popular places in Australia
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| **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG9S04 | * drawing conclusions about the impact of a geographical challenge on people, places and environments; for example, investigating the causes of a decline in food species, its impacts on food security and the establishment of the Svalbard Global Seed Vault, or the effects of cyberattacks on technological interconnections and implementation of international laws related to cyber security
* justifying conclusions by reflecting on perspectives identified and reasons for these perspectives; for example, considering environmental, economic and social factors when challenging disappearing arable land converted from food production to non-food crops, or promoting ecotourism that impacts on people and places
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| develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG9S05 | * proposing individual action and supporting the proposal with reasons; for example, reducing food wastage or reducing negative environmental impacts when visiting theme parks or national parks
* proposing collective action and supporting the proposal with reasons; for example, organisations that work to end hunger and improve food security, or improve labour practices and increase wages for people working to produce goods exported to other countries
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, examining factors likely to impact on achieving Goal 2 of the Sustainable Development Goals – Ending global hunger by 2030 or monitoring the extent that a management plan for a national park is implemented
* explaining the outcomes and impacts of a strategy, such as providing people with adequate and quality food that is acceptable in different cultures, or reducing the global movement of hazardous waste between countries
* reflecting on the influence of personal values and attitudes on predicted outcomes and impacts; for example, how preferring to buy locally produced food reduces food miles and greenhouse gases, or how reducing, recycling and reusing goods contributes to a more sustainable environment
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| **Humanities and Social Sciences (HASS) – Geography** **Year 10**   | **Knowledge and understanding** Environmental change and management | the human-induced changes that challenge the sustainability of places and environmentsAC9HG10K01 | * identifying tensions between the conflicting perspectives of individuals, communities and governments on the use of sustainable practices
* explaining the nature of human-induced environmental changes (for example, water and atmospheric pollution; loss of biodiversity; degradation of land and aquatic environments) and the challenge they pose for sustainability
* discussing the concept of sustainability in relation to environmental functions and identifying tensions between the conflicting perspectives of communities, businesses and government
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| First Nations Australians’ approaches to custodial responsibility and environmental management in different regions of AustraliaAC9HG10K03 | * identifying the influence of cultural values on how First Nations Australians manage environments (for example, continuity of cultural practices, management or development of Country/Place, and land tenure systems) and explaining custodial responsibilities for a Country/Place
* explaining First Nations Australians’ models of sustainability, which contribute to broader conservation practices; for example, obligations to Country/Place, land management and care practices such as cleaning up the land and fire management, removal of weeds and rubbish, protection of threatened species, and capacity building within their communities
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| causes and effects of a change in an identified environment at a local, national or global scale, and strategies to manage sustainabilityAC9HG10K04 | * identifying a context to be studied, describing the causes of the environmental change and impacts for the sustainability of its functions (resource, service or spiritual)
* comparing management strategies in Australia with strategies in another country for human-induced environmental change, using criteria; for example, managing waste in Australia compared with India’s rubbish pickers or managing floods in Australia compared to floods in China
* explaining how Traditional Owners, communities, developers, governments and non-government organisations use environmental, economic and social criteria, and consider trade-offs when making decisions
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|  | **Knowledge and understanding** Geographies of human wellbeing | reasons for, and consequences of, spatial variations in human wellbeing in Australia, including for First Nations AustraliansAC9HG10K07 | * explaining the environmental factors (access to resources – fossil fuels, water, fertile soils), the social factors (adequate food, health and education services), the economic factors (employment, income) and the technological factors (information and communications technology) that influence human wellbeing and development between and within countries
* interpreting and analysing similarities, differences, patterns and trends in human wellbeing data for communities of First Nations Australians compared to non-Indigenous Australians, and explaining the links between human wellbeing and Closing the Gap initiatives
* explaining how a person’s wellbeing is influenced by where they live, with reference to interconnections of environmental, economic, social and technological factors in at least 2 different places in Australia, such as urban and remote places
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|  | **Knowledge and understanding** Geographies of human wellbeing | responses of international and national government and non-government organisations to improve human wellbeing in Australia, within India and another country in the PacificAC9HG10K08 | * identifying and describing a national, state or community program to reduce regional inequalities in human wellbeing in a country such as Papua New Guinea or Indonesia
* explaining the objectives and outcomes of an overseas economic and social development program by the Australian Government (for example, AusAID) or a non-government overseas aid program (for example, World Vision) in India or a country in the Pacific
* identifying and explaining ways to improve the wellbeing of remote communities of First Nations Australians, including ways proposed by the communities
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|  | **Skills**Questioning and researching using geographical methods | develop a range of questions for a geographical inquiry related to a phenomenon or challengeAC9HG10S01 | * developing a range of relevant questions to investigate why a geographical phenomenon has changed or a challenge may arise; for example, “What is human wellbeing?”, “How has human wellbeing changed over time?”, “How and why should inequality in human wellbeing be reduced?”
* developing and modifying questions to sharpen the focus of an investigation using concepts or scale of study; for example, “How are variations in the spatial distribution of human wellbeing measured at the global scale?”, “Why does human wellbeing vary between and within countries?” (national scale), “How would you measure human wellbeing in the local area?” (local scale)
* planning an investigation of a phenomenon or challenge being studied at a range of scales, using digital tools; for example, investigating the causes of human-induced climate change at the global scale and its impacts on Australia, Bangladesh and/or a Pacific Island country at the national scale
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| collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriateAC9HG10S02 | * identifying primary research methods, including fieldwork, to collect original materials; for example, survey and interviews regarding perspectives on environmental management at the local scale, or strategies to improve human wellbeing of First Nations Australians at the national and local scale
* collecting relevant secondary research materials online using targeted criteria; for example, “allintext: critically endangered list by country” or “allintext: targets for reducing hunger or increasing access to health care”
* identifying and respecting protocols for consultation with communities of First Nations Australians when planning and conducting investigations; for example, acknowledging their earth-centred world view and how their traditional knowledges contribute to environmental management projects, or considering cultural and spiritual wellbeing of First Nations Australians when implementing programs to reduce economic and social inequality
* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking?”), reliability (for example, “Who is/are the author/s? Does the author reference other experts in the field?”) and bias, such as information bias presenting one side of an issue, or selection bias presenting information on the positive aspects of foreign aid with cultural and social issues not considered
* comparing findings from primary research with those from secondary research materials for relevance and reliability; for example, comparing survey data or interviews on attitudes towards environmental management or improving human wellbeing with commentary or reports on peoples’ views on the causes of issues affecting the environment or human wellbeing
* representing multi-variable data using geospatial technologies; for example, using scatterplots to visually represent data for countries to demonstrate the correlation between 2 variables, such as comparing adult literacy with GDP per capita in United Arab Emirates or Bhutan
* representing multi-variable data using digital tools; for example, generating pie graphs showing threats to biodiversity; using digital photographs to indicate differences in material goods between people and places, and the influence of environment, culture and income; using tables to measure and compare wellbeing using different indexes and the world gender equality gap
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| **Skills**Concluding and decision-making | develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG10S05 | * proposing individual action and supporting the strategy with reasons; for example, reducing their ecological footprint by reducing the amount of food packaging included in a packed lunch, or becoming volunteers for non-government organisations such as the Red Cross or Red Crescent to increase social connectedness
* proposing collective action and evaluation of actions; for example, identifying ways to improve the wellbeing of remote communities of First Nations Australians and evaluating the actions proposed and implemented by the community members
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, reflecting on whether environment degradation has been reduced and human wellbeing improved
* explaining reasons for decisions and choices, such as the traditional use of firestick farming by First Nations Australians to control fires, or grassroots decisions on implementation and effectiveness of aid projects
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| **Skills**Communicating  | create descriptions, explanations and responses, using geographical knowledge and geographical tools as appropriate, and concepts and terms that incorporate and acknowledge research findingsAC9HG10S06 | * presenting conclusions using geospatial technologies and digital tools to create representations of data (for example, the trends in Human Development Index [HDI] over time in a selected country or region) and research findings (for example, how a person’s wellbeing is influenced by where they live) to explain causes and effects of a geographical phenomenon or challenge, and reinforcing understanding of the interconnections between people, places and the environment
* developing an explanation, applying tone appropriate to purpose and audience; for example, using an authoritative tone, and referring to representations of data and information when explaining a strategy to improve the sustainability of an identified environment or action to improve human wellbeing
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| Years 9 and 10 |
| Key aspect 3: Designing solutions and meeting challenges |
| Learning area/subject | Strand/sub-strand | Content descriptions | Content elaborations |
| **Design and Technologies** | **Knowledge and understanding** Technologies and society | analyse how people in design and technologies occupations consider ethical, security and sustainability factors to innovate and improve products, services and environmentsAC9TDE10K01 | * considering the factors that influence design and manufacture, and the work of professional designers, engineers and technologists, including time, access to skills, knowledge, finance, expertise in global engineering and manufacturing, for example Australian designers and engineers working with rapid prototyping manufacturers in a country in Asia or the significance of the collaboration between Australia and Vietnam on the development of the Cao Lanh Bridge
* explaining how product life cycle thinking can influence decision-making related to design and technologies, for example rethinking products to provide for re-use, selecting a material for a product that has a lower carbon footprint
* examining mass production systems taking into account ethics and sustainability considerations, for example the mass production of food, clothing and shoes and why manufacturers produce different versions of the same product and support complete product life cycle strategies
* explaining the consequences of ethical and sustainability decisions for products, services and environments, for example the accessibility of a managed public environment, the design of roads to include aerial bridges for wildlife and signage powered with solar technologies
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| analyse the impact of innovation, enterprise and emerging technologies on designed solutions for global preferred futuresAC9TDE10K02 | * investigating how the knowledges of First Nations Australians have led to the discovery of potential innovative solutions, for example biodegradable polymers using spinifex grass to reduce landfill and strengthen latex, plastics and concrete
* exploring the ways commercial enterprises respond to the challenges and opportunities of technological change, for example e-commerce, and considering their carbon footprint
* investigating scenarios of how the future may unfold and what opportunities and impacts there may be for society and particular groups in a preferred future, for example by using forecasting and backcasting techniques
* examining real-world problems and understanding basic needs when considering designed solutions, for example students collaborating to design solutions to challenges in the Asia region; or artists from a country in South-East Asia creating posters for the world to take action in a pandemic
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| **Knowledge and understanding**Technologies context: Food and fibre production | analyse and make judgements on the ethical, secure and sustainable production and marketing of food and fibre enterprises AC9TDE10K04 | * analysing grain sources used by First Nations Australians, such as acacia, for their nutrient content, including energy, fat and protein and suitability as a sustainable food source in drought or famine-prone, semi-arid, and tropical regions, as compared with cereal crops such as wheat and rice
* investigating how digital tools could be used to enhance food production systems, for example global positioning systems (GPS) for managing animals, crop sensors, automated animal-feeding or milking systems, or drones for locating and managing weeds
* investigating the interdependence of plants and animals and comparing the environmental impacts of intensive and extensive production systems and their contribution to food and fibre production, for example the impact of pesticide use on bee populations or comparing caged and free-range chicken production
* considering the meaning of food and water security and how they may influence design decisions for creating preferred futures, for example using water-efficient irrigation, protected cropping where crops are grown under cover to increase production over a longer period or choosing drought-resistant varieties of plants and animals
* examining the marketing chain of a range of agricultural products and outlining the effect of product processing and advertising on demand and price including the impact of cash crops on communities
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| **Knowledge and understanding**Technologies context: Materials and technologies specialisations | analyse and make judgements on how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutionsAC9TDE10K06 | * analysing how First Nations Australians identified the superior thermal properties of possum fur in their development of products such as cloaks and blankets including making judgements on how these fibres are sourced, and how these knowledges continue to be used today as seen in the emerging market of high-performance thermal clothing made from blended possum and wool fibre
* justifying decisions when selecting from a broad range of technologies − tools, equipment, processes, materials, systems and components, for example selecting low-emission paints and locally sourced materials such as bamboo for cross-laminated timbers (CLT)
* analysing and explaining the ways in which the properties and characteristics of materials have been considered in the design of a product with specific requirements, such as minimising weight to reduce transport costs in rural Australia
* investigating emerging materials and their impact on design decisions, for example researching products such as sustainable bioplastic material made from discarded potato peels which can be used for a variety of applications including buttons and eyeglasses
* investigating fibre-based medical textile products and structures used in a medical environment for treatment of an injury or the clinical treatment of a wound or an illness, for example collagen fibre used as a suture is as strong as silk and biodegradable
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| **Processes and production skills** Investigating and defining | analyse needs or opportunities for designing; develop design briefs; and investigate, analyse and select materials, systems, components, tools and equipment to create designed solutionsAC9TDE10P01 | * analysing First Nations Australians’ traditional grains for their potential for providing nutritional and commercial solutions and developing a design brief to highlight the materials, systems, components and tools or equipment needed
* analysing the design of new products to identify how well design ideas respond to sustainability issues, for example swimming pool covers, ultraviolet lights and lamps for disinfection, or disposable household products
* developing design briefs that take into consideration the needs of users, for example considering universal design principles or Safety by Design principles to improve accessibility and safety
* analysing a range of design and technologies ideas, for example assessing those that draw on the intellectual property of others, including Indigenous cultural and intellectual property rights
* considering the needs of community groups to identify rich design tasks, for example interviewing community members about accessibility requirements to develop the initial brief and then during specific phases of the design process to determine the best possible designed solution for the community
* examining tools, techniques, equipment and relationships of properties for complementary materials for product development, for example examining compressive and tensile strengths of materials
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| **Processes and production skills** Generating and designing | apply innovation and enterprise skills to generate, test, iterate and communicate design ideas, processes and solutions, including using digital toolsAC9TDE10P02 | * using techniques including combining and modifying ideas and exploring functionality to generate solution concepts and reimagining designs to feature emerging technologies, for example designing wearable technology that could help or give independence to elderly people, such as wearable blood glucose monitors
* considering competing variables that may hinder or enhance project development, for example weight, strength and price of materials; laws; sustainability; accessibility; social protocols, user needs and community consultation processes
* producing drawings, models and prototypes to explore design ideas, for example using technical drawing techniques (for example perspective and orthogonal drawings), digital imaging programs, 3D printers or augmented reality (AR) modelling software; producing multiple prototypes that show an understanding of key aesthetic considerations in competing designs
* communicating using appropriate technical terms and recording the generation and development of design ideas and processes for an intended audience including justification of decisions, for example developing a digital portfolio with images and text which clearly communicate each step of a design process
* using design thinking and enterprise skills to create innovative approaches to processes and solutions, for example brainstorming novel ideas inspired by nature or transforming a solution into an enterprise for a target market
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| **Processes and production skills** Producing and implementing | select, justify, test and use suitable technologies, skills and processes, and apply safety procedures to safely make designed solutions AC9TDE10P03 | * refining technical skills and using production skills with independence to produce quality designed solutions and reducing risks in production with appropriate, safe working practices required for a specific design project, for example independently setting up a lathe and wearing appropriate personal protective equipment (PPE) to produce a part to specified dimensions
* using materials, components, tools, equipment and techniques safely and considering alternatives to maximise sustainability, for example using timber because it stores carbon and offsets the demand for alternative products
* experimenting with innovative combinations and ways of manipulating traditional and contemporary materials, components, tools, equipment and techniques, and recording findings in a collaborative space to debate the merits of each with peers
* modifying production processes to respond to opportunities, risks or unforeseen challenges, for example when producing bulk quantities of recipes in terms of workload and coordination, the impact of lower-than-average rainfalls on crop growth or using materials with unexpected faults
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| **Processes and production skills** Evaluating | develop design criteria independently including sustainability to evaluate design ideas, processes and solutionsAC9TDE10P04 | * establishing specific design criteria for evaluating designed solutions, for example determining necessary function of a product, service or environment such as an acceptable load for an engineered structure to carry and making a judgement about whether these have been met after stress testing or user testing
* evaluating and justifying the use and best combination of traditional, contemporary and emerging technologies during project development, including consideration of sustainability, for example considering farming methods that improve soil quality including those methods used in South-East Asia
* reflecting on learning including processes or choices made at various stages of a design process and modifying plans when needed with consideration of design criteria
* responding creatively to evaluation feedback to iterate and modify design ideas and processes to improve sustainability measures, for example considering opportunities to use sustainable materials, such as plant-based timber oils or bioplastics
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| **Processes and production skills**Collaborating and managing | develop project plans for intended purposes and audiences to individually and collaboratively manage projects, taking into consideration time, cost, risk, processes and production of designed solutionsAC9TDE10P05 | * producing, explaining and interpreting drawings and planning production timelines using digital tools, for example establishing materials and equipment needs using spreadsheets, or creating production flowcharts to ensure efficient, safe and sustainable workflows
* collaborating to develop production plans for equitable distribution of work including discussing roles, tasks and deadlines and considering flexibility and contingencies
* investigating manufacturing processes to identify strategies to enhance production, for example identifying techniques to reduce use, cut costs, speed up processes or to form beneficial partnerships with others in production
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| **Digital Technologies** | **Processes and production skills** Acquiring, managing and analysing data | develop techniques to acquire, store and validate data from a range of sources using software, including spreadsheets and databases AC9TDI10P01 | * accessing and storing data from the Australian Bureau of Statistics in a format that is useful for analysis, for example acquiring data on the population growth across age groups in Australia
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| analyse and visualise data interactively using a range of software, including spreadsheets and databases, to draw conclusions and make predictions by identifying trends and outliers AC9TDI10P02 | * using software to visualise and compare data to identify patterns, relationships and trends, for example investigating emerging trends in Australia's industries
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| **Processes and production skills** Generating and designing | design algorithms involving logical operators and represent them as flowcharts and pseudocode AC9TDI10P05 | * describing algorithms using flowcharts or other appropriate diagram types, for example a decision tree for classifying an animal based on physical characteristics
* using Boolean operations (that is, AND, OR and NOT) to express complex conditions in control structures, for example IF [the temperature is above 30 degrees AND people are inside the building] THEN open the windows
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|  | **Processes and production skills** Producing and implementing | implement, modify and debug modular programs, applying selected algorithms and data structures, including in an object-oriented programming language AC9TDI10P09 | * applying simple data structures and algorithms appropriately in their programs, for example using an array to store temperature data for a month, a dictionary to store character information in a role-playing game (RPG), and the binary search function from a library to find a value in a sorted array
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| **Processes and production skills** Evaluating | evaluate existing and student solutions against the design criteria, user stories, possible future impact and opportunities for enterprise AC9TDI10P10 | * judging the quality of the output of their solution against the design criteria, for example confirming that the stock levels recorded by their inventory management application are accurate within allowed parameters
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| **Science – Year 9** | **Science as a human endeavour**Use and influence of science | analyse the key factors that contribute to science knowledge and practices being adopted more broadly by societyAC9S9H03 | * examining how government initiatives such as Landcare support adoption of effective land restoration practices that improve soil quality and increase carbon sequestration in soils
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| **Science – Year 10** | **Science as a human endeavour**Use and influence of science | analyse the key factors that contribute to science knowledge and practices being adopted more broadly by societyAC9S10H03 | * investigating why agricultural practices have changed to include widespread use of genetically engineered crops
* considering how the traditional ecological knowledges of First Nations Australians are being reaffirmed by modern science and how these practices are being used by Traditional Owners in carbon farming initiatives
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| **Humanities and Social Sciences (HASS) – Geography** **Year 9**  | **Knowledge and understanding** Biomes and food security | the distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivityAC9HG9K01 | * identifying and describing the major aquatic and terrestrial biomes of Australia and other areas of the world, and mapping their distribution
* interpreting and explaining patterns and trends in the productivity of the major aquatic and terrestrial biomes in Australia compared with a country in Asia
* explaining the effects of interconnections between environmental processes (atmosphere, hydrosphere, lithosphere and biosphere) and human activities, such as deforestation, mining and agriculture on the characteristics of biomes
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| the effects on environments of human alteration of biomes to produce food, industrial materials and fibresAC9HG9K02 | * identifying the biomes in Australia and a country in Asia that produce some of the foods and plant material people consume
* explaining the differences between natural and agricultural ecosystems in flows of nutrients and water, and in biodiversity; for example, the tropical rainforest biome in Indonesia produces food such as fruit, grains, nuts, vegetables and spices, and non-food products such as wood, rubber, coffee, chocolate and palm oil
* explaining how human alteration of biomes (for example, drip irrigation, fertilisers, pesticides, genetically modified seeds, agrobiotics, terracing, and controlling erosion and overgrazing) has increased agricultural productivity in Australia and a country in Asia
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| the environmental, economic and technological factors that impact agricultural productivity, in Australia and a country in AsiaAC9HG9K03 | * examining how environmental factors, such as climate, soil, landform, water and hazards, support higher agricultural production, such as wheat, rice and maize, in Australia and a country in Asia
* examining how economic factors such as available land, labour, finance and enterprise, and technological factors such as biotechnology and use of Geographical Information Systems (GIS) software, affect agricultural production in Australia and a country in Asia; for example, increased labour supply or access to storage, transportation and markets
* examining how agricultural innovations have reduced environmental limitations on food production in Australia and a country in Asia; for example, increased food production due to research into and development of high-yielding and genetically engineered pest resistant varieties, construction of drip irrigation systems, and the use of stubble mulching, intercropping, agroforestry and crop rotation
* explaining the impact of the interconnections between environmental, economic and technological factors on the yield of a particular crop, such as wheat, rice or maize, in Australia
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| challenges to sustainable food production and food security in Australia and appropriate management strategiesAC9HG9K04 | * examining environmental impacts of changes to food production causing a decline in the capacity of the land to provide agricultural products; for example, land and water degradation such as soil erosion, salinity and desertification, shortage of fresh water, competing land uses, climate change and pollution contribute to a decrease in food production
* examining economic and social impacts of changes to food production; for example, competing land uses such as urban and industrial uses, and recreation activities
* examining the impacts of modifications to biomes on the productivity and availability of staple resources for First Nations Australians; for example, reduced access to bush food such as myrrnong (yam daisy) in Victoria or cycads, bunya nuts and wongi plums in northern Australia
* examining management strategies that improve food security; for example, efforts to reduce food wastage, government policies or trade barriers
* explaining management strategies that restore the quality or diversity of agriculture in Australia; for example, improving the function of natural biomes and anthropogenic biomes, monitoring land management practices, improving the condition of the soil or building the capability of farmers
* generating ideas for a strategy to expand agricultural production in Australia; for example, market bush food such as herbs and wattle seed, invest in research, support farm innovations or develop the expertise of farmers
 |
| **Skills**Questioning and researching using geographical methods | develop a range of questions for a geographical inquiry related to a phenomenon or challengeAC9HG9S01 | * developing a range of questions to investigate why a geographical phenomenon has changed or why a challenge may arise; for example, “Why is food security important?”, “What are sources of food in Australia?”, “How are people, places and environments connected?”
* developing and modifying questions to sharpen the focus of an investigation using concepts or scale of study; for example, “Why is the security and sustainability of food production important at the national scale?”, “How can bush food become a sustainable nutritional source of food in Australia?”, “How can connections between people, environments and places affect the sustainability of places at the global scale?”
* planning an investigation of a geographical phenomenon or challenge being studied at a range of scales, using digital tools; for example, the diverse types of biomes modified by humans for food and non-food products at a national and global scale, or the different types of connections between people and places at local, national and global scales
 |
| collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriateAC9HG9S02 | * identifying primary research methods, including fieldwork, to collect original materials; for example, comparison of aerial photographs or field sketches over time to document the use or alteration of biomes by people, or surveying peers on their use of the internet or other technologies
* collecting relevant secondary research materials online using targeted criteria; for example, "connections between food security and deforestation in Bangladesh”, “the digital divide and its impacts on people and places in North Korea”
* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking on sustainable food production?”) and reliability (for example, “Who is/are the author/s? Does the author reference other experts or reports in the field of environmental management?”)
* creating a presentation of data and information using geospatial technologies; for example, a 3D diagram illustrating interactions between an oil spill in coral reefs and resultant decline in aquatic food production; a flow diagram showing the daily activities of a female subsistence farmer in Africa; or a diagram of a mangrove ecosystem before and after human interactions
* creating visual representations of multi-variable geographical data using digital tools; for example, a table to compare the daily consumption of meat per person in developed and developing countries; a complex graph to illustrate the relationship between temperature, precipitation and biomes; or a cross-section identifying horizons in a soil profile, and the impacts of mining and fracking on agricultural land
* representing spatial distribution of geographical phenomena by constructing special purpose maps that conform to cartographic conventions, for example creating a map to show the relationship between biomes and world food production
 |
| **Skills**Interpreting and analysing geographical data and information | evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationshipsAC9HG9S03 | * making generalisations about trends; for example, using questionnaires or interviews to identify people’s perspectives on live food fish trade in Australia or people’s access to the internet in the local area
* explaining a pattern; for example, using the current Global Hunger Index and the updated Food and Agricultural Organization’s Low-Income Food-Deficit Countries (LIFDCs) to identify locations of food scarcity and malnutrition, or comparing maps showing transport networks with survey responses on personal mobility
* explaining relationships between causes and impacts of factors represented in data; for example, the impact of the use of Global Positioning System (GPS) and Geographic Information Systems (GIS) on the way farmers control the dispersion of fertilisers and pesticides to produce higher yields and limit run-off, or the effects of the use of GPS to construct maps on how tourists use different transport systems to visits popular places in Australia
 |
| **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG9S04 | * drawing conclusions about the impact of a geographical challenge on people, places and environments; for example, investigating the causes of a decline in food species, its impacts on food security and the establishment of the Svalbard Global Seed Vault, or the effects of cyberattacks on technological interconnections and implementation of international laws related to cyber security
* justifying conclusions by reflecting on perspectives identified and reasons for these perspectives; for example, considering environmental, economic and social factors when challenging disappearing arable land converted from food production to non-food crops, or promoting ecotourism that impacts on people and places
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| develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG9S05 | * proposing individual action and supporting the proposal with reasons; for example, reducing food wastage or reducing negative environmental impacts when visiting theme parks or national parks
* proposing collective action and supporting the proposal with reasons; for example, organisations that work to end hunger and improve food security, or improve labour practices and increase wages for people working to produce goods exported to other countries
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, examining factors likely to impact on achieving Goal 2 of the Sustainable Development Goals – Ending global hunger by 2030 or monitoring the extent that a management plan for a national park is implemented
* explaining the outcomes and impacts of a strategy, such as providing people with adequate and quality food that is acceptable in different cultures, or reducing the global movement of hazardous waste between countries
* reflecting on the influence of personal values and attitudes on predicted outcomes and impacts; for example, how preferring to buy locally produced food reduces food miles and greenhouse gases, or how reducing, recycling and reusing goods contributes to a more sustainable environment
 |
| **Skills**Communicating | create descriptions, explanations and responses, using geographical knowledge and geographical tools as appropriate, and concepts and terms that incorporate and acknowledge research findingsAC9HG9S06 | * developing a response using geographical concepts and terms; for example, strategies to improve the sustainability of a place or environment
* creating a description, using representations of data (for example, using maps to illustrate the major terrestrial biomes of Australia and photographs to show their impacts on people and places) and research findings (for example, using diagrams, graphs, tables and/or satellite images to show how environmental, economic or technological factors affect crop yields)
* creating an explanation that applies tone appropriate to the audience; such as reducing food wastage, or developing a management plan for a tourist hot spot, in an authoritative tone and reasoned argument
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| **Humanities and Social Sciences (HASS) – Geography** **Year 10**   | **Knowledge and understanding** Environmental change and management | the human-induced changes that challenge the sustainability of places and environmentsAC9HG10K01 | * identifying tensions between the conflicting perspectives of individuals, communities and governments on the use of sustainable practices
* explaining the nature of human-induced environmental changes (for example, water and atmospheric pollution; loss of biodiversity; degradation of land and aquatic environments) and the challenge they pose for sustainability
* discussing the concept of sustainability in relation to environmental functions and identifying tensions between the conflicting perspectives of communities, businesses and government
 |
| First Nations Australians’ approaches to custodial responsibility and environmental management in different regions of AustraliaAC9HG10K03 | * identifying the influence of cultural values on how First Nations Australians manage environments (for example, continuity of cultural practices, management or development of Country/Place, and land tenure systems) and explaining custodial responsibilities for a Country/Place
* explaining First Nations Australians’ models of sustainability, which contribute to broader conservation practices; for example, obligations to Country/Place, land management and care practices such as cleaning up the land and fire management, removal of weeds and rubbish, protection of threatened species, and capacity building within their communities
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| causes and effects of a change in an identified environment at a local, national or global scale, and strategies to manage sustainabilityAC9HG10K04 | * identifying a context to be studied, describing the causes of the environmental change and impacts for the sustainability of its functions (resource, service or spiritual)
* comparing management strategies in Australia with strategies in another country for human-induced environmental change, using criteria; for example, managing waste in Australia compared with India’s rubbish pickers or managing floods in Australia compared to floods in China
* explaining how Traditional Owners, communities, developers, governments and non-government organisations use environmental, economic and social criteria, and consider trade-offs when making decisions
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| **Knowledge and understanding** Geographies of human wellbeing | the methods used to measure spatial variations in human wellbeing and development, and how these can be applied to determine differences between places at the global scaleAC9HG10K05 | * identifying the United Nations Sustainable Development Goals 2015–2030 relevant to human wellbeing
* comparing different measurements of human wellbeing (for example, comparing rankings of selected indicators such as Gross Domestic Product [GDP], Human Development Index [HDI] and Physical Quality of Life Index [PQLI] for Australia, India and a country in the Pacific) and explaining trends in the different measurements
* interpreting and explaining trends in human wellbeing in a developed country and a developing country over time; for example, Australia compared with a country in Asia or the Pacific
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| reasons for, and consequences of, spatial variations in human wellbeing at a regional and national scale, drawing on studies such as from within India or another country in AsiaAC9HG10K06 | * interpreting and analysing measures of human wellbeing, and identifying and describing the causes and consequences of inequality
* identifying and describing the economic, social, technological, political or environmental causes of variations in human wellbeing within India or another country compared to Australia
* interpreting and analysing spatial data on human wellbeing in India or another country in Asia to identify the regions with high and low levels of human wellbeing, explaining similarities and differences; for example, rural Rajasthan compared to urban Mumbai
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| reasons for, and consequences of, spatial variations in human wellbeing in Australia, including for First Nations AustraliansAC9HG10K07 | * explaining the environmental factors (access to resources – fossil fuels, water, fertile soils), the social factors (adequate food, health and education services), the economic factors (employment, income) and the technological factors (information and communications technology) that influence human wellbeing and development between and within countries
* interpreting and analysing similarities, differences, patterns and trends in human wellbeing data for communities of First Nations Australians compared to non-Indigenous Australians, and explaining the links between human wellbeing and Closing the Gap initiatives
* explaining how a person’s wellbeing is influenced by where they live, with reference to interconnections of environmental, economic, social and technological factors in at least 2 different places in Australia, such as urban and remote places
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| responses of international and national government and non-government organisations to improve human wellbeing in Australia, within India and another country in the PacificAC9HG10K08 | * identifying and describing a national, state or community program to reduce regional inequalities in human wellbeing in a country such as Papua New Guinea or Indonesia
* explaining the objectives and outcomes of an overseas economic and social development program by the Australian Government (for example, AusAID) or a non-government overseas aid program (for example, World Vision) in India or a country in the Pacific
* identifying and explaining ways to improve the wellbeing of remote communities of First Nations Australians, including ways proposed by the communities
 |
| **Skills**Questioning and researching using geographical methods | develop a range of questions for a geographical inquiry related to a phenomenon or challengeAC9HG10S01 | * developing a range of relevant questions to investigate why a geographical phenomenon has changed or a challenge may arise; for example, “What is human wellbeing?”, “How has human wellbeing changed over time?”, “How and why should inequality in human wellbeing be reduced?”
* developing and modifying questions to sharpen the focus of an investigation using concepts or scale of study; for example, “How are variations in the spatial distribution of human wellbeing measured at the global scale?”, “Why does human wellbeing vary between and within countries?” (national scale), “How would you measure human wellbeing in the local area?” (local scale)
* planning an investigation of a phenomenon or challenge being studied at a range of scales, using digital tools; for example, investigating the causes of human-induced climate change at the global scale and its impacts on Australia, Bangladesh and/or a Pacific Island country at the national scale
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| collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriateAC9HG10S02 | * identifying primary research methods, including fieldwork, to collect original materials; for example, survey and interviews regarding perspectives on environmental management at the local scale, or strategies to improve human wellbeing of First Nations Australians at the national and local scale
* collecting relevant secondary research materials online using targeted criteria; for example, “allintext: critically endangered list by country” or “allintext: targets for reducing hunger or increasing access to health care”
* identifying and respecting protocols for consultation with communities of First Nations Australians when planning and conducting investigations; for example, acknowledging their earth-centred world view and how their traditional knowledges contribute to environmental management projects, or considering cultural and spiritual wellbeing of First Nations Australians when implementing programs to reduce economic and social inequality
* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking?”), reliability (for example, “Who is/are the author/s? Does the author reference other experts in the field?”) and bias, such as information bias presenting one side of an issue, or selection bias presenting information on the positive aspects of foreign aid with cultural and social issues not considered
* comparing findings from primary research with those from secondary research materials for relevance and reliability; for example, comparing survey data or interviews on attitudes towards environmental management or improving human wellbeing with commentary or reports on peoples’ views on the causes of issues affecting the environment or human wellbeing
* representing multi-variable data using geospatial technologies; for example, using scatterplots to visually represent data for countries to demonstrate the correlation between 2 variables, such as comparing adult literacy with GDP per capita in United Arab Emirates or Bhutan
* representing multi-variable data using digital tools; for example, generating pie graphs showing threats to biodiversity; using digital photographs to indicate differences in material goods between people and places, and the influence of environment, culture and income; using tables to measure and compare wellbeing using different indexes and the world gender equality gap
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| **Skills**Interpreting and analysing geographical data and information | evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationshipsAC9HG10S03 | * developing generalisations; for example, critically analysing text and images for their meaning and significance, such as satellite images showing before and after deforestation in the Amazon or contrasting nightlife in North and South Korea
* explaining patterns and trends; for example, explaining why a vegetation corridor for movement of koalas assists them to traverse through the bush and reduce death rates, or whether there has been an increased use of technology such as satellite images, drones and robots during and after a natural disaster to identify the need for aid
* inferring relationships between key environmental indicators and sustainability of places at the national scale; for example, using a geospatial technologies application to create a map of Australia and another country to show measures of environmental change such as air quality, freshwater quality, fish resources, energy use, biodiversity or waste generation
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| **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG10S04 | * drawing conclusions using at least 2 concepts, such as place, space, environment, interconnection, sustainability, scale and change as organisers for example discussing the concept of sustainability in relation to human-induced change affecting environments or considering implications of spatial variations in human wellbeing
* examining the reasons given for making a specific decision and explain how these reasons have or have not justified the conclusion reached, such as considering the interconnection of environmental, economic, social, political or technological factors when developing strategies to address sustainable management of environments, or unequal access of people to resources essential for human wellbeing
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| develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG10S05 | * proposing individual action and supporting the strategy with reasons; for example, reducing their ecological footprint by reducing the amount of food packaging included in a packed lunch, or becoming volunteers for non-government organisations such as the Red Cross or Red Crescent to increase social connectedness
* proposing collective action and evaluation of actions; for example, identifying ways to improve the wellbeing of remote communities of First Nations Australians and evaluating the actions proposed and implemented by the community members
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, reflecting on whether environment degradation has been reduced and human wellbeing improved
* explaining reasons for decisions and choices, such as the traditional use of firestick farming by First Nations Australians to control fires, or grassroots decisions on implementation and effectiveness of aid projects
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| **Skills**Communicating  | create descriptions, explanations and responses, using geographical knowledge and geographical tools as appropriate, and concepts and terms that incorporate and acknowledge research findingsAC9HG10S06 | * presenting conclusions using geospatial technologies and digital tools to create representations of data (for example, the trends in Human Development Index [HDI] over time in a selected country or region) and research findings (for example, how a person’s wellbeing is influenced by where they live) to explain causes and effects of a geographical phenomenon or challenge, and reinforcing understanding of the interconnections between people, places and the environment
* developing an explanation, applying tone appropriate to purpose and audience; for example, using an authoritative tone, and referring to representations of data and information when explaining a strategy to improve the sustainability of an identified environment or action to improve human wellbeing
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| Years 9 and 10 |
| Key aspect 4: Economy |
| Learning area/subject | Strand/sub-strand | Content descriptions | Content elaborations |
| **Design and Technologies** | **Knowledge and understanding** Technologies and society | analyse how people in design and technologies occupations consider ethical, security and sustainability factors to innovate and improve products, services and environmentsAC9TDE10K01 | * analysing design and technologies professions and their contributions to society, for example engineers working in disaster recovery or empowering communities to improve access to clean, safe energy
* considering the factors that influence design and manufacture, and the work of professional designers, engineers and technologists, including time, access to skills, knowledge, finance, expertise in global engineering and manufacturing, for example Australian designers and engineers working with rapid prototyping manufacturers in a country in Asia or the significance of the collaboration between Australia and Vietnam on the development of the Cao Lanh
* explaining how product life cycle thinking can influence decision-making related to design and technologies, for example rethinking products to provide for re-use, selecting a material for a product that has a lower carbon footprint
* examining mass production systems taking into account ethics and sustainability considerations, for example the mass production of food, clothing and shoes and why manufacturers produce different versions of the same product and support complete product life cycle strategies
* explaining the consequences of ethical and sustainability decisions for products, services and environments, for example the accessibility of a managed public environment, the design of roads to include aerial bridges for wildlife and signage powered with solar technologies
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| analyse the impact of innovation, enterprise and emerging technologies on designed solutions for global preferred futuresAC9TDE10K02 | * exploring the ways commercial enterprises respond to the challenges and opportunities of technological change, for example e-commerce, and considering their carbon footprint
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| **Knowledge and understanding**Technologies context: Food and fibre production | analyse and make judgements on the ethical, secure and sustainable production and marketing of food and fibre enterprises AC9TDE10K04 | * analysing grain sources used by First Nations Australians, such as acacia, for their nutrient content, including energy, fat and protein and suitability as a sustainable food source in drought or famine-prone, semi-arid, and tropical regions, as compared with cereal crops such as wheat and rice
* examining emerging production technologies and methods in terms of productivity, profitability and sustainability, for example taking account of animal welfare considerations in food and fibre production enterprises, protected cropping, hydroponics or aquaculture
* investigating how digital tools could be used to enhance food production systems, for example global positioning systems (GPS) for managing animals, crop sensors, automated animal-feeding or milking systems, or drones for locating and managing weeds
* investigating the interdependence of plants and animals and comparing the environmental impacts of intensive and extensive production systems and their contribution to food and fibre production, for example the impact of pesticide use on bee populations or comparing caged and free-range chicken production
* considering the meaning of food and water security and how they may influence design decisions for creating preferred futures, for example using water-efficient irrigation, protected cropping where crops are grown under cover to increase production over a longer period or choosing drought-resistant varieties of plants and animals
* examining the marketing chain of a range of agricultural products and outlining the effect of product processing and advertising on demand and price including the impact of cash crops on communities
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|  | **Knowledge and understanding**Technologies context: Materials and technologies specialisations | analyse and make judgements on how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutionsAC9TDE10K06 | * analysing how First Nations Australians identified the superior thermal properties of possum fur in their development of products such as cloaks and blankets including making judgements on how these fibres are sourced, and how these knowledges continue to be used today as seen in the emerging market of high-performance thermal clothing made from blended possum and wool fibre
* critiquing the design of an existing product to identify environmental consequences of material selection and investigating emerging materials and their impact on design decisions, for example examining the properties of common plastic bags and researching innovative materials that could be used as a sustainable alternative such as bioplastics or renewable materials such as seaweed
* justifying decisions when selecting from a broad range of technologies − tools, equipment, processes, materials, systems and components, for example selecting low-emission paints and locally sourced materials such as bamboo for cross-laminated timbers (CLT)
* analysing and explaining the ways in which the properties and characteristics of materials have been considered in the design of a product with specific requirements, such as minimising weight to reduce transport costs in rural Australia
* investigating emerging materials and their impact on design decisions, for example researching products such as sustainable bioplastic material made from discarded potato peels which can be used for a variety of applications including buttons and eyeglasses
* investigating fibre-based medical textile products and structures used in a medical environment for treatment of an injury or the clinical treatment of a wound or an illness, for example collagen fibre used as a suture is as strong as silk and biodegradable
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| **Digital Technologies** | **Processes and production skills** Acquiring, managing and analysing data | develop techniques to acquire, store and validate data from a range of sources using software, including spreadsheets and databases AC9TDI10P01 | * accessing and storing data from the Australian Bureau of Statistics in a format that is useful for analysis, for example acquiring data on the population growth across age groups in Australia
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|  | **Processes and production skills** Acquiring, managing and analysing data | analyse and visualise data interactively using a range of software, including spreadsheets and databases, to draw conclusions and make predictions by identifying trends and outliers AC9TDI10P02 | * using software to visualise and compare data to identify patterns, relationships and trends, for example investigating emerging trends in Australia's industries
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| **Processes and production skills** Evaluating | evaluate existing and student solutions against the design criteria, user stories, possible future impact and opportunities for enterprise AC9TDI10P10 | * judging the quality of the output of their solution against the design criteria, for example confirming that the stock levels recorded by their inventory management application are accurate within allowed parameters
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| **Humanities and Social Sciences (HASS) – Geography** **Year 9** | **Knowledge and understanding** Biomes and food security | the environmental, economic and technological factors that impact agricultural productivity, in Australia and a country in AsiaAC9HG9K03 | * examining how environmental factors, such as climate, soil, landform, water and hazards, support higher agricultural production, such as wheat, rice and maize, in Australia and a country in Asia
* examining how economic factors such as available land, labour, finance and enterprise, and technological factors such as biotechnology and use of Geographical Information Systems (GIS) software, affect agricultural production in Australia and a country in Asia; for example, increased labour supply or access to storage, transportation and markets
* examining how agricultural innovations have reduced environmental limitations on food production in Australia and a country in Asia; for example, increased food production due to research into and development of high-yielding and genetically engineered pest resistant varieties, construction of drip irrigation systems, and the use of stubble mulching, intercropping, agroforestry and crop rotation
* explaining the impact of the interconnections between environmental, economic and technological factors on the yield of a particular crop, such as wheat, rice or maize, in Australia
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| challenges to sustainable food production and food security in Australia and appropriate management strategiesAC9HG9K04 | * examining environmental impacts of changes to food production causing a decline in the capacity of the land to provide agricultural products; for example, land and water degradation such as soil erosion, salinity and desertification, shortage of fresh water, competing land uses, climate change and pollution contribute to a decrease in food production
* examining economic and social impacts of changes to food production; for example, competing land uses such as urban and industrial uses, and recreation activities
* examining the impacts of modifications to biomes on the productivity and availability of staple resources for First Nations Australians; for example, reduced access to bush food such as myrrnong (yam daisy) in Victoria or cycads, bunya nuts and wongi plums in northern Australia
* examining management strategies that improve food security; for example, efforts to reduce food wastage, government policies or trade barriers
* explaining management strategies that restore the quality or diversity of agriculture in Australia; for example, improving the function of natural biomes and anthropogenic biomes, monitoring land management practices, improving the condition of the soil or building the capability of farmers
* generating ideas for a strategy to expand agricultural production in Australia; for example, market bush food such as herbs and wattle seed, invest in research, support farm innovations or develop the expertise of farmers
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| **Skills**Interpreting and analysing geographical data and information | evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationshipsAC9HG9S03 | * making generalisations about trends; for example, using questionnaires or interviews to identify people’s perspectives on live food fish trade in Australia or people’s access to the internet in the local area
* explaining a pattern; for example, using the current Global Hunger Index and the updated Food and Agricultural Organization’s Low-Income Food-Deficit Countries (LIFDCs) to identify locations of food scarcity and malnutrition, or comparing maps showing transport networks with survey responses on personal mobility
* explaining relationships between causes and impacts of factors represented in data; for example, the impact of the use of Global Positioning System (GPS) and Geographic Information Systems (GIS) on the way farmers control the dispersion of fertilisers and pesticides to produce higher yields and limit run-off, or the effects of the use of GPS to construct maps on how tourists use different transport systems to visits popular places in Australia
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| **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG9S04 | * drawing conclusions about the impact of a geographical challenge on people, places and environments; for example, investigating the causes of a decline in food species, its impacts on food security and the establishment of the Svalbard Global Seed Vault, or the effects of cyberattacks on technological interconnections and implementation of international laws related to cyber security
* justifying conclusions by reflecting on perspectives identified and reasons for these perspectives; for example, considering environmental, economic and social factors when challenging disappearing arable land converted from food production to non-food crops, or promoting ecotourism that impacts on people and places
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| **Humanities and Social Sciences (HASS) – Geography** **Year 10** | **Knowledge and understanding** Environmental change and management | the human-induced changes that challenge the sustainability of places and environmentsAC9HG10K01 | * identifying tensions between the conflicting perspectives of individuals, communities and governments on the use of sustainable practices
* explaining the nature of human-induced environmental changes (for example, water and atmospheric pollution; loss of biodiversity; degradation of land and aquatic environments) and the challenge they pose for sustainability
* discussing the concept of sustainability in relation to environmental functions and identifying tensions between the conflicting perspectives of communities, businesses and government
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| causes and effects of a change in an identified environment at a local, national or global scale, and strategies to manage sustainabilityAC9HG10K04 | * identifying a context to be studied, describing the causes of the environmental change and impacts for the sustainability of its functions (resource, service or spiritual)
* comparing management strategies in Australia with strategies in another country for human-induced environmental change, using criteria; for example, managing waste in Australia compared with India’s rubbish pickers or managing floods in Australia compared to floods in China
* explaining how Traditional Owners, communities, developers, governments and non-government organisations use environmental, economic and social criteria, and consider trade-offs when making decisions
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| **Knowledge and understanding** Geographies of human wellbeing | the methods used to measure spatial variations in human wellbeing and development, and how these can be applied to determine differences between places at the global scaleAC9HG10K05 | * identifying the United Nations Sustainable Development Goals 2015–2030 relevant to human wellbeing
* comparing different measurements of human wellbeing (for example, comparing rankings of selected indicators such as Gross Domestic Product [GDP], Human Development Index [HDI] and Physical Quality of Life Index [PQLI] for Australia, India and a country in the Pacific) and explaining trends in the different measurements
* interpreting and explaining trends in human wellbeing in a developed country and a developing country over time; for example, Australia compared with a country in Asia or the Pacific
 |
|    | reasons for, and consequences of, spatial variations in human wellbeing at a regional and national scale, drawing on studies such as from within India or another country in AsiaAC9HG10K06 | * interpreting and analysing measures of human wellbeing, and identifying and describing the causes and consequences of inequality
* identifying and describing the economic, social, technological, political or environmental causes of variations in human wellbeing within India or another country compared to Australia
* interpreting and analysing spatial data on human wellbeing in India or another country in Asia to identify the regions with high and low levels of human wellbeing, explaining similarities and differences; for example, rural Rajasthan compared to urban Mumbai
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| reasons for, and consequences of, spatial variations in human wellbeing in Australia, including for First Nations AustraliansAC9HG10K07 | * explaining the environmental factors (access to resources – fossil fuels, water, fertile soils), the social factors (adequate food, health and education services), the economic factors (employment, income) and the technological factors (information and communications technology) that influence human wellbeing and development between and within countries
* interpreting and analysing similarities, differences, patterns and trends in human wellbeing data for communities of First Nations Australians compared to non-Indigenous Australians, and explaining the links between human wellbeing and Closing the Gap initiatives
* explaining how a person’s wellbeing is influenced by where they live, with reference to interconnections of environmental, economic, social and technological factors in at least 2 different places in Australia, such as urban and remote places
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| responses of international and national government and non-government organisations to improve human wellbeing in Australia, within India and another country in the PacificAC9HG10K08 | * identifying and describing a national, state or community program to reduce regional inequalities in human wellbeing in a country such as Papua New Guinea or Indonesia
* explaining the objectives and outcomes of an overseas economic and social development program by the Australian Government (for example, AusAID) or a non-government overseas aid program (for example, World Vision) in India or a country in the Pacific
* identifying and explaining ways to improve the wellbeing of remote communities of First Nations Australians, including ways proposed by the communities
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| **Skills**Questioning and researching using geographical methods | collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriateAC9HG10S02 | * identifying primary research methods, including fieldwork, to collect original materials; for example, survey and interviews regarding perspectives on environmental management at the local scale, or strategies to improve human wellbeing of First Nations Australians at the national and local scale
* collecting relevant secondary research materials online using targeted criteria; for example, “allintext: critically endangered list by country” or “allintext: targets for reducing hunger or increasing access to health care”
* identifying and respecting protocols for consultation with communities of First Nations Australians when planning and conducting investigations; for example, acknowledging their earth-centred world view and how their traditional knowledges contribute to environmental management projects, or considering cultural and spiritual wellbeing of First Nations Australians when implementing programs to reduce economic and social inequality
* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking?”), reliability (for example, “Who is/are the author/s? Does the author reference other experts in the field?”) and bias, such as information bias presenting one side of an issue, or selection bias presenting information on the positive aspects of foreign aid with cultural and social issues not considered
* comparing findings from primary research with those from secondary research materials for relevance and reliability; for example, comparing survey data or interviews on attitudes towards environmental management or improving human wellbeing with commentary or reports on peoples’ views on the causes of issues affecting the environment or human wellbeing
* representing multi-variable data using geospatial technologies; for example, using scatterplots to visually represent data for countries to demonstrate the correlation between 2 variables, such as comparing adult literacy with GDP per capita in United Arab Emirates or Bhutan
* representing multi-variable data using digital tools; for example, generating pie graphs showing threats to biodiversity; using digital photographs to indicate differences in material goods between people and places, and the influence of environment, culture and income; using tables to measure and compare wellbeing using different indexes and the world gender equality gap
 |
| **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG10S04 | * drawing conclusions using at least 2 concepts, such as place, space, environment, interconnection, sustainability, scale and change as organisers for example discussing the concept of sustainability in relation to human-induced change affecting environments or considering implications of spatial variations in human wellbeing
* examining the reasons given for making a specific decision and explain how these reasons have or have not justified the conclusion reached, such as considering the interconnection of environmental, economic, social, political or technological factors when developing strategies to address sustainable management of environments, or unequal access of people to resources essential for human wellbeing
 |
| develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG10S05 | * proposing individual action and supporting the strategy with reasons; for example, reducing their ecological footprint by reducing the amount of food packaging included in a packed lunch, or becoming volunteers for non-government organisations such as the Red Cross or Red Crescent to increase social connectedness
* proposing collective action and evaluation of actions; for example, identifying ways to improve the wellbeing of remote communities of First Nations Australians and evaluating the actions proposed and implemented by the community members
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, reflecting on whether environment degradation has been reduced and human wellbeing improved
* explaining reasons for decisions and choices, such as the traditional use of firestick farming by First Nations Australians to control fires, or grassroots decisions on implementation and effectiveness of aid projects
 |
| **Skills**Communicating  | create descriptions, explanations and responses, using geographical knowledge and geographical tools as appropriate, and concepts and terms that incorporate and acknowledge research findingsAC9HG10S06 | * presenting conclusions using geospatial technologies and digital tools to create representations of data (for example, the trends in Human Development Index [HDI] over time in a selected country or region) and research findings (for example, how a person’s wellbeing is influenced by where they live) to explain causes and effects of a geographical phenomenon or challenge, and reinforcing understanding of the interconnections between people, places and the environment
* developing an explanation, applying tone appropriate to purpose and audience; for example, using an authoritative tone, and referring to representations of data and information when explaining a strategy to improve the sustainability of an identified environment or action to improve human wellbeing
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| Years 9 and 10 |
| Key aspect 5: People |
| Learning area/subject | Strand/sub-strand | Content descriptions | Content elaborations |
| **Design and Technologies** | **Knowledge and understanding** Technologies and society | analyse how people in design and technologies occupations consider ethical, security and sustainability factors to innovate and improve products, services and environmentsAC9TDE10K01 | * examining sustainability factors influencing the design and production of a solution developed by First Nations Australians, such as the sustainable production of culturally significant pigments, for example in many places throughout Australia white and red pigments are not freely available and must be manufactured through a complex process of calcination by firing rocks or clays in a kiln
* analysing design and technologies professions and their contributions to society, for example engineers working in disaster recovery or empowering communities to improve access to clean, safe energy
 |
| analyse the impact of innovation, enterprise and emerging technologies on designed solutions for global preferred futuresAC9TDE10K02 | * investigating how the knowledges of First Nations Australians have led to the discovery of potential innovative solutions, for example biodegradable polymers using spinifex grass to reduce landfill and strengthen latex, plastics and concrete
* exploring the ways commercial enterprises respond to the challenges and opportunities of technological change, for example e-commerce, and considering their carbon footprint
* investigating scenarios of how the future may unfold and what opportunities and impacts there may be for society and particular groups in a preferred future, for example by using forecasting and backcasting techniques
* examining real-world problems and understanding basic needs when considering designed solutions, for example students collaborating to design solutions to challenges in the Asia region; or artists from a country in South-East Asia creating posters for the world to take action in a pandemic
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|  | **Knowledge and understanding**Technologies context: Food and fibre production | analyse and make judgements on the ethical, secure and sustainable production and marketing of food and fibre enterprises AC9TDE10K04 | * analysing grain sources used by First Nations Australians, such as acacia, for their nutrient content, including energy, fat and protein and suitability as a sustainable food source in drought or famine-prone, semi-arid, and tropical regions, as compared with cereal crops such as wheat and rice
* examining the marketing chain of a range of agricultural products and outlining the effect of product processing and advertising on demand and price including the impact of cash crops on communities
 |
| **Knowledge and understanding**Technologies context: Materials and technologies specialisations | analyse and make judgements on how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutionsAC9TDE10K06 | * analysing how First Nations Australians identified the superior thermal properties of possum fur in their development of products such as cloaks and blankets including making judgements on how these fibres are sourced, and how these knowledges continue to be used today as seen in the emerging market of high-performance thermal clothing made from blended possum and wool fibre
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| **Processes and production skills** Investigating and defining | analyse needs or opportunities for designing; develop design briefs; and investigate, analyse and select materials, systems, components, tools and equipment to create designed solutionsAC9TDE10P01 | * analysing First Nations Australians’ traditional grains for their potential for providing nutritional and commercial solutions and developing a design brief to highlight the materials, systems, components and tools or equipment needed
* analysing the design of new products to identify how well design ideas respond to sustainability issues, for example swimming pool covers, ultraviolet lights and lamps for disinfection, or disposable household products
* developing design briefs that take into consideration the needs of users, for example considering universal design principles or Safety by Design principles to improve accessibility and safety
* analysing a range of design and technologies ideas, for example assessing those that draw on the intellectual property of others, including Indigenous cultural and intellectual property rights
* considering the needs of community groups to identify rich design tasks, for example interviewing community members about accessibility requirements to develop the initial brief and then during specific phases of the design process to determine the best possible designed solution for the community
* examining tools, techniques, equipment and relationships of properties for complementary materials for product development, for example examining compressive and tensile strengths of materials
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| **Science – Year 9** | **Science as a human endeavour**Use and influence of science | analyse the key factors that contribute to science knowledge and practices being adopted more broadly by societyAC9S9H03 | * examining how government initiatives such as Landcare support adoption of effective land restoration practices that improve soil quality and increase carbon sequestration in soils
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| **Science – Year 10** | **Science as a human endeavour**Use and influence of science | analyse the key factors that contribute to science knowledge and practices being adopted more broadly by societyAC9S10H03 | * investigating why agricultural practices have changed to include widespread use of genetically engineered crops
* considering how the traditional ecological knowledges of First Nations Australians are being reaffirmed by modern science and how these practices are being used by Traditional Owners in carbon farming initiatives
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| **Humanities and Social Sciences (HASS) – Geography** **Year 9**  | **Knowledge and understanding** Biomes and food security  | the distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivityAC9HG9K01 | * identifying and describing the major aquatic and terrestrial biomes of Australia and other areas of the world, and mapping their distribution
* interpreting and explaining patterns and trends in the productivity of the major aquatic and terrestrial biomes in Australia compared with a country in Asia
* explaining the effects of interconnections between environmental processes (atmosphere, hydrosphere, lithosphere and biosphere) and human activities, such as deforestation, mining and agriculture on the characteristics of biomes
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| the effects on environments of human alteration of biomes to produce food, industrial materials and fibresAC9HG9K02 | * identifying the biomes in Australia and a country in Asia that produce some of the foods and plant material people consume
* explaining the differences between natural and agricultural ecosystems in flows of nutrients and water, and in biodiversity; for example, the tropical rainforest biome in Indonesia produces food such as fruit, grains, nuts, vegetables and spices, and non-food products such as wood, rubber, coffee, chocolate and palm oil
* explaining how human alteration of biomes (for example, drip irrigation, fertilisers, pesticides, genetically modified seeds, agrobiotics, terracing, and controlling erosion and overgrazing) has increased agricultural productivity in Australia and a country in Asia
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| the environmental, economic and technological factors that impact agricultural productivity, in Australia and a country in AsiaAC9HG9K03 | * examining how environmental factors, such as climate, soil, landform, water and hazards, support higher agricultural production, such as wheat, rice and maize, in Australia and a country in Asia
* examining how economic factors such as available land, labour, finance and enterprise, and technological factors such as biotechnology and use of Geographical Information Systems (GIS) software, affect agricultural production in Australia and a country in Asia; for example, increased labour supply or access to storage, transportation and markets
* examining how agricultural innovations have reduced environmental limitations on food production in Australia and a country in Asia; for example, increased food production due to research into and development of high-yielding and genetically engineered pest resistant varieties, construction of drip irrigation systems, and the use of stubble mulching, intercropping, agroforestry and crop rotation
* explaining the impact of the interconnections between environmental, economic and technological factors on the yield of a particular crop, such as wheat, rice or maize, in Australia
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| challenges to sustainable food production and food security in Australia and appropriate management strategiesAC9HG9K04 | * examining environmental impacts of changes to food production causing a decline in the capacity of the land to provide agricultural products; for example, land and water degradation such as soil erosion, salinity and desertification, shortage of fresh water, competing land uses, climate change and pollution contribute to a decrease in food production
* examining economic and social impacts of changes to food production; for example, competing land uses such as urban and industrial uses, and recreation activities
* examining the impacts of modifications to biomes on the productivity and availability of staple resources for First Nations Australians; for example, reduced access to bush food such as myrrnong (yam daisy) in Victoria or cycads, bunya nuts and wongi plums in northern Australia
* examining management strategies that improve food security; for example, efforts to reduce food wastage, government policies or trade barriers
* explaining management strategies that restore the quality or diversity of agriculture in Australia; for example, improving the function of natural biomes and anthropogenic biomes, monitoring land management practices, improving the condition of the soil or building the capability of farmers
* generating ideas for a strategy to expand agricultural production in Australia; for example, market bush food such as herbs and wattle seed, invest in research, support farm innovations or develop the expertise of farmers
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| **Skills**Questioning and researching using geographical methods  | develop a range of questions for a geographical inquiry related to a phenomenon or challengeAC9HG9S01 | * developing a range of questions to investigate why a geographical phenomenon has changed or why a challenge may arise; for example, “Why is food security important?”, “What are sources of food in Australia?”, “How are people, places and environments connected?”
* developing and modifying questions to sharpen the focus of an investigation using concepts or scale of study; for example, “Why is the security and sustainability of food production important at the national scale?”, “How can bush food become a sustainable nutritional source of food in Australia?”, “How can connections between people, environments and places affect the sustainability of places at the global scale?”
* planning an investigation of a geographical phenomenon or challenge being studied at a range of scales, using digital tools; for example, the diverse types of biomes modified by humans for food and non-food products at a national and global scale, or the different types of connections between people and places at local, national and global scales
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| collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriateAC9HG9S02 | * identifying primary research methods, including fieldwork, to collect original materials; for example, comparison of aerial photographs or field sketches over time to document the use or alteration of biomes by people, or surveying peers on their use of the internet or other technologies
* collecting relevant secondary research materials online using targeted criteria; for example, "connections between food security and deforestation in Bangladesh”, “the digital divide and its impacts on people and places in North Korea”
* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking on sustainable food production?”) and reliability (for example, “Who is/are the author/s? Does the author reference other experts or reports in the field of environmental management?”)
* creating a presentation of data and information using geospatial technologies; for example, a 3D diagram illustrating interactions between an oil spill in coral reefs and resultant decline in aquatic food production; a flow diagram showing the daily activities of a female subsistence farmer in Africa; or a diagram of a mangrove ecosystem before and after human interactions
* creating visual representations of multi-variable geographical data using digital tools; for example, a table to compare the daily consumption of meat per person in developed and developing countries; a complex graph to illustrate the relationship between temperature, precipitation and biomes; or a cross-section identifying horizons in a soil profile, and the impacts of mining and fracking on agricultural land
* representing spatial distribution of geographical phenomena by constructing special purpose maps that conform to cartographic conventions, for example creating a map to show the relationship between biomes and world food production
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| **Skills**Interpreting and analysing geographical data and information | evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationshipsAC9HG9S03 | * making generalisations about trends; for example, using questionnaires or interviews to identify people’s perspectives on live food fish trade in Australia or people’s access to the internet in the local area
* explaining a pattern; for example, using the current Global Hunger Index and the updated Food and Agricultural Organization’s Low-Income Food-Deficit Countries (LIFDCs) to identify locations of food scarcity and malnutrition, or comparing maps showing transport networks with survey responses on personal mobility
* explaining relationships between causes and impacts of factors represented in data; for example, the impact of the use of Global Positioning System (GPS) and Geographic Information Systems (GIS) on the way farmers control the dispersion of fertilisers and pesticides to produce higher yields and limit run-off, or the effects of the use of GPS to construct maps on how tourists use different transport systems to visits popular places in Australia
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| **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG9S04 | * drawing conclusions about the impact of a geographical challenge on people, places and environments; for example, investigating the causes of a decline in food species, its impacts on food security and the establishment of the Svalbard Global Seed Vault, or the effects of cyberattacks on technological interconnections and implementation of international laws related to cyber security
* justifying conclusions by reflecting on perspectives identified and reasons for these perspectives; for example, considering environmental, economic and social factors when challenging disappearing arable land converted from food production to non-food crops, or promoting ecotourism that impacts on people and places
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| develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG9S05 | * proposing individual action and supporting the proposal with reasons; for example, reducing food wastage or reducing negative environmental impacts when visiting theme parks or national parks
* proposing collective action and supporting the proposal with reasons; for example, organisations that work to end hunger and improve food security, or improve labour practices and increase wages for people working to produce goods exported to other countries
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, examining factors likely to impact on achieving Goal 2 of the Sustainable Development Goals – Ending global hunger by 2030 or monitoring the extent that a management plan for a national park is implemented
* explaining the outcomes and impacts of a strategy, such as providing people with adequate and quality food that is acceptable in different cultures, or reducing the global movement of hazardous waste between countries
* reflecting on the influence of personal values and attitudes on predicted outcomes and impacts; for example, how preferring to buy locally produced food reduces food miles and greenhouse gases, or how reducing, recycling and reusing goods contributes to a more sustainable environment
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| **Humanities and Social Sciences (HASS) – Geography** **Year 10**   | **Knowledge and understanding** Environmental change and management | the human-induced changes that challenge the sustainability of places and environmentsAC9HG10K01 | * identifying tensions between the conflicting perspectives of individuals, communities and governments on the use of sustainable practices
* explaining the nature of human-induced environmental changes (for example, water and atmospheric pollution; loss of biodiversity; degradation of land and aquatic environments) and the challenge they pose for sustainability
* discussing the concept of sustainability in relation to environmental functions and identifying tensions between the conflicting perspectives of communities, businesses and government
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| First Nations Australians’ approaches to custodial responsibility and environmental management in different regions of AustraliaAC9HG10K03 | * identifying the influence of cultural values on how First Nations Australians manage environments (for example, continuity of cultural practices, management or development of Country/Place, and land tenure systems) and explaining custodial responsibilities for a Country/Place
* explaining First Nations Australians’ models of sustainability, which contribute to broader conservation practices; for example, obligations to Country/Place, land management and care practices such as cleaning up the land and fire management, removal of weeds and rubbish, protection of threatened species, and capacity building within their communities
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| causes and effects of a change in an identified environment at a local, national or global scale, and strategies to manage sustainabilityAC9HG10K04 | * identifying a context to be studied, describing the causes of the environmental change and impacts for the sustainability of its functions (resource, service or spiritual)
* comparing management strategies in Australia with strategies in another country for human-induced environmental change, using criteria; for example, managing waste in Australia compared with India’s rubbish pickers or managing floods in Australia compared to floods in China
* explaining how Traditional Owners, communities, developers, governments and non-government organisations use environmental, economic and social criteria, and consider trade-offs when making decisions
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| **Knowledge and understanding** Geographies of human wellbeing | the methods used to measure spatial variations in human wellbeing and development, and how these can be applied to determine differences between places at the global scaleAC9HG10K05 | * identifying the United Nations Sustainable Development Goals 2015–2030 relevant to human wellbeing
* comparing different measurements of human wellbeing (for example, comparing rankings of selected indicators such as Gross Domestic Product [GDP], Human Development Index [HDI] and Physical Quality of Life Index [PQLI] for Australia, India and a country in the Pacific) and explaining trends in the different measurements
* interpreting and explaining trends in human wellbeing in a developed country and a developing country over time; for example, Australia compared with a country in Asia or the Pacific
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|  | reasons for, and consequences of, spatial variations in human wellbeing at a regional and national scale, drawing on studies such as from within India or another country in AsiaAC9HG10K06 | * interpreting and analysing measures of human wellbeing, and identifying and describing the causes and consequences of inequality
* identifying and describing the economic, social, technological, political or environmental causes of variations in human wellbeing within India or another country compared to Australia
* interpreting and analysing spatial data on human wellbeing in India or another country in Asia to identify the regions with high and low levels of human wellbeing, explaining similarities and differences; for example, rural Rajasthan compared to urban Mumbai
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| reasons for, and consequences of, spatial variations in human wellbeing in Australia, including for First Nations AustraliansAC9HG10K07 | * explaining the environmental factors (access to resources – fossil fuels, water, fertile soils), the social factors (adequate food, health and education services), the economic factors (employment, income) and the technological factors (information and communications technology) that influence human wellbeing and development between and within countries
* interpreting and analysing similarities, differences, patterns and trends in human wellbeing data for communities of First Nations Australians compared to non-Indigenous Australians, and explaining the links between human wellbeing and Closing the Gap initiatives
* explaining how a person’s wellbeing is influenced by where they live, with reference to interconnections of environmental, economic, social and technological factors in at least 2 different places in Australia, such as urban and remote places
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| responses of international and national government and non-government organisations to improve human wellbeing in Australia, within India and another country in the PacificAC9HG10K08 | * identifying and describing a national, state or community program to reduce regional inequalities in human wellbeing in a country such as Papua New Guinea or Indonesia
* explaining the objectives and outcomes of an overseas economic and social development program by the Australian Government (for example, AusAID) or a non-government overseas aid program (for example, World Vision) in India or a country in the Pacific
* identifying and explaining ways to improve the wellbeing of remote communities of First Nations Australians, including ways proposed by the communities
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|  | **Skills**Questioning and researching using geographical methods | develop a range of questions for a geographical inquiry related to a phenomenon or challengeAC9HG10S01 | * developing a range of relevant questions to investigate why a geographical phenomenon has changed or a challenge may arise; for example, “What is human wellbeing?”, “How has human wellbeing changed over time?”, “How and why should inequality in human wellbeing be reduced?”
* developing and modifying questions to sharpen the focus of an investigation using concepts or scale of study; for example, “How are variations in the spatial distribution of human wellbeing measured at the global scale?”, “Why does human wellbeing vary between and within countries?” (national scale), “How would you measure human wellbeing in the local area?” (local scale)
* planning an investigation of a phenomenon or challenge being studied at a range of scales, using digital tools; for example, investigating the causes of human-induced climate change at the global scale and its impacts on Australia, Bangladesh and/or a Pacific Island country at the national scale
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| collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriateAC9HG10S02 | * identifying primary research methods, including fieldwork, to collect original materials; for example, survey and interviews regarding perspectives on environmental management at the local scale, or strategies to improve human wellbeing of First Nations Australians at the national and local scale
* collecting relevant secondary research materials online using targeted criteria; for example, “allintext: critically endangered list by country” or “allintext: targets for reducing hunger or increasing access to health care”
* identifying and respecting protocols for consultation with communities of First Nations Australians when planning and conducting investigations; for example, acknowledging their earth-centred world view and how their traditional knowledges contribute to environmental management projects, or considering cultural and spiritual wellbeing of First Nations Australians when implementing programs to reduce economic and social inequality
* evaluating primary or secondary research materials for relevance (for example, “Does the information reflect current thinking?”), reliability (for example, “Who is/are the author/s? Does the author reference other experts in the field?”) and bias, such as information bias presenting one side of an issue, or selection bias presenting information on the positive aspects of foreign aid with cultural and social issues not considered
* comparing findings from primary research with those from secondary research materials for relevance and reliability; for example, comparing survey data or interviews on attitudes towards environmental management or improving human wellbeing with commentary or reports on peoples’ views on the causes of issues affecting the environment or human wellbeing
* representing multi-variable data using geospatial technologies; for example, using scatterplots to visually represent data for countries to demonstrate the correlation between 2 variables, such as comparing adult literacy with GDP per capita in United Arab Emirates or Bhutan
* representing multi-variable data using digital tools; for example, generating pie graphs showing threats to biodiversity; using digital photographs to indicate differences in material goods between people and places, and the influence of environment, culture and income; using tables to measure and compare wellbeing using different indexes and the world gender equality gap
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|  | **Skills**Interpreting and analysing geographical data and information | evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationshipsAC9HG10S03 | * developing generalisations; for example, critically analysing text and images for their meaning and significance, such as satellite images showing before and after deforestation in the Amazon or contrasting nightlife in North and South Korea
* explaining patterns and trends; for example, explaining why a vegetation corridor for movement of koalas assists them to traverse through the bush and reduce death rates, or whether there has been an increased use of technology such as satellite images, drones and robots during and after a natural disaster to identify the need for aid
* inferring relationships between key environmental indicators and sustainability of places at the national scale; for example, using a geospatial technologies application to create a map of Australia and another country to show measures of environmental change such as air quality, freshwater quality, fish resources, energy use, biodiversity or waste generation
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|  | **Skills**Concluding and decision-making | evaluate data and information to justify conclusionsAC9HG10S04 | * drawing conclusions using at least 2 concepts, such as place, space, environment, interconnection, sustainability, scale and change as organisers for example discussing the concept of sustainability in relation to human-induced change affecting environments or considering implications of spatial variations in human wellbeing
* examining the reasons given for making a specific decision and explain how these reasons have or have not justified the conclusion reached, such as considering the interconnection of environmental, economic, social, political or technological factors when developing strategies to address sustainable management of environments, or unequal access of people to resources essential for human wellbeing
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| develop and evaluate strategies using environmental, economic or social criteria; recommend a strategy and explain the predicted impactsAC9HG10S05 | * proposing individual action and supporting the strategy with reasons; for example, reducing their ecological footprint by reducing the amount of food packaging included in a packed lunch, or becoming volunteers for non-government organisations such as the Red Cross or Red Crescent to increase social connectedness
* proposing collective action and evaluation of actions; for example, identifying ways to improve the wellbeing of remote communities of First Nations Australians and evaluating the actions proposed and implemented by the community members
* evaluating the effectiveness of a strategy in relation to environmental, economic or social criteria; for example, reflecting on whether environment degradation has been reduced and human wellbeing improved
* explaining reasons for decisions and choices, such as the traditional use of firestick farming by First Nations Australians to control fires, or grassroots decisions on implementation and effectiveness of aid projects
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|  | **Skills**Communicating  | create descriptions, explanations and responses, using geographical knowledge and geographical tools as appropriate, and concepts and terms that incorporate and acknowledge research findingsAC9HG10S06 | * presenting conclusions using geospatial technologies and digital tools to create representations of data (for example, the trends in Human Development Index [HDI] over time in a selected country or region) and research findings (for example, how a person’s wellbeing is influenced by where they live) to explain causes and effects of a geographical phenomenon or challenge, and reinforcing understanding of the interconnections between people, places and the environment
* developing an explanation, applying tone appropriate to purpose and audience; for example, using an authoritative tone, and referring to representations of data and information when explaining a strategy to improve the sustainability of an identified environment or action to improve human wellbeing
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