# **AH Level 1 Course Outline 1**

# Guide to aid teacher planning only - designed to be printed or viewed in A3, landscape.

## Purpose

This example Course Outline has been produced to help teachers and schools understand the new NCEA Learning and Assessment matrices and could be used to create a year-long programme of learning. It will give teachers ideas of how the new standards might work to assess the curriculum at a particular level.

## Agricultural Production Systems Focus

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| **Significant Learning** | **Learning activities and assessment opportunities**Assessment for learning happens often throughout the year. Evidence may also be collected for summative assessment. | **Duration** Total of 32 weeks |
| Investigate the relevance of agricultural and horticultural production to people and locationUnderstand that primary industries are driven by market demands and user preferences which can be responded to through service, leadership, and responsibility, for example kuleanaUnderstand that pūtake is influenced by interrelated economic, social, cultural, and environmental reasonsExplore how cultural values impact our decisions about our environmentInvestigate how values and practices influence how people interact with the environmentExplore roles and career pathways throughout the primary sector | **Unit 1: Pūtake and location****Introduction to agriculture in Aotearoa New Zealand**Explore the interrelationships and [whakapapa](https://www.sciencelearn.org.nz/videos/258-whakapapa-and-biodiversity) of living things in a production system to recognise that no living thing exists alone, but rather is part of an interconnected system that includes soils, climate and people and how agriculture contributes to the lives of groups of people* Identification of main agricultural industries in Aotearoa New Zealand
* Economic importance of different industries
* Ranking of industries in terms of $/ha
* [Careers](https://www.careers.govt.nz/plan-your-career/get-ideas-for-your-career/vocation-nation/?gclid=CjwKCAjwoZWHBhBgEiwAiMN66UGZiyqv__AozfspCMXTeVx5L0YwhrwYU1-dK8kUj7Wp1FShyBPo-hoCo5EQAvD_BwE&gclsrc=aw.ds) and [job opportunities](https://www.opportunitygrowshere.nz/?gclid=CjwKCAjwoZWHBhBgEiwAiMN66Qhc_5HaOZptn3cfbjPr019d20mzGVediRTOEY7sPqiIJsyzgaBk_RoCp1wQAvD_BwE#industries) in different industries – how they contribute to regions and Aotearoa New Zealand as a whole.

**Māori and European settlement patterns** * Where and when different groups settled in Aotearoa New Zealand – including both Māori and European settlers
* Discussion, and information, around why most of Aotearoa New Zealand’s towns and cities are located near waterways
* Opportunity to look at iwi in specific areas – historic and current settlement areas, use of land and reasons why.

**Pūtake of the product*** Look at pūtake and how influences are interrelated (may include social, cultural, technological, environmental, economic or political motivations)
* Explore how cultural values impact our decisions about our environment
* Investigate how values and practices influence how people interact with the environment.

**Changing land use in Aotearoa New Zealand** * Look at ways that agricultural land use has changed in Aotearoa New Zealand in the last 150 years
* Key changes and basic drivers of change (for example, falls in wool prices, increases in global demand for dairy products)
* Discussion around proposed future changes.

**Regional economic land use in Aotearoa New Zealand*** Mapping activity – identification of main regions for production, urban settlements, transport routes, export destinations
* Look at basic climatic information of the regions – sunshine, precipitation, temperature, wind
* Discuss general climate patterns of Aotearoa New Zealand (for example, wetter in the west, drier in the east)
* Map key production systems in each region
* What LUC means, and a discussion/teaching around the different production systems that suit each class and why
* Regional (using local region) mapping activity – different land use classes and production types in these areas/classes
* Explore climatic and physical factors, market demands, workforce, social licence, community, history around the locations of primary production systems.

**Case Studies** * Economic comparisons – for example, Ātihau-Whanganui, Ngāi Tahu, Pāmu (LandCorp), Molesworth Station
* Opportunity to use local connections and visit different production systems in your region
* Regional Economic Case Studies – for example, why Taranaki is suitable for [dairy farming](https://www.sciencelearn.org.nz/image_maps/105-dairy-farming-planning-pathways) (focus on climatic, physical, social factors).

**Pastoral farming in Aotearoa New Zealand*** What pastoral farming is and what climatic and physical factors it requires
* Opportunities and challenges of pastoral based farming systems – case study of an agricultural production system of your choice
* Why pastoral farming makes Aotearoa New Zealand unique – consider the positioning of Aotearoa New Zealand products in the global market.

**Learning covered in this part of the unit will contribute to the assessment of AH1.2. Demonstrate understanding of management practices that modify the growing environment in a primary production system****Work produced during this unit may contribute to the assessment of AH1.3 Demonstrate understanding of the pūtake and location of agricultural and horticultural production** | **8 weeks** |
| Learn about the whakapapa and life processes of organisms grown for primary productionExplore how whakapapa and relationships influence life processesExplore how management practices of life processes affect product outcomesExplore how and why primary production management practices are done as they areExplain how manaakitanga influences the choice of management practicesConsider how management of life processes changes over timeAppreciate the ways life processes and growing environments affect end products of primary productionExamine how producers use management practices to modify products to meet the needs of society | **Unit 2: Livestock whakapapa, management practices and their influence****Health and Safety*** Importance particularly when doing practical tasks
* Teachers can go through the Risk Assessment Matrix with students so that they have a thorough understanding

**Calendar of Operations*** Teaching of the [Māori lunar calendar](https://www.youtube.com/watch?v=CGhNt6CCJBc) – [Maramataka](https://akojournal.org.nz/2021/01/13/te-maramataka/)
* Understanding Manaakitanga, or respect for the origins of life, in detailing how and why Aotearoa New Zealand pastoral farming systems are heavily linked to the seasons of the growing region – for example, lambing and calving time and the seasonal cycling of ewes
* Plan, as the year progresses, management practices that should be done for a range of production systems. These would provide the prelude to exploring how management practices affect product outcomes, covered in detail based on the production type and end product of your choosing
* Create a yearly calendar of operations for agricultural production systems – this could be completed throughout the year and could coincide with students completing practical skills, such as vaccinating and body condition scoring.

**Livestock** Whakapapa – explore how the history and significant relevant relationships of agricultural and horticultural products in Aotearoa New Zealand influence their life processes. For example, introduction of Merino sheep, or the Aotearoa New Zealand Perendale.Part 1: Life Processes:*NB: Students should know about a range of livestock to give them a holistic understanding of agricultural livestock production in Aotearoa New Zealand** Digestion – Form and function of monogastric and ruminant animals. This could be an opportunity for a dissection to show differences in anatomy (particularly for ruminant stomachs)
* Reproduction – male and female form and function, basic Mendelian Genetics and relevance to primary production systems
* Growth and development – stages of growth (S-Curve), feed requirements and how these change as animals grow/mature/produce
* Health – including illnesses, parasites (internal and external), diseases, deficiencies, and the different impacts on production
* Animal husbandry – flight zones, five freedoms of animal welfare

Part 2: Management practices *NB: Should be taught and selected based on both life processes and the livestock. A range of management practices are expected, and both monogastric and ruminant animal groups should be covered. Selected life processes should explain how management practices modify products to meet the needs of society, and how they change over time.** Example 1: Health – impacts of diseases (like clostridial disease in sheep). Teaching of the management practice of vaccinating including how and why it is done
* Example 2: Young animals require high levels of protein in their feed to grow and develop muscle and bone. Focus on a range of supplementary feeds (such as chicory, clover or ryegrass) and get students to select the best feed types for the animal's life stages.

Part 3: Product outcomes*Students should understand and appreciate how management practices, growing environments and life processes change over time and affect the production of end products** For example: if the end product was milk, students should be able to link the life processes of digestion, reproduction, and health to the ways that farms manage these to produce high yields of milk
* Consideration of management tools such as [Maramataka](https://akojournal.org.nz/2021/01/13/te-maramataka/) to offer opportunities to include a Māori worldview related to growing. Students would then link each management practice carried out by primary producers to the production of a product for use. This link to the end product is important.

**Learning covered in this part of the unit will contribute to the assessment of AH1.1 Demonstrate understanding of life processes and how they are managed in a primary production system****Learning covered during this unit may contribute to the assessment of AH1.4 Demonstrate understanding of kaitiakitanga and sustainability considerations in agriculture and horticulture** | **8 weeks** |
| Learn about the whakapapa and life processes of organisms grown for primary productionExplore how whakapapa and relationships influence life processesExplore how management practices of life processes affect product outcomesExplore how and why primary production management practices are done as they areExplain how manaakitanga influences the choice of management practicesConsider how management of life processes changes over timeAppreciate the ways life processes and growing environments affect end products of primary productionExamine how producers use management practices to modify products to meet the needs of society | **Unit 3: Modification of Growing Environments.** Part 1: Principles of soil science:To understand how whakapapa and life processes of organisms grown for primary production, consider [soil](https://www.sciencelearn.org.nz/resources/981-visual-soil-assessment) as a living sponge of interconnected [microorganisms](https://www.sciencelearn.org.nz/resources/975-growing-soil-microbes), micro and macro invertebrates and home to living things [starting with Papatūānuku.](https://www.youtube.com/watch?v=AnOWHeJNbZM) To explore how whakapapa and relationships influence life processes, consider the whenua of soils and their connection to atua:* Learn about [soil texture](https://www.sciencelearn.org.nz/resources/919-soil-farming-and-science-introduction) (sand, silt, clay, and texture triangles) and structure
* Investigate the properties of soil, and the impact they have on pasture/crop growth.
	+ Chemical properties – nutrient retention, nutrient status and pH
	+ Physical properties – water holding capacity, temperature, aeration and drainage
	+ [biological](https://www.sciencelearn.org.nz/resources/895-observing-soil-microbes) [properties of soil](https://www.sciencelearn.org.nz/resources/970-soil-names) – organic matter, micro-organisms, pests and diseases.
* Complete soil experiments and practical learning to reinforce learning
	+ Drainage of different soil types
	+ Texture by sedimentation
	+ Dig a hole and look at soil profiles and organic matter.

Part 2: Life Processes:* To investigate key plant growing processes, how aspects of soil science impact the effectiveness of these processes, and how life processes and growing environments affect end products over time, understand:
	+ Photosynthesis
	+ Respiration
	+ Transpiration (nutrient uptake).
* Grazing and pasture management
	+ Grazing systems used on farms – rotational grazing, break feeding, set stocking etc
	+ Pasture growth process – tillers etc.
* Soil health (micro-organisms, organic matter, and information around good/poor quality soil)
* Nutritional values of a [pasture](https://www.sciencelearn.org.nz/images/4537-new-zealand-pasture-species)/crop and how they link to livestock systems:
	+ Energy requirements of growing animals
	+ Protein in feed and importance to muscle/bone growth.

Part 3: Modification of Growing Environment: * To appreciate how life processes and growing environments affect end products of primary production, and how producers use management practices to modify products investigate the management practices farmers use to modify soils for cultivation and why they are done as they are:
	+ fertiliser application: observe fertiliser application/soil testing on a local farm, carry out experiments investigating the impact of different nutrients on grass growth
	+ drainage: research different drainage systems, set up a mini-novaflow system and observe how it impacts water levels in soil
	+ grazing systems: set up a temporary electric fence, make a mini-pasture and investigate the impact of different ‘grazing systems’ on its growth over a time period
	+ crop/pasture rotations: bring in an agronomist as a guest speaker to discuss rotations, and planting of new crops/pastures
	+ cultivation: carry out small scale cultivation in a garden or horticulture plot, looking at how different techniques (minimum tillage, regenerative agriculture etc) affect pasture performance.
* To explore how management practices of life processes affect product outcomes, link the management practice to how it has an impact on the properties of soil, and plant growing processes. For example:
	+ irrigation and photosynthesis: set up different punnets of pasture with different water application rates and measure growth of a period of weeks
	+ soil temperature (could be linked to aeration, adding organic matter etc): grow crops in different temperatures and look at the different growth rates
	+ create mind maps to show the links between the management practice, soil properties and plant growth
	+ visit a local farm and look at ways soil and water are modified in that growing environment.
* To explore the concept of manaakitanga and how it influences the choice of management practices:
	+ define manaakitanga, and what it means in a Māori worldview
	+ invite local iwi to present significance of manaakitanga to agricultural and horticultural production
	+ discuss the idea of reciprocity and its significance to agricultural systems
	+ investigate the relationships beef farmers need to foster to optimise production (soil and pasture, pasture and cattle etc.)
	+ visit a local Māori farm and see manaakitanga in practice.

**Learning covered in this part of the unit will contribute to the assessment of AH1.2 Demonstrate understanding of management practices that modify the growing environment in a primary production system.****Learning covered during this unit may contribute to the assessment of AH1.4 Demonstrate understanding of kaitiakitanga and sustainability considerations in agriculture and horticulture.**  | **8 weeks** |
| Recognise the importance of kaitiakitanga for production systems Recognise that mātauranga drives stakeholder views in kaitiakitanga decision makingRecognise different stakeholder views and external influences on the decisions made in production systemsAppreciate how management practices impact on the environment Explore sustainability considerations, including environmental, social, cultural, and economic considerations for long-term productionConsider the impacts of management practices on sustainability considerations | **Unit 4: Environmental Sustainability and Kaitiakitanga** Part 1: Introduction to the Environment * define what makes up the environment (Aotearoa New Zealand or Pacific areas) - air, water land/soil and living organisms
* revisit the concept of *manaakitanga* – to recognise its significance, explore the interrelationships and connections between aspects of the environment (eg healthy waterways are needed for the presence of freshwater organisms)
* [importance of land and water](https://www.learnz.org.nz/water172/bg-standard-f/people-and-water) - Māori (*tapu, mauri,* [*kaitiakitanga*](https://www.sciencelearn.org.nz/videos/1940-kaitiakitanga)etc) and Pacific (*va*) values around land and water
* practical learning experiences: for example, stream study in a local environment looking at water quality changes, estuary looking at density of organisms, soil comparison in different environments.

Part 2: [Use of land and waterways](https://www.sciencelearn.org.nz/image_maps/91-land-use-impacts-on-waterways)* [Community](https://www.rph.org.nz/public-health-topics/nutrition/community-gardens/) use of land and [waterways](https://www.sciencelearn.org.nz/videos/1989-rivers-and-us-monitoring-our-waterways) - traditional Māori and/or Pacific use, current recreational use, and values (*tapu, mauri, kaitiakitanga, va*) around waterways
* Ways that [primary producers use](https://www.sciencelearn.org.nz/videos/1947-stock-access-to-waterways) land and waterways – and the ways that this use is significant to regions - culturally, economically, and socially.

Part 3: Environmental impacts of agricultural and horticultural production* Identification of a range of management practices carried out on production systems and their impact - should focus on positive management ([regenerative agriculture](https://www.youtube.com/watch?v=sGGzmKPimq8), [riparian planting)](https://www.youtube.com/watch?v=YNOExshBCcI) and negative impacts (water and soil quality issues) as well as their mitigation (erosion of hill country is helped through planting of poplar poles)
* Discussion of local issues - visit a local primary production system and list/discuss management practices and how they are mitigated or managed
* Guest speakers - local growers, regional councils - either visits or video conferencing options could be used.

Part 4: Stakeholder(s), and perspectives, around environmental impacts * Define what a stakeholder is, with examples for local or regional production systems – for example, debates and issues around Ruataniwha Dam in Hawke’s Bay, dairy farming and degradation of [Selwyn River](https://www.stuff.co.nz/environment/117963750/where-we-used-to-swim-the-turning-point-for-canterburys-selwyn-river) in Canterbury
* Discuss reasons why people hold different viewpoints - beliefs, values and perspectives – bias and how this impacts [thoughts and actions](https://www.sciencelearn.org.nz/resources/3030-dairy-farming-and-climate-change-a-context-for-learning)
* Who should have the final say in decision making around [environmental issues](https://www.sciencelearn.org.nz/videos/1940-kaitiakitanga) in Aotearoa New Zealand?
* Use different primary and secondary sources to identify values and perspectives stakeholders have - and the way this informs action/response - in a global and regional setting

Part 5: Case Studies: Exam Focus - Dairy Production***(n.b. this focus will be dependent on the context given for the exam)**** Define kaitiakitanga, and what it, and sustainability, means in a dairy farming context.
* Brainstorm potential impacts [dairy farming](https://www.sciencelearn.org.nz/image_maps/105-dairy-farming-planning-pathways) could have on the environment - land/soil, water, [air](https://www.sciencelearn.org.nz/images/4574-te-ao-maori-perspectives), micro-organisms
* Research and investigate ways that farmers minimise their environmental impact.
	+ consider the long-term social, environmental, economic and cultural impacts of their management practices.
* Explore current environmental legislation dairy systems must comply with. eg fertiliser application, effluent systems, fencing and planting of waterways.
	+ consider the social, environmental, economic and cultural impacts of this legislation.
* Choose a locally significant agricultural or horticultural production system and investigate kaitiakitanga in that setting.

**Work produced as part of this unit will contribute to the formative and summative assessment of AS 1.4 – Demonstrate understanding of kaitiakitanga and sustainability considerations in agriculture and horticulture** | **8 weeks** |