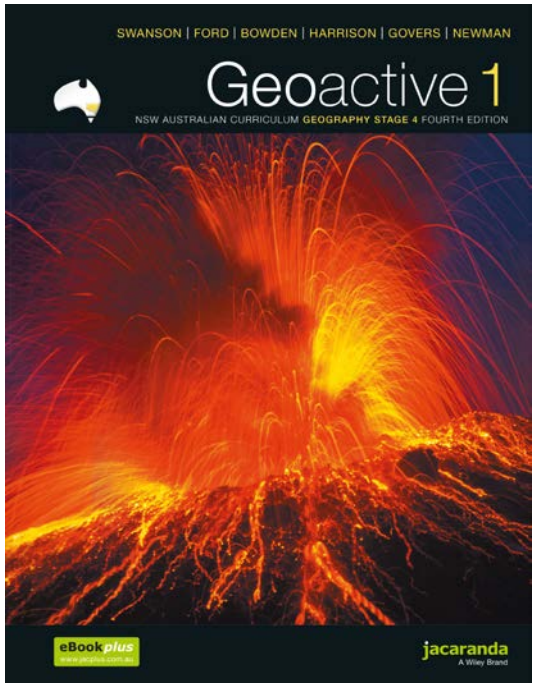
Teaching Program (Draft)
Jacaranda Geoactive
NSW AC Geography Stage 4



Draft Sample

jacaranda
A Wiley Brand

Landscapes and landforms — Chapter 4: Mountain landscapes | Stage 4 | Geography

Summary	Duration
Students explore landscapes and landforms using examples from Australia and throughout the world. They explain processes that create landscapes and shape individual landforms and they describe the value of landscapes and landforms to different people. Students examine issues of landscape degradation and ways to manage and protect landscapes and landforms. Students also investigate a natural hazard associated with landscapes and people's responses to that hazard.	5 weeks

Key inquiry questions	Skills
▪ Why is there a diversity of landscapes and landforms on Earth? ▪ What environmental and human processes form and transform landscapes and landforms? ▪ Why do people value landscapes and landforms? ▪ To what extent are landscapes and landforms sustainably managed and protected?	▪ Maps ▪ Fieldwork ▪ Graphs and statistics ▪ Spatial technologies ▪ Visual representations

Outcomes	Geographical concepts
A student: GE4-1 locates and describes the diverse features and characteristics of a range of places and environments GE4-2 describes processes and influences that form and transform places and environments GE4-4 examines perspectives of people and organisations on a range of geographical issues GE4-5 discusses management of places and environments for their sustainability GE4-7 acquires and processes geographical information by selecting and using geographical tools for inquiry GE4-8 communicates geographical information using a variety of strategies	Place – the concept of place is about the significance of places and what they are like. Space – the concept of space is about the significance of location and spatial distribution, and ways people organise and manage the spaces that we live in. Environment – the concept of environment is about the significance of the environment and human life, and the important interrelationships between humans and the environment. Interconnection – the concept of interconnection emphasises that no object of geographical study can be viewed in isolation. Scale – the concept of scale is about the way that geographical phenomena and problems can be examined at different spatial levels. Sustainability – the concept of sustainability is about the capacity of the environment to continue to support our lives and the lives of other living creatures in the future. Change – the concept of change is about explaining geographical phenomena by investigating how they have developed over time.

Content	Teaching, learning and assessment	Adjustments and extensions
Landscapes and landforms Students: • investigate different landscape and the geomorphic processes that create distinctive landforms, for example: (ACHGK048, ACHGK050) ⇒ identification of a variety of landscapes and landforms ⇒ explanation of geomorphic processes that create landforms, e.g. weathering, erosion, deposition, tectonic activity ⇒ examination of ONE landscape and its distinctive landforms	**4.1 WHERE ARE THE WORLD'S MOUNTAINS?** ▪ Mind map and Think, Pair, Share: Pre-test students by having each student construct a mind map of what they already know about mountains. This may be terms, features or places. Students compare their mind maps with a partner. Discuss as a class, to share knowledge and introduce topic. ▪ Show students the introductory video 'Majestic mountains' (eles-1626) and discuss the value of mountains to people around the world. ▪ Use the image on the chapter opener to compare the Dolomites in Italy to the mountain landforms that are in Australia. Some questions for discussion may include: ▪ What human features of the environment can be seen? ▪ What natural features can be seen? ▪ How do people interact with mountain environments here? ▪ How do we interact with mountain environments in Australia? ▪ Students complete the starter questions in the chapter opener section. ▪ Read through 'The world's mountains and ranges' in section 4.1. ▪ Discuss the location of the world's mountain ranges. Teachers may want to compare this to a map of the tectonic plates. Ask students if they find any similarities or differences between the two. Teachers may wish to revisit concepts and information from Chapter 1: The formation and	**Adjustment:** Students complete scaffolded worksheet 4.2 'The changing ecosystems on a mountain' in the eBookPLUS. **Adjustment:** Students complete a matching activity using five key terms and definitions. **Adjustment:** Have students create a word wall of all the key terms found in section 4.1. Students can find images to represent each term and display them in the classroom. **Adjustment:** Students read through the text and compile a PMI chart on the topic being taught in section 4.1. **Adjustment:** Have students locate mountains they may have visited on a globe in the classroom. Students can use *Jacaranda myWorldAtlas* as a guide. **Extension:** Have a student who may have visited a mountain range share their story/experience with the class. **Extension:** Assess the spatial distribution of mountain ranges across the globe. **Extension:** Compare and contrast the height of mountains on each continent. **Extension:** Students write a travel blog imagining that they have

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Value of landscapes and landforms Students: • investigate the aesthetic, cultural, spiritual and economic value of landscapes and landforms for people, including Aboriginal and Torres Strait Islander Peoples, for example: (ACHGK049) ⇒ explanation of the aesthetic value of landscapes and landforms to culture and identity ⇒ description of the cultural and spiritual value of landscapes or landforms in different places ⇒ identification of how a landscape can have economic	diversity of landscapes and landforms. ▪ Mapping — atlas work: Use a copy of *Jacaranda myWorldAtlas* and textbook to locate major mountain ranges. Plot these on a blank map to show spatial distribution across the globe. This could be done digitally on Scribble Maps or students could create their own Google Map. ▪ Students complete questions 1--6 in the activities box. 4.2 HUMAN USE OF THE MOUNTAIN ENVIRONMENT ▪ Discuss with students how different mountain regions are valued around the world. ▪ Read through 'Mountain people and cultures' and 'Mountain landscapes in the Dreamtime' in section 4.2. ▪ Discuss the Dreamtime stories with the students. What is similar or different with each story? What does this tell us about how Aboriginal Australians value these mountain landscapes? ▪ Students could research other Dreamtime stories of different mountain landforms and discuss how they explain their formation. ▪ Read 'Sacred and special places' in section 4.2 and discuss the different	visited one of the mountain ranges seen on Google Earth. Adjustment: Students use Google Maps to virtually climb Mount Kosciusko and complete the 'Vegetation identification' worksheet. Adjustment: Students label a diagram showing the cross-section and vegetation changes of a mountain ecosystem. Extension: Students write a report on the how the scale of the world mountains differs across continents. Adjustment: Use worksheet 4.4 'Slopes of my area' worksheet to study different slopes within the school grounds. Adjustment: Students complete scaffolded worksheet 4.5 'Value of mountains for different people'. Extension: Students construct a Venn diagram to show the similarities and differences between the mountain environment and the environment in which they live. Extension: Students could conduct some research on the formation of the Glasshouse Mountains and Blue Mountains. Page 52 of the *Jacaranda Atlas 8th Edition* provides information on the Blue Mountains. Further research would include the formation of the Three Sisters. How do these

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value for different people	values that people place on mountains. ▪ Students complete scaffolded worksheet 4.5 'The value of mountains for different people' in the eBookPLUS. ▪ Use section 4.2 to explain how the natural environment has been changed by human activity. Construct an annotated field sketch showing changes made by humans. Refer to the 'Constructing a field sketch' SkillBuilder in the eBookPLUS. ▪ Use section 4.2 to have students make a list of the type of people, work and recreation that may occur in the mountain environment. Students can use graphic organisers or electronic programs, such as bubbl.us, to complete their list. Students may also collect a variety of photographs. ▪ Students watch the interactivity 'Break down!' (int-3101) in chapter 1 of the eBookPLUS to review how weathering and erosion shape the land. <u>Fieldwork opportunity</u> Read through the 'Focus on fieldwork' feature and go around the school ground or slopes nearby to use a handmade clinometer to calculate the slopes. This activity can be used to show how slopes are used in the local area and if there are any impacts on the slopes because of human interactions, such as erosion. Use the questions in the 'Focus on fieldwork' feature to guide the inquiry.	explanations compare with the Dreamtime stories? Extension: Students choose one of the Hindu or Buddhist beliefs linked to mountains, then use the internet to find out details of this connection. They should present their information as a print or electronic brochure. Extension: Students research where their water supply comes from. Which mountains, if any, are located near their water supply? Extension: Students draw a consequence chart to show how and why mountains are important for water supply; then add information to their chart about what might happen if this was reduced for some reason, for example through climate change. Extension: Students use section 4.2 to write a report of how mountains can have spiritual or cultural significance. Visit *Jacaranda myWorldAtlas* to learn more about Uluru.

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Changing landscapes Students: • investigate the human causes and effects of land degradation, for example: (ACHGK051) ⇒ identification of the ways people utilise and change landscapes ⇒ description of the impact of a range of human activities on landscapes ⇒ examination of ONE type of landscape degradation including its spatial distribution, causes and impact	Students may wish to use worksheet 4.4 'Slopes of my area' in the eBookPLUS to help complete the activity. Teachers may wish to use this information to calculate the gradient of the slopes. **4.3 WHAT ARE THE FORCES THAT FORM MOUNTAINS?** ▪ Using the map provided in section 4.3, students mark the plate margins and names onto a blank world map. ▪ Watch the 'Drifting continents' video in the eBookPLUS explaining how continents move. Based on direction, draw a sketch to show what the world's continents might look like many years into the future. ▪ Use the 'Dynamic Earth' weblink in the eBookPLUS to explore the Earth's structure and the movement of the continental plates. Work through the activities and complete the challenges to investigate the movement beneath the Earth's surface. ▪ Students describe the different types of plate margins, either in writing or videotape news-style segments. Students can use the knowledge gained from the 'Drifting continents' video and the 'Dynamic Earth' weblink.	Extension: Students read the explanation of subduction in section 4.3. Use an Oreo cookie, or other cream-filled biscuit, to illustrate the concept of subduction. Students can then write a procedure report demonstrating their understanding of the process after completion of the Oreo activity. Adjustment: Students complete scaffolded worksheet 4.6 'Movement of continental plates'. Extension: Students complete the 'Grand peaks' interactivity (int-3110) in section 4.4 of the eBookPLUS, which provides information on different types of mountains. Extension: Refer to the *Jacaranda Atlas 8th Edition* to look at further examples of mountain formations, such as the Mt Buffalo granite plateau (p. 60), Wilpena Pound (p. 68), Ural Mountains (p. 110) and the Grand Canyon (p. 132).

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	4.4 HOW DO DIFFERENT TYPES OF MOUNTAINS FORM? ▪ Students use the information in section 4.4 to learn how each of the mountain types is formed. Use play dough to create each landform and write a brief explanation of how each is formed. ▪ Use the interactive activity 'Mountain builders' (int-3109) in section 4.3 of the eBookPLUS to examine how forces shape mountain ranges. ▪ Use the 'Anticline and syncline' weblink in the eBookPLUS to see the formation of fold mountains. ▪ Use the 'Fold mountains' weblink in the eBookPLUS to explain the formation of fault-block mountains. ▪ Use *Jacaranda myWorldAtlas* to locate the Sierra Nevada Range in the US. Students should describe its location and name two national parks in this mountain range. They then choose one, and investigate some of its geographical characteristics. They should present their findings as a PowerPoint, Keynote or Prezi presentation. ▪ Students write an explanation, including diagrams, on how any one of the mountain ranges described in section 4.4 were formed. ▪ Students complete the 'Investigate and predict' activity 9 on the Himalayas.	Adjustment: Use different coloured strips of plasticine to make models of the landforms contained in Figure 3, showing how a collision of continental and oceanic plates differs from a collision of two continental plates. Students are encouraged to have a go at explaining this to a family member. Adjustment: Students use scaffolded worksheet 4.7 to match the diagrams with definitions of mountain types. Adjustment: Students can use scaffolded worksheet 4.7 'Mountain formations' to create a sketch of each mountain formation. Write a small dot point summary outlining how each is formed. Extension: There are several sites and apps that provide up-to-date earthquake data. Provide a digital or print table for students to complete as they access the data each day and keep a record of the events as they occur. Extension: The *Jacaranda Atlas 8th Edition* provides maps of landscape hazards for each continent. Each map provides information about the location of volcanic eruptions, earthquakes and tsunamis. Divide the class into groups and have them investigate these maps for one of the continents. As a further extension, compare these maps to a map of the continental plates, and ask the students to write a statement

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		to describe the relationship.
	4.5 HOW DO EARTHQUAKES AND TSUNAMIS FORM? ▪ Students complete a 'Quick write, quick draw' on the key terms in relation to earthquakes: focus, epicentre and seismic waves. ▪ Discuss the differences in scale and magnitude between each level. ▪ Use the selection of weblinks found in the eBookPLUS to view animations to help explain P- and S-waves. Show these several times so that students understand them. Complete activity 5. ▪ Use *Jacaranda myWorldAtlas* to discover more about the Haiti earthquake or Banda Aceh tsunami. ▪ Study the 'Tsunami animation' weblink in the eBookPLUS, and figure 7. Students use their own words to explain how a tsunami occurs. ▪ Students work through the case study of the Japanese tsunami of 2011. There are many videos of this event online. Students should read and interpret the maps in figures 4 and 5 before they attempt questions 8 and 9. Students can also collect different types of photographs from the internet. ▪ Students use Google Earth and the BBC video available via the 'World's biggest tsunami' weblink in the eBookPLUS to complete question 7. Watch the video about this tsunami and help students to choose	**Extension:** The *Jacaranda Atlas 8th Edition* provides maps of landscape hazards for each continent. Each map provides information about the location of volcanic eruptions, earthquakes and tsunamis. Divide the class into groups and have them investigate these maps for one of the continents. As a further extension, compare these maps to a map of the continental plates, and ask the students to write a statement to describe the relationship. **Adjustment:** Students use scaffolded worksheet 4.8 to label diagrams about how plate movements can cause earthquakes and tsunamis.

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Landscape management and protection Students: • investigate ways people, including Aboriginal and Torres Strait Islander Peoples, manage and protect landscapes, for example: (ACHGK052) ⇒ description of the nature and extent of landscape protection across a range of scales, e.g. locally protected places, national parks, world heritage listing ⇒ examination of management and protection strategies for ONE landscape ⇒ assessment of the contribution of Aboriginal and Torres Strait Islander Peoples' knowledge to the use and management of an Australian landscape or landform	appropriate terms for an internet search. Ask them to describe where Lituya Bay is located and provide them with an atlas to show the location. After listening to the eyewitness event, discuss the scale of this tsunami. How does it compare with the Japanese tsunami? What were the differences? Students use images and videos to write and record their own new segment on the Japanese tsunami. ▪ Students design a web-based pamphlet to help Australians survive a potential tsunami. 4.6 WHAT ARE THE IMPACTS OF EARTHQUAKES AND TSUNAMIS? ▪ Students plot the 10 worst earthquakes and tsunamis on a blank world map or use ScribbleMaps to complete this task. Students use figure 1 and *Jacaranda myWorldAtlas* as a guide. ▪ Students investigate one earthquake or tsunami that has occurred in the last five years and give details about the impact and the recovery. ▪ Students construct a mind map to show the social, economic and environmental impacts of earthquakes/tsunamis. Examine a series of photos and ask students to categorise the impacts. ▪ Access the 'Liquefaction' weblink in the eBookPLUS, showing liquefaction in Tokyo. Show this on a large screen in the classroom. Discuss.	Adjustment: Students use scaffolded worksheet 4.9 to construct a table of the impacts of earthquakes and tsunamis.

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Geomorphic hazards Students: • investigate ONE contemporary geomorphic hazard including causes, impacts and responses, for example: (ACHGK053) ⇒ description of the spatial distribution of the disaster ⇒ explanation of geomorphic processes causing the disaster	SKILLBUILDER: DRAWING A SIMPLE CROSS-SECTION Use the SkillBuilder eLesson and interactivity in the eBookPLUS to complete a simple cross-section. SKILLBUILDER: INTERPRETING AN AERIAL PHOTO Use the SkillBuilder eLesson and interactivity in the eBookPLUS to complete a simple interpretation of an aerial photo. 4.7 HOW ARE VOLCANIC MOUNTAINS FORMED? ▪ The 'Hawaii's hotspot' weblink in the eBookPLUS provides an excellent animation to show the Hawaiian islands moving over a hotspot. Explain that the northernmost islands are the oldest, and are either less active or extinct because they have moved away from the hotspot. What is predicted to happen in the future? ▪ Conduct research to find out information about the Cotopaxi volcano, which is located in the Andes. ▪ Use Google Earth to zoom in on the islands in the Mid-Atlantic Ridge, as	Adjustment: Students use scaffolded worksheet 4.10 to draw diagrams to show how volcanic movements create different landforms. Extension: Investigate volcanic landforms in Australia. These could be the volcanic plains in Western Victoria, the Tweed volcano in north-east New South Wales, the Warrumbungles in New South Wales, or the Glasshouse Mountains in Queensland. Conduct research on when these were active and how they formed. Extension: Read about Indonesia's volcanoes on page 98 of

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and its impacts ⇒ examination of the responses of individuals, groups and government to the impact of the disaster ⇒ discussion of management strategies to reduce the future impact of similar natural hazard events including the role of technology in monitoring and predicting geomorphic hazards	listed in the text. Students are to provide the absolute location (latitude and longitude) and the relative location of these islands and the ridge (space); therefore, they should be able to identify the interconnection. ▪ Go to *Jacaranda myWorldAtlas* and read the information about Hawaii's hotspot and the formation of the islands. ▪ Draw sketches to illustrate changes in Iceland and Africa. Complete the 'Predict' questions found in the eBookPLUS. ▪ Refer to *Jacaranda myWorldAtlas*. Examine a map of Africa and look at the shape of the island of Madagascar. Ask students to try to imagine fitting this island back into the mainland. Using plate tectonic terms, they should write a paragraph to describe how Madagascar's location has changed over time. **4.8 HOW DID MOUNT TARANAKI FORM?** ▪ Revise information about contour lines in the 'Reading contour lines on a map' SkillBuilder in chapter 2. Discuss how the shape of the contours reflects the shape of the volcano. ▪ Complete the 'Drawing simple cross-sections' SkillBuilder. Set aside one lesson to do this and allow students time to practise the skill. Once this is completed, they can complete the cross-section from A to B on this map. **4.9 WHAT IS THE ANATOMY OF A VOLCANO?**	the *Jacaranda Atlas 8th Edition*. Extension: Use the information on pages 90--91 of the *Jacaranda Atlas 8th Edition* to discover more landform features created by volcanoes. Extension: Read about geysers and hot springs, another feature of volcanic regions, on page 140 of the *Jacaranda Atlas 8th Edition*. Conduct research about the potential super-eruption that some scientists think might occur at Yellowstone National Park. Extension: Students refer to the Investigating Topic on lahars in *Jacaranda myWorldAtlas* and complete the study activities. Adjustment: Students use scaffolded worksheet 4.11

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	▪ Examine figure 1 ‘The anatomy of a volcano’. Create a simplified diagram of a volcano, labeling all the main components. Describe, in detail, the changes to the environment that volcanic eruptions can cause. ▪ Students use the internet to find pictures of volcanic landforms and materials. These include crater lakes, geysers, calderas, fields of ash deposits, volcanic plugs, lava tubes, hummocks and pumice. They could also find pictures of the two types of lava: a'a and pahoehoe. They should use their pictures to put together a field guide to volcanic landforms. Each page should contain a picture of the landform, a brief description and a place where it could be found — sometimes they are tourist attractions. **4.10 HOW DO VOLCANOES AFFECT PEOPLE?** ▪ Examine figure 3 ‘Predicting volcanic eruptions’. Create a mind map of the methods used to predict eruptions. ▪ Examine *Jacaranda myWorldAtlas* and watch the video about Mount Vesuvius. ▪ Complete activities 1–6. ▪ Use the ‘Timetoast’ weblink in the eBookPLUS to create a timeline of the worst volcanic eruptions. ▪ For question 3, divide the class into groups. Each group should be given one region of the world: Asia, Europe, Africa, North America or South America. They should then use the *Jacaranda Atlas 8th Edition* and look	‘Structure of a volcano’ to label the parts of a volcano. Extension: Refer to *Jacaranda myWorldAtlas*. Examine maps showing world population density, settlements and the location of volcanoes. Students write statements that describe the relationship between population density, settlements and volcano locations. How does this relate to people's risk? Extension: Writing Task — Explain how mountain landscapes determine how land is used and managed. Students use the Extended writing task scaffolded worksheet to complete the extended response.

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	at the 'Hazards' and 'Human features' maps for their region. The 'Hazards' maps show the location of earthquakes, volcanoes and tsunamis, and the 'Human features' maps show population density and settlements. Each group should write two statements about the relationships shown in these maps. The groups should report their findings to the wider class and write a summary statement about the overall relationship.	