

Unit Description [copy from syllabus]	Unit Objectives [copy from syllabus]
<p>Module 1: Water This module explores the fundamentals of safe water supply, including water chemistry, water treatment, catchment studies, water health, filtering processes, the meteorological causes of water shortage in Australia and possible water provision scenarios.</p> <p>Field work: 5 hours</p> <p>Covering the following electives and disciplines:</p> <p>Electives</p> <ul style="list-style-type: none"> • Health and lifestyles • Environments <p>Disciplines</p> <ul style="list-style-type: none"> • Chemistry • Earth and Environmental Science <p>Underpinning factors</p> <ul style="list-style-type: none"> • applied learning • community connections • core skills for work • literacy • numeracy. <p>Module 2: Environmental study This module expands on knowledge and skills developed in Module 1 to allow students to gain a deeper understanding of the impact they have on the world around them. This will be done by investigating a local waterway, analysing human and natural impacts.</p> <p>Field work: 5 hours</p> <p>Covering the following electives and disciplines:</p> <p>Electives</p> <ul style="list-style-type: none"> • Environments <p>Disciplines</p>	<p>Scientific literacy and working scientifically</p> <ul style="list-style-type: none"> • C1.1 Scientific literacy • C1.2 Scientific methodology • C1.3 Thinking scientifically <p>Workplace health and safety</p> <ul style="list-style-type: none"> • C2.1 Workplace safety • C2.2 Risk assessment • C2.3 Safe working procedures <p>Communication and self-management</p> <ul style="list-style-type: none"> • C3.1 Communication • C3.2 Self-management • C3.3 Problem-solving

- Biology
- Chemistry
- Earth and Environmental Science

Underpinning factors

- applied learning
- community connections
- core skills for work
- literacy
- numeracy.

Assessment Plan:				
Task: FORMATIVE	%	Objectives to be assessed	Conditions	Date
<p>Collection of work - Complete a series of tasks related to the topic of water quality.</p> <ul style="list-style-type: none"> • Spoken component • Test component • Performance component 	Formative	<ul style="list-style-type: none"> • Knowing and understanding • Analysing and applying • Planning and evaluating 	<p>Oral presentation and interview questions acting as a local political candidate delivering a plan to tackle the decline in water quality in the community. 1.0–2.0 minutes</p> <p>Series of short items requiring sentence or short paragraph responses based on water chemistry and filtration. 20.0–30.0 minutes</p> <p>Perform a series of laboratory tests including calibration of equipment to test water quality</p>	T1 Weeks 7-9
Task: FORMATIVE	%	Objectives to be assessed	Conditions	Date
<p>Investigation Investigate a stream's health by travelling downstream and using various tests at various points. Analyse the findings, assess the conditions surrounding them and write a report providing conclusions/ recommendations on the stream's overall health</p>	Formative	<ul style="list-style-type: none"> • Knowing and understanding • Analysing and applying • Planning and evaluating 	<p>Written response Report on the health of a local stream. Students collect the data in groups and complete the report individually. 500–800 words</p>	T2 Weeks 3-5

Monitoring and Reviewing:			
Strategies for Monitoring Student Progress	Date	Planned Reviews at Key Intervals	Date
<p>Module 1 In class practice questions Test and performance components Spoken component</p>	<p>Every lesson Week 7, T1 Week 9, T1</p>	<p>Checking progress Checking progress</p>	<p>Week 6, T1 Week 8, T1</p>
<p>Module 2 In class practice questions Formative assessment Investigation</p>	<p>Every lesson Week 2, T2 Week 5, T2</p>	<p>Checking progress Checking progress</p>	<p>Week 2, T2 W3&4, T2</p>

Underpinning Factors:			
Guaranteed Vocabulary:		Literacy Skills	21 st Century Skill/s
MODULE 1 Salinity Particle Filtration pH Nutrients Nitrates Nitrites Phosphates Dissolved oxygen Ammonia Microorganisms Contamination Pollutants Stagnant Algal bloom Critical shortage Restrictions	MODULE 2 Water catchment Nutrients Nitrates Nitrites Phosphates Ammonia Dissolved oxygen Transect Species diversity Microorganisms Invertebrate Vertebrate Weir Fish gate Nutrient cycling	Summarising texts Vocabulary knowledge Accurately recording data	<ul style="list-style-type: none"> • collaboration and teamwork – participating and contributing • critical thinking – analytical thinking, reflecting and evaluating, reasoning • creative thinking – identifying alternatives communication – effective written communication • Use of global examples
		Numeracy Skills Reading values from scientific instruments Interpreting measurement units Calculating averages and differences between values Calculating percentages	Cognitive Verbs Analyse Assess Calculate Classify Compare Demonstrate Explain Justify Propose Recall Recognise Summarise Understand

TEACHING AND LEARNING PLAN:

Hours/Weeks	Unit Objectives/Core Concepts and Ideas	Subject Matter/Knowledge Understanding and Skills (pg 18 Syllabus)	Learning Experiences [reflecting DQ 3, 4, 5 and 6]	Possible Resources
2	C1.1 Scientific literacy	Relevant facts and concepts of Biology, Chemistry, Earth and Environmental Science or Physics that explain various phenomena in different contexts	<u>Importance of water to society</u> Introductory activity (individual review) <ul style="list-style-type: none"> • Students recall the importance of water for survival. Teacher-led activity (support with worksheet and online activity)	Worksheets <ul style="list-style-type: none"> • Online activity <ul style="list-style-type: none"> • Practicals <ul style="list-style-type: none"> •

	C1.3 Thinking scientifically	<p>ethical implications of science research and technology</p> <p>evidence-based conclusions (claims that fit with data, information and evidence)</p>	<ul style="list-style-type: none"> Students recognise the requirements of water for survival, hygiene, production of resources etc. Lead discussion with direct questioning. Students complete online activity and consolidate learning with teacher generated worksheet questions on cell survival. <p>Teacher-led activity (support with video and group activity)</p> <ul style="list-style-type: none"> Explain active transport using the example of glucose absorption in the small intestine. Support with the video <i>Transport across Cell Membranes</i>. Consolidate: Use a jigsaw group activity (expert group uses a different organ or process) to consolidate student learning about active transport. 	<p>Videos</p> <ul style="list-style-type: none">
2	<p>C1.1 Scientific literacy</p> <p>C1.2 Scientific methodology</p> <p>C1.3 Thinking scientifically</p>	<p>Relevant facts and concepts of Biology, Chemistry, Earth and Environmental Science or Physics that explain various phenomena in different contexts</p>	<p><u>Sources of water</u></p> <p>Introductory activity (individual review)</p> <ul style="list-style-type: none"> <p>Teacher-led activity (support with worksheet and online activity)</p> <ul style="list-style-type: none"> Students recognise <p>Practical activity (groups)</p> <ul style="list-style-type: none"> Students investigate <p>Practical demonstration</p> <ul style="list-style-type: none"> Students use <p>Teacher-led activity (support with video and group activity)</p> <ul style="list-style-type: none"> Explain Consolidate: Use 	<p>Worksheets</p> <ul style="list-style-type: none"> <p>Online activity</p> <ul style="list-style-type: none"> <p>Practicals</p> <ul style="list-style-type: none"> <p>Videos</p> <ul style="list-style-type: none">

			<p>Teacher-led activity (support with animated slide show and graphic organiser)</p> <ul style="list-style-type: none"> • Students understand <p>Consolidate: Direct students to</p> <p>Practical activity (pairs)</p> <p>Students predict</p>	
3 (1+2)	<p>C1.1 Scientific literacy</p> <p>C1.2 Scientific methodology</p> <p>C1.3 Thinking scientifically</p>		<p><u>Water chemistry</u></p>	
5 (2+3)	<p>C1.1 Scientific literacy</p> <p>C1.2 Scientific methodology</p> <p>C1.3 Thinking scientifically</p> <p>C2.1 Workplace safety</p> <p>C2.2 Risk assessment</p> <p>C2.3 Safe working procedures</p>		<p><u>Water quality testing</u></p> <p>Introductory activity (individual review)</p> <ul style="list-style-type: none"> • <p>Teacher-led activity (support with worksheet and online activity)</p> <ul style="list-style-type: none"> • Students recognise <p>Practical activity (groups)</p> <ul style="list-style-type: none"> • Students investigate <p>Practical demonstration</p> <ul style="list-style-type: none"> • Students use <p>Teacher-led activity (support with video and group activity)</p> <ul style="list-style-type: none"> • Explain • Consolidate: Use <p>Teacher-led activity (support with animated slide show and graphic organiser)</p> <ul style="list-style-type: none"> • Students understand <p>Consolidate: Direct students to</p> <p>Practical activity (pairs)</p> <p>Students predict</p>	<p>Worksheets</p> <ul style="list-style-type: none"> • <p>Online activity</p> <ul style="list-style-type: none"> • <p>Practicals</p> <ul style="list-style-type: none"> • <p>Videos</p> <ul style="list-style-type: none"> •
6 (5+1)	<p>C1.1 Scientific literacy</p>		<p><u>Water filtration and treatment techniques</u></p> <p>Introductory activity (individual review)</p>	<p>Worksheets</p> <ul style="list-style-type: none"> •

	<p>C1.2 Scientific methodology C1.3 Thinking scientifically C2.1 Workplace safety C2.2 Risk assessment C2.3 Safe working procedures C3.1 Communication C3.2 Self-management C3.3 Problem-solving</p>		<ul style="list-style-type: none"> • <p>Teacher-led activity (support with worksheet and online activity)</p> <ul style="list-style-type: none"> • Students recognise <p>Practical activity (groups)</p> <ul style="list-style-type: none"> • Students investigate <p>Practical demonstration</p> <ul style="list-style-type: none"> • Students use <p>Teacher-led activity (support with video and group activity)</p> <ul style="list-style-type: none"> • Explain • Consolidate: Use <p>Teacher-led activity (support with animated slide show and graphic organiser)</p> <ul style="list-style-type: none"> • Students understand <p>Consolidate: Direct students to</p> <p>Practical activity (pairs)</p> <p>Students predict</p>	<p>Online activity</p> <ul style="list-style-type: none"> • <p>Practicals</p> <ul style="list-style-type: none"> • <p>Videos</p> <ul style="list-style-type: none"> •
<p>6 (3+3)</p>	<p>C1.1 Scientific literacy C1.3 Thinking scientifically C2.1 Workplace safety C3.2 Self-management C3.3 Problem-solving</p>	<p>(3+3)</p>	<p><u>Impacts of unclean water / Clean water shortage impacts to society</u></p> <p>Introductory activity (individual review)</p> <ul style="list-style-type: none"> • <p>Teacher-led activity (support with worksheet and online activity)</p> <ul style="list-style-type: none"> • Students recognise <p>Practical activity (groups)</p> <ul style="list-style-type: none"> • Students investigate <p>Practical demonstration</p> <ul style="list-style-type: none"> • Students use <p>Teacher-led activity (support with video and group activity)</p> <ul style="list-style-type: none"> • Explain • Consolidate: Use 	<p>Worksheets</p> <ul style="list-style-type: none"> • <p>Online activity</p> <ul style="list-style-type: none"> • <p>Practicals</p> <ul style="list-style-type: none"> • <p>Videos</p> <ul style="list-style-type: none"> •

			<p>Teacher-led activity (support with animated slide show and graphic organiser)</p> <ul style="list-style-type: none"> • Students understand <p>Consolidate: Direct students to</p> <p>Practical activity (pairs)</p> <p>Students predict</p>	
18 (9+9)	<p>C1.1 Scientific literacy</p> <p>C1.2 Scientific methodology</p> <p>C1.3 Thinking scientifically</p> <p>C2.1 Workplace safety</p> <p>C2.2 Risk assessment</p> <p>C2.3 Safe working procedures</p> <p>C3.1 Communication</p> <p>C3.2 Self-management</p> <p>C3.3 Problem-solving</p>		<p><u>Communication of skills and concepts (assessment)</u></p> <p>Introductory activity (individual review)</p> <ul style="list-style-type: none"> • <p>Teacher-led activity (support with worksheet and online activity)</p> <ul style="list-style-type: none"> • Students recognise <p>Practical activity (groups)</p> <ul style="list-style-type: none"> • Students investigate <p>Practical demonstration</p> <ul style="list-style-type: none"> • Students use <p>Teacher-led activity (support with video and group activity)</p> <ul style="list-style-type: none"> • Explain • Consolidate: Use <p>Teacher-led activity (support with animated slide show and graphic organiser)</p> <ul style="list-style-type: none"> • Students understand <p>Consolidate: Direct students to</p> <p>Practical activity (pairs)</p> <p>Students predict</p>	<p>Worksheets</p> <ul style="list-style-type: none"> • <p>Online activity</p> <ul style="list-style-type: none"> • <p>Practicals</p> <ul style="list-style-type: none"> • <p>Videos</p> <ul style="list-style-type: none"> •

YEAR-TO-YEAR INFORMATION:

Differentiation [for small groups or individuals]:

- Include increased scaffolding where needed
- Plan open-ended lesson tasks that require higher order thinking skills for more capable students
- Make use of heterogeneous collaborative groups to gain different perspectives
- Attend to any individual work plan requirements

- Collect and analyse student profiles for literacy and numeracy needs

LESSON SEQUENCES

MODULE 1

WEEK	LESSON 1	LESSON 2	LESSON 3
T1 W1		The importance of water in society <ul style="list-style-type: none"> • The value of freshwater • Usage rates and types • Impacts of shortages 	The water cycle <ul style="list-style-type: none"> • How we get freshwater (water cycle) • How water chemistry changes with rain and evaporation
T1 W2	PRACTICAL: Detecting water quality – looking through microscopes and basic chemical tests	Rainfall reliability <ul style="list-style-type: none"> • Goyder’s line • Climate change • Strategies of water capture Strategies of water conservation	PRACTICAL: Water filtration methods and detection of improvement <ul style="list-style-type: none"> • Water chemistry safe levels • Individual methods e.g. Survival straws, solar sills, charcoal sieves
T1 W3	PRACTICAL: using basic techniques to purify water	Water filtration and safety for cities <ul style="list-style-type: none"> • Large scale filtration techniques • Legal issues Workplace safety in purification plants	Historical cities and collapse due to lack of water
T1 W4	PRACTICAL: Declaring water safe – using laboratory equipment	How cities can cope with water shortages <ul style="list-style-type: none"> • Case studies of urban and rural examples e.g. Cape Town 	How cities can cope with water shortages Why might there be wars over water Case studies of urban and rural examples e.g. Cape Town
T1 W5	PRACTICAL: Plan a city’s water supply	EXCURSION to water treatment plant	Reflection on techniques used at water treatment plant Innovative methods of water treatment/testing around the world
T1 W6	TEST <ul style="list-style-type: none"> • Answer short questions • Test water samples 	Assessment – plan for resolving decline in water quality	Assessment – plan for resolving decline in water quality
T1 W7	Assessment – plan for resolving decline in water quality	PRESENTATIONS	PRESENTATIONS

MODULE 2

WEEK	LESSON 1	LESSON 2	LESSON 3
T1 W8	Water chemistry along riverways <ul style="list-style-type: none"> • Salinity • Nitrates • Water flow 	Sources of pollution along rivers <ul style="list-style-type: none"> • Fertilisers • Eroded rocks • cattle Techniques for reducing pollution in rivers <ul style="list-style-type: none"> • use of reeds and vegetation 	PRACTICAL: testing river water quality with known pollutants
T1 W10	Impact of dams along riverways <ul style="list-style-type: none"> • water flow rates How humans can reduce their impacts on rivers <ul style="list-style-type: none"> • flow gates • water management 	Water trading and river flows <ul style="list-style-type: none"> • the importance of having enough water in the system to farming/ecology Impacts of poor water quality on wildlife <ul style="list-style-type: none"> • Invertebrates • Vertebrates • Food webs 	PRACTICAL: building and testing a sustainable water system with 3 compartments with different flow rates <ul style="list-style-type: none"> - comparing plant growth rates in compartments of different flow rates
T2 W1	FORMATIVE ASSESSMENT	Research techniques: surveying environments <ul style="list-style-type: none"> • species diversity • vegetation • transects 	PRACTICAL: modelling river management
T2 W2	Research	Write introduction	FIELD TRIP
T2 W3	Research	Results, Methods	Results, Method
T2 W4	Discussion	Conclusion	DRAFT DUE
T2 W5	Editing	Editing	REPORT DUE