KIRWAN STATE HIGH SCHOOL	SUBJECT: SCIENCE IN PRACTICE	UNIT: 3

Unit Description		Unit Objectives
Module 5: Forensics This module investigates the scientific methods employed in investigating different types of crimes. Students will explore forensic testing such as DNA analysis, determining unknown substances and crash scene investigations. Field work: 5 hours **<u>Covering the following electives and disciplines:</u>** **Electives** • Discovery and change **Disciplines** • Biology • Chemistry • Physics **Underpinning factors** • applied learning • community connections • core skills for work • literacy • numeracy.	**Module 6: Consumer protection** In this module students develop investigation skills by investigating claims made about consumer products, such as foods and drinks, diets, cosmetics, medicines and fitness technology. Students develop skills that form the basis of many STEM careers and are valued by employers. Field work: 0 hours **<u>Covering the following electives and disciplines:</u>** **Electives** • Science for the workplace • Health and lifestyles • Discovery and change **Disciplines** • Biology • Chemistry • Physics' **Underpinning factors** • applied learning • core skills for work • literacy • numeracy	**Scientific literacy and working scientifically** C1.1 Scientific literacy C1.2 Scientific methodology C1.3 Thinking scientifically **Workplace health and safety** C2.1 Workplace safety C2.2 Risk assessment C2.3 Safe working procedures **Communication and self-management** C3.1 Communication C3.2 Self-management C3.3 Problem-solving

Assessment Plan:				
Task: SUMMATIVE	**%**	**Objectives to be assessed**	**Conditions**	**Date**
MODULE 5 **Collection of work** Complete a series of tasks based on different crime scenes and forensic techniques. **Spoken component** Interview about DNA analysis of a crime scene. **Performance component** Equipment calibration and determining unknown substances. **Test component** Knowledge of crime scene analysis and management. 20–30 minutes	16.7	**Knowing and understanding** • Describe and explain scientific facts, concepts and phenomena in a range of situations • Describe and explain scientific skills, techniques, methods and risks. **Analysing and applying** • Analyse data, situations and relationships • Apply scientific knowledge, understanding and skills to generate solutions • Communicate using scientific terminology, diagrams, conventions and symbols. **Planning and evaluating** • Plan scientific activities and investigations • Evaluate reliability and validity of plans and procedures, and data and information • Draw conclusions, and make decisions and recommendations using scientific evidence.	**Spoken component**: 1.5-2.5mins **Performance component**: 15mins **Test component**: 20-30mins	T1W4- T1 W5
Task: SUMMATIVE		**Objectives to be assessed**	**Conditions**	**Date**
MODULE 6 **Investigation** Investigate the validity of the claims made by a company about its product. **Written response** Report addressing the validity of the company's claims based on tests conducted to investigate the product's effectiveness. 600–1000 words	16.7%	**Knowing and understanding** • Describe and explain scientific facts, concepts and phenomena in a range of situations • Describe and explain scientific skills, techniques, methods and risks. **Analysing and applying** • Analyse data, situations and relationships • Apply scientific knowledge, understanding and skills to generate solutions • Communicate using scientific terminology, diagrams, conventions and symbols. **Planning and evaluating** • Plan scientific activities and investigations • Evaluate reliability and validity of plans and procedures, and data and information • Draw conclusions, and make decisions and recommendations using scientific evidence.	**Written component:** 600–1000 words	T1W9- T2W2

Monitoring and Reviewing:			
Strategies for Monitoring Student Progress	**Date**	**Planned Reviews at Key Intervals**	**Date**
Module 5			
Formative assessment	T1 W2	checking progress	
Spoken component	T1 W5	checking progress	T1 W1-2
Performance component	T1 W5	checking understanding and integration of concepts with	T1 W2
Test component	T1 W5	formative assessment	
Module 6			
Formative assessment	T1, W8	checking understanding and integration of concepts	
Written component draft	T2 W1	checking progress	T1W10-T2W1
Written component	T2 W2		

Underpinning Factors:			
Guaranteed Vocabulary:		**Literacy Skills**	**21st Century Skill/s**
Module 5 Forensic Trace Individual evidence Class evidence Direct evidence Indirect evidence Chain of custody Suspect Continuity Ridge patterns Whorl Arch Loop Chromotography Cuticle Scales Cortex Medulla Fibre Spatter	**Module 6**	Summarising texts Vocabulary knowledge Accurately recording data	• 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	**Cognitive Verbs**
		Reading values from scientific instruments Interpreting measurement units Calculating averages and differences between values Calculating percentages	Analyse Assess Calculate Classify Compare Demonstrate Explain Justify Propose Recall Recognise Summarise Understand

TEACHING AND LEARNING PLAN: MODULE 5 FORENSICS

Hours/ Weeks	Unit Objectives/Core Concepts and Ideas	Subject Matter/Knowledge Understanding and Skills (pg 18 of syllabus)	Learning Experiences [reflecting DQ 3, 4, 5 and 6]	Possible Resources
4	C1.1 Scientific literacy	C1.1 SCIENTIFIC LITERACY • relevant facts and concepts of Biology, Chemistry, Earth and Environmental Science or Physics that explain various phenomena in different contexts • scientific knowledge needed to discuss relevant contemporary scientific issues • ethical implications of science research and technology • evidence-based arguments	**PRINCIPLES OF FORENSICS** **Introductory activity (individual review)** • crime scenario – what evidence would be available **Teacher-led activity** Students recognise that evidence is transferred when people interact, including during criminal activities. Explain importance of chain of custody Students brainstorm types of evidence that can be collected. **Practical activity (groups)** • Students explore different scenarios to identify types of evidence.	**Worksheets** • **Online activity** • **Practicals** • **Videos** •
13	**C1.2 Scientific methodology** **C1.3 Thinking scientifically** **C2.1 Workplace safety** **C2.2 Risk assessment** **C2.3 Safe working procedures**	C1.2 SCIENTIFIC METHODOLOGY Research questions and/or hypotheses • problems and/or issues that can be investigated scientifically • hypothesis writing Variables: • dependent • independent • controlled (and the importance of controlled variables) • measurement Reliability, accuracy and precision: • technology use • sources of error Results: • patterns, trends, and anomalies • results checked against scientific	**TYPES OF FORENSICS EVIDENCE** **Introductory activity (individual review)** • introduction to each type of evidence – strengths and limitations • How to collect and analyse this type of evidence **Practical activity (groups)** • Students collect evidence and analyse it • Examination of how unique this evidence is across the population • Students individually write up their findings using prescribed notation.	**Worksheets** • **Online activity** • **Practicals** • **Videos** •

		concepts and theories C1.3 THINKING SCIENTIFICALLY • validity and reliability of claims • quality of methodologies and evidence • evidence and reasoning for accepting or rejecting claims • evidence-based conclusions (claims that fit with data, information and evidence) C2.1 WORKPLACE SAFETY • workplace health and safety requirements and safe operational scientific procedures • workplace health and safety documents, e.g. - safety data sheets (SDS) - standard operating procedures (SOP) - relevant Australian standards C2.2 RISK ASSESSMENT • hazard identification, assessment and reporting (in the laboratory and the field) • hazardous substances — reading labels and SDS • administrative control for hazardous substances and situations C2.3 SAFE WORKING PROCEDURES • personal protection equipment (PPE) • surroundings adapted to meet safety requirements • precautions to prevent injury, e.g. when handling glass and/or hot objects • correct SOP when: - using hazardous substances - handling and using a range of tools, technologies and equipment - handling biological materials such as live animal and plant specimens, microorganisms and materials for dissection - working in the laboratory and in the		

		field		
4	C1.1 Scientific literacy 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**	C3.3 PROBLEM-SOLVING SKILLS INCLUDING: • clarifying issues and problems to frame a possible problem-solving process • working systematically through issues • generating alternative approaches • modifying and refining ideas when circumstances change • applying knowledge and problem-solving skills to new contexts analysing and synthesising information to inform a course of action	**ANALYSING A CRIME SCENE** **Introductory activity (individual review)** • **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)** • Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and group activity)** • Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	**Worksheets** • **Online activity** • **Practicals** • **Videos** •
5	C1.1 Scientific literacy 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**	• work with minimal supervision: - following safe work practices when carrying out procedures - recognising industry standards - applying work ethics • team work in the workplace: - communicating interpersonally - self-organising - identifying collective goals - defining and allocating roles - persisting • organisation and preparation of materials and/or equipment for self and others	**ASSESSMENT** **Introductory activity (individual review)** • **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)** • Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and**	**Worksheets** • **Online activity** • **Practicals** • **Videos** •

	C3.3 Problem-solving	• time management — completing tasks within agreed timeframes C3.1 COMMUNICATION IN A SCIENTIFIC CONTEXT: - using scientific terminology - recording accurate and thorough data using appropriate formats communication in a workplace: - using language for the workplace - following oral and written instruction and information - giving clear oral and written communication using technology to communicate information clearly and concisely	**group activity)** • Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	

TEACHING AND LEARNING PLAN: MODULE 6

Hours/Weeks	Unit Objectives/Core Concepts and Ideas	Subject Matter/Knowledge Understanding and Skills (pg 18 of syllabus)	Learning Experiences [reflecting DQ 3, 4, 5 and 6]	Possible Resources
	C1.1 Scientific literacy C1.2 Scientific methodology	• relevant facts and concepts of Biology, Chemistry, Earth and Environmental Science or Physics that explain various phenomena in different contexts • scientific knowledge needed to discuss relevant contemporary scientific issues • ethical implications of science research and technology • evidence-based arguments Research questions and/or hypotheses • problems and/or issues that can be investigated scientifically • hypothesis writing Variables: • dependent • independent • controlled (and the importance of controlled variables) • measurement Reliability, accuracy and precision: • technology use • sources of error Results: • patterns, trends, and	**Introductory activity (individual review)** • **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)** • Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and group activity)** • Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	**Worksheets** • **Online activity** • **Practicals** • **Videos** •

		anomalies • results checked against scientific concepts and theories		
	C1.3 Thinking scientifically	• validity and reliability of claims • quality of methodologies and evidence • evidence and reasoning for accepting or rejecting claims • evidence-based conclusions (claims that fit with data, information and evidence)		
	C2.1 Workplace safety	• workplace health and safety requirements and safe operational scientific procedures • workplace health and safety documents, e.g. - safety data sheets (SDS) - standard operating procedures (SOP) - relevant Australian standards		
	C2.2 Risk assessment	• hazard identification, assessment and reporting (in the laboratory and the field) • hazardous substances — reading labels and SDS • administrative control for hazardous substances and situations		

	C2.3 Safe working procedures	• personal protection equipment (PPE) • surroundings adapted to meet safety requirements • precautions to prevent injury, e.g. when handling glass and/or hot objects • correct SOP when: - using hazardous substances - handling and using a range of tools, technologies and equipment - handling biological materials such as live animal and plant specimens, microorganisms and materials for dissection - working in the laboratory and in the field		
	C3.1 Communication	communication in a scientific context: - using scientific terminology - recording accurate and thorough data using appropriate formats communication in a workplace: - using language for the workplace - following oral and written instruction and information - giving clear oral and written communication - using technology to		

	C3.2 Self-management	communicate information clearly and concisely • work with minimal supervision: - following safe work practices when carrying out procedures - recognising industry standards - applying work ethics • team work in the workplace: - communicating interpersonally - self-organising - identifying collective goals - defining and allocating roles - persisting • organisation and preparation of materials and/or equipment for self and others • time management — completing tasks within agreed timeframes		
	C3.3 Problem-solving	problem-solving skills including: • clarifying issues and problems to frame a possible problem-solving process • working systematically through issues • generating alternative approaches • modifying and refining ideas when circumstances change • applying knowledge and problem-solving skills to new		

		contexts • analysing and synthesising information to inform a course of action		
	C1.1 Scientific literacy 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		**Introductory activity (individual review)** • **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)** • Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and group activity)** • Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	**Worksheets** • **Online activity** • **Practicals** • **Videos** •
	C1.1 Scientific literacy 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		**Introductory activity (individual review)** • **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)** • Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and group activity)**	**Worksheets** • **Online activity** • **Practicals** • **Videos** •

			• Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	
	C1.1 Scientific literacy 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		**Introductory activity (individual review)** • **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)** • Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and group activity)** • Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	**Worksheets** • **Online activity** • **Practicals** • **Videos** •
	C1.1 Scientific literacy 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		**Introductory activity (individual review)** • **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)**	**Worksheets** • **Online activity** • **Practicals**

	C3.3 Problem-solving		• Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and group activity)** • Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	• **Videos** •
	C1.1 Scientific literacy C1.2 Scientific methodology C1.3 Thinking scientifically		**Introductory activity (individual review)** • **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)** • Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and group activity)** • Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	**Worksheets** • **Online activity** • **Practicals** • **Videos** •
	C1.1 Scientific literacy		**Introductory activity (individual review)**	**Worksheets**

	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		• **Teacher-led activity (support with worksheet and online activity)** • Students recognise **Practical activity (groups)** • Students investigate **Practical demonstration** • Students use **Teacher-led activity (support with video and group activity)** • Explain • **Consolidate:** Use **Teacher-led activity (support with animated slide show and graphic organiser)** • Students understand **Consolidate:** Direct students to **Practical activity (pairs)** Students predict	• **Online activity** • **Practicals** • **Videos** •

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 5: FORENSICS

WEEK	LESSON 1	LESSON 2	LESSON 3
T4 W5	Introduction to forensics – transfer of trace evidence, observations and chain of custody	Fingerprinting	Footprints and treads
T4 W6	Chromatography	Handwriting and document recreation	Firearms/tool marks
T4 W7	Material typing- fibres/stains/hair	Soil analysis	Blood typing
T4 W8	Blood spatter	Forensic anthropology - bones	Forensic anthropology
SUMMER BREAK			
T1 W1	Working a crime scene + revision	Analysing a crime scene with multiple types of evidence	Analysing a crime scene with multiple types of evidence
T1 W2	Analysing a crime scene with multiple types of evidence	Analysing a crime scene with multiple types of evidence	FORMATIVE ASSESSMENT
T1 W3	Estimating time of death	DNA	DNA
T1 W4	Revision	SUMMATIVE ASSESSMENT – SPOKEN COMPONENT DNA DATA PROVIDED	SUMMATIVE ASSESSMENT - TEST
T1 W5	Practice of spoken component- teacher feedback provided	SUMMATIVE ASSESSMENT – SPOKEN/PERFORMANCE	SUMMATIVE ASSESSMENT – PERFORMANCE Recording of spoken performance due.

MODULE 6 : CONSUMER PROTECTION

WEEK	LESSON 1	LESSON 2	LESSON 3
T1 W6	Introduction to consumer law and advertising standards	Food/drinks – law and advertising	Food/drinks – how to test
T1 W7	Cosmetics/hygiene – law and advertising	Cosmetics/hygiene – how to test	Medicines– law and advertising
T1 W8	Medicines– how to test	Diets/fitness– law and advertising	Formative assessment Diets/fitness– how to test
T1 W9	Equipment– law and advertising	Equipment– how to test	Summative Assessment – Planning
T1 W10	Summative Assessment – Product testing	Summative Assessment – Product testing	Summative Assessment - writing
SCHOOL HOLIDAYS			
T2 W1	Summative Assessment - writing	Summative Assessment – Draft Due	Editing
T2 W2	Editing	Editing	Summative Assessment – Written component due