



BEHIND THE SCENES:

TEACHING FORENSIC SCIENCE

This context is highly engaging for students, can be enjoyable for staff and is worth considering for both primary and secondary students. Mike Stone investigates.

DEFINITION

Forensic science is the application of scientific principles and methods to investigate and solve crimes. Evidence is collected at a crime scene and analysed to help determine what happened. Often it is about determining which people, and which objects were present at the crime scene. The findings are ultimately presented in a court of law.

MĀORI INVESTIGATED CRIME HISTORICALLY

Before European contact in 1800, Māori needed to investigate crime and resolve disputes. Often skilled storytellers (kai korero) were asked to gather information from witnesses and examine the scene of the crime.

Together with community knowledge, customary laws (tapu and mana), the hapū considered the circumstances and severity of the offense and with the rangatira determined appropriate utu (repayment or redress). The aim of this process was primarily to restore balance and ensure justice.

TEACHING EXPERIENCES

Discussions with four educators experienced in teaching forensic science revealed different approaches but a common emphasis on observation and inference.

ONEHUNGA HIGH SCHOOL

Initially designed as an end of year activity to keep students engaged, the forensic science unit now runs an entire term for all Year 10 students. Each year, the course revolves around a new scenario;



TOP: Image: cottonbro studio (pexels.com)

BOTTOM: Example of a shoe print comparison. Image: Stechondanet, CC BY 3.0 Wikimedia Commons

this year's case involves a stolen item from the science department and the assault of the science technician. Scripted video clips of department members provide evidence (e.g., visible Band-Aid, alibi).

Student activities, supported with content teaching, for this year's scenario include:

- **Fingerprints:** Creating their own (inkpads and paper) and deciding the type, matching evidence with suspects. Making and lifting latent prints, using talcum powder and brush, and lifting them with adhesive tape.
- **Time Estimation:** Using temperature changes to determine how long ago a cup of tea was made (graphing data from a practical investigation).
- **Blood Analysis:** Identifying blood type and analysing blood spatter to infer assailant height.
- **DNA Evidence:** Analysing gel electrophoresis to match evidence with suspects.
- **Urine Analysis:** Confirming alibis (e.g., detecting protein in urine suggests a steak dinner was consumed).
- **Soil Analysis:** Testing for pH, ions (flame test), and microscopic appearance.
- **Handwriting Examination:** Analysing ink composition using chromatography (including fingerprint analysis on an envelope)

WAIOPEHU COLLEGE

The Year 9 and 10 forensic unit runs for two terms and includes forensic psychology. In addition to practical activities like those at Onehunga High School, students participate in:

- **Crime Scene Mapping:** Drawing a crime scene to scale using SmartDraw software.
- **Blood Spatter Investigation:** Conducting a fair test to analyse the effects of height and angle on blood splatter patterns.
- **Impression Analysis:** Examining bite and lip imprints.
- **Forensic Entomology:** Collecting and examining insect larvae laid on a dead chicken.
- **Digital Forensic Simulations:** Running the online scenario [When Did Zelda Die?](#)
- **Crime Report Analysis:** Evaluating evidence based on a crime report.
- **Neuroscience Activities:** Learning about brain regions and crafting a brain hat.
- **Eyewitness Reliability:** Engaging in activities to test eyewitness reliability.
- **Offender Profiling:** Studying body language and researching serial killers.

EDGEWATER COLLEGE

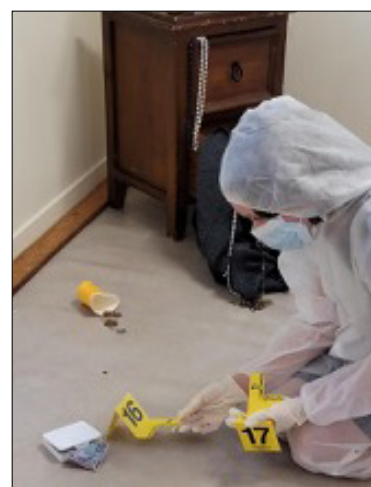
As well as activities like those above, this forensic science unit is based around two episodes of The Simpsons: Who Shot Mr. Burns? (1995). Students analyse evidence including: a gun with fingerprints, a bullet, a



Making shoe prints.
Image: Forensic Insight.



Using AFIS.
Image: Forensic Insight.



Placing evidence markers.
Image: Forensic Insight.



handwritten letter, and DNA from an eyelash. The department created the resources and activities for the students to investigate, adapting the story and the outcome.

Additional student activities include:

- **Handwriting & Paper Analysis:** Using chromatography to examine pigment mixtures in a range of black pens.
- **Blood Spatter:** Using fake blood and other clues to infer height.
- **Evidence Summaries:** Compiling and displaying evidence analysis on a crime board.
- **Forensic Psychology:** Watching Criminal Minds clips on handwriting psychology.
- **Motive & Alibi Exploration:** Investigating suspects within the storyline.

FORENSIC INSIGHT WORKSHOPS

Run by Tom Coyle, a forensic practitioner and fingerprint expert trained at New Scotland Yard (London), these workshops aim to make forensic science hands-on and engaging.

Student activities include:

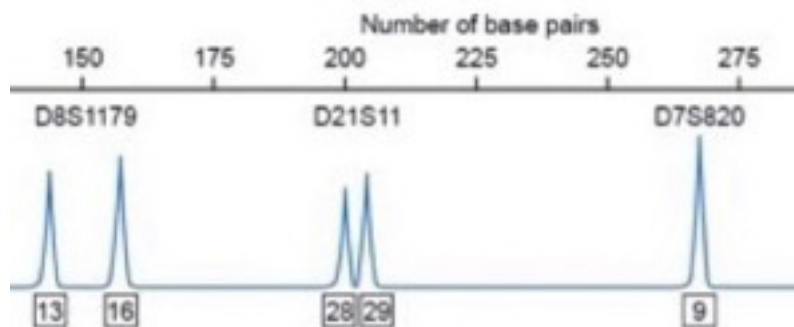
- **Years 2–4 Clue hunts.** Finding hidden objects with pieces missing and matching with remnants back in the classroom. Making foot prints and shoe prints also work with this age group.
- **Years 5–6 Whodunit exercise.** Students lift and classify fingerprints before matching them to suspects.

- **Years 7–8 Observing mock crime scenes.** Identifying what has been moved, making inferences from their observations and providing evidence.
- **Years 9–10 Investigating a mock murder scene (either live or via photos).** Developing fingerprints, making shoe print cast, observing hairs, fibres, and a DNA profile. Classifying fingerprint types and comparing the classroom fingerprint distribution to national statistics.
- **Years 12–13 In-depth investigation of a crime scene.** Including advanced DNA profiling and exploring career paths

ASSESSMENT

Two types of assessment discussed were portfolio and diorama.

- **Portfolio:** Students compile a collection of their forensic science work, demonstrating their investigation process, evidence analysis, and understanding of forensic techniques.
- **Diorama:** Students construct a model crime scene following specific guidelines: The scene must contain four pieces of evidence, the scene must be age appropriate, characters in the scene must give permission and cannot include family members.



LEFT: An electropherogram. D8S1179 is a gene about 150 base pairs long on the DNA, and the 2 chromosomes have a different number of repeats at that site, 13 on 1 and 16 on the other.

[WATCH: Nikolay's Genetics Lessons - How to read STR electropherogram](#)

RESOURCES

Most schools developed their own materials, including student booklets. Other useful resources include:

- **Online Videos:** Covering specific forensic techniques (e.g., entomology) and real crime detection, selected for age-appropriateness.
- **Police Museum (Porirua):** Provides insights into forensic investigation.
- **Police Visits (Waiopahu College):** Officers share how fingerprints are used in investigations.
- **Online Resources:** Murdle: A free website with daily logic puzzles solving murders (also available as books). Twinkl Resources: Available with a paid subscription, offering forensic science materials.
- **Forensic Insight – Tom Coyle (Website):** Provides professional learning development (PLD) for teachers via student workshops, and also sells forensic science kits.
- **Additional Resources:** A comprehensive list of useful materials is linked at the end of this article.

ISSUES

Careful planning is essential when designing forensic scenarios. At Onehunga High School, a past scenario involving the murder of a technician was designed to coincide with her scheduled medical leave. While unintentional, it felt too realistic and led to a complaint due to personal trauma. Ensuring sensitivity in scenario selection can help prevent distress.

Always consider health and safety. Some students may have crime-related trauma, particularly those with incarcerated family

members. Blood-related activities can cause fainting in some individuals, while fingerprint powders may trigger asthma symptoms. Being mindful of these risks and providing alternatives where needed is important for student well-being.

In accordance with tikanga Māori, body fluids such as blood and saliva, as well as hair, are considered tapu (sacred). Using real samples may not be appropriate, so photographs or artificial substitutes should be used instead, with clear communication to students about their authenticity.

SUGGESTED TIPS

- **Inform Parents Early:** Sending a letter home outlining the content to prevent misunderstandings or complaints. This is especially important if a visiting speaker will discuss real crime scenes.
- **Reinforce Vocabulary:** Incorporate literacy activities to strengthen terminology and comprehension.
- **Prepare Relief Lessons:** While the unit is largely practical, have backup lessons ready—such as readings with literacy and comprehension activities or videos with questions.
- **Utilise Student Prior Knowledge:** If discussing guns and bullets, consider drawing on the knowledge of students who hunt. (A theoretical lesson!)
- **Verify Online Information:** Not all sources are reliable—seek confirmation from multiple references or contact Tom Coyle (info@forensicinsight.co.nz) for guidance.
- **Build Expertise Gradually:** Start small, develop skills over time, and invite experts to support learning.

TIKANGA AND HOMICIDE

Māori have many tikanga around death, which help the whānau pani (bereaved family) say good-bye and transition to life without their loved one. However, when a death occurs due to homicide, forensic experts are required to investigate the circumstances. These can be conflicting needs that must be carefully negotiated.

A deceased person (tūpāpaku) becomes tapu (sacred), as do the places where they lay and any items involved in their death. Tapu is lifted through rituals and ceremonies, including sprinkling water, karakia and waiata. While every iwi has their own tikanga, some common features include always having a whānau member with the tūpāpaku; having no food near the body; and blessing the body, the site and any personal items involved to lift the tapu and allow the person's spirit to return to their ancestors.

The police, coroner and forensic scientists have practices in place to acknowledge and make provision for this tikanga. They ensure whānau are allowed as close as feasible to the crime scene and are kept informed about the processes involved at the scene and afterwards. The tūpāpaku and its tissues are treated respectfully in both word and action. Where possible, disconnected body parts are kept with the tūpāpaku and both are returned as soon as possible.

TEACHING RESOURCES

[Available resources \(Google Drive\):](#)

A list of links to online resources that are worth investigating.

A resource for students to explore mātauranga Māori in this context.

Advice on methods for exploring different forensic evidence.

NGĀ KUPU

iwi: extended kinship group, tribe

karakia: incantation, ritual chant, prayer

mana: prestige, authority, influence, status,

rangatira: chief (male or female)

tapu: sacred, prohibited, restricted, set apart

tikanga: customary system of values and practices

tūpāpaku: deceased person's body, corpse

utu: redress

waiata: song, chant, psalm

whānau: extended family, family group

whānau pani: bereaved family

ACKNOWLEDGEMENTS

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ABOVE: Yellow markers at a crime scene show where important clues like blood, clothes or bullet shells were found. Image: cottonbro studio (pexels.com)