

An integrated investigation: Science at Taita College

A project that integrates several strands of the curriculum in a culturally responsive way is driving student engagement in science at Taita College in Lower Hutt.

Science teachers at Taita College have been looking for a way to move from ‘subject silos’ and towards a programme where integration, collaboration and culturally responsive practice is a focus.

HOD Science Sujata Rajagopal says that one driving force of this new programme is the desire to offer one thematic project that enables students to achieve multiple NCEA credits from several different disciplines.

She says that as a curriculum leader she wants to be responsive to her students’ diverse perspectives and cultural backgrounds so that students feel engaged and included in learning.

“Here at Taita College we’re aware that our demographic landscape is increasingly changing, so we have to be able to offer a diverse curriculum that promotes active learning, and one where varying world views and cultures can be incorporated, in order to make a difference for all of our learners,” she says.

THE HANGI AND UMU PROJECT

An example of this approach at the school has been a scientific inquiry into the hangi and umu (earth oven) as authentic contexts. This project has now been carried out for two years consecutively.

The integrated studies unit takes place over the last term, and involves all year 10 students at the school, enabling them to gain a few credits in advance of year 11. Beginning with an investigation and subsequent data collection throughout the term, students then go on to host a special whānau event at the school, complete with a hot dinner and musical entertainment.

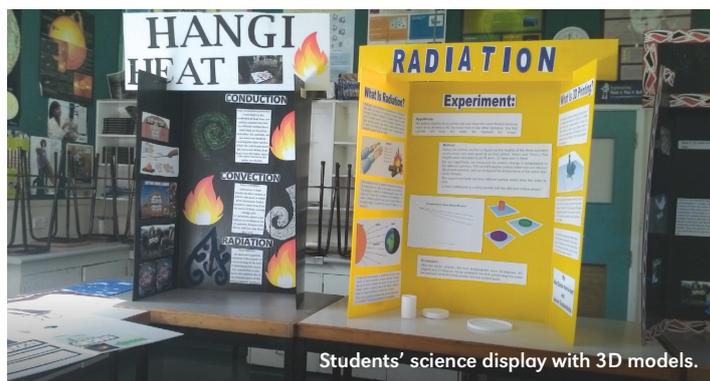
“The students really enjoy this unit of work. New students ask me if they will be able to do it when they are in year 10. I like how engaged and driven they are when they’re working on this – the girls and boys cooperate together to complete the scientific investigation and to create a special event for their whānau,” she says.

For the students involved, the day-long event begins at 8am when they arrive at school in old clothes to dig the umu and prepare the food.

“By 5 o’clock they’re neatly dressed in their uniforms, ready to greet and serve their guests,” says Sujata.



Students and teachers prepare the umu.



Students' science display with 3D models.

“... the girls and boys cooperate together to complete the scientific investigation and to create a special event for their whānau.”

“They don’t complain about being tired, in spite of the manual work they’ve done all day. It’s an exciting day for them.”

The hangi and umu project integrates aspects of science, mathematics, te reo Māori, music, digital technology and Samoan language.

As a result of using this one topic across the curriculum, students have the potential to earn multiple credits for this unit of work, depending on the subject courses they have selected.

“I think NCEA allows us to deliver units of work to our students creatively – we can find ways of smartly linking areas of knowledge together. It allows us to look at the whole child and think about their learning in a holistic way.

“I also believe that by linking the subjects together, we reinforce the learning for our students – so it’s more effective.”

BUILDING UP TO A SPECIAL DAY

The project builds up to a spectacular one day event that involves:

- digging the pit for a hangi and umu
- preparing the food
- measuring conduction, convection and radiation process happening in the respective contexts
- designing and distributing a digital invitation to students’ whānau and friends, in the hope they will attend the day’s performances and share in the meal
- learning and rehearsing a powhiri to welcome whānau to the event, with all students involved in either haka, karanga, or whaikorero
- learning and rehearsing musical items based around the experience or that were culturally inclusive, to be performed before the hangi is shared
- performing poems and musical items to the audience before the meal in te reo Māori and Samoan. 🇳🇿



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INVESTIGATING IMPLICATIONS OF HEAT FOR EVERYDAY LIFE

In 2016 all Taita College year 10 students were involved in the hangi and umu project, giving the opportunity to achieve the science standard, AS90943 'Investigate implications of heat for everyday life'.

This was carried out by pre-teaching the concepts in the classroom.

The investigation and data collection was completed in an authentic learning context, as students had to physically make a hangi and umu in order to carry out the experiments. This process enabled students to get first-hand experience of the concepts of heat transfer and particle theory of matter.

The project was student-centred and incorporated *The New Zealand Curriculum's* key competencies.

During the hangi and umu preparation day, students were involved in the cutting and preparation of the vegetables and meat, making sure each piece was correctly sized for heating/cooking purposes.

Students also had to dig and measure the pit and research the materials to be used to start the fire; for example, the volcanic rocks in hangi and their purposes, and the river rocks in an umu.

Students used the thermo-camera to measure the temperature in the hangi pit, both during the preparation time and also when covered and cooking; they established a reference to distance.

Students were able to draw a linear graph and used this information to interpret the relationship between distance and temperature, and also radiant heat. Students were able to experience the difference between hangi and umu methods of cooking and compare the conduction, convection and radiation process happening in the respective context.

Throughout this project students were also involved in making 3D models in association with Creative Pathways from the School of Design, Victoria University, Wellington. These models were made with different materials, colours, volume, thickness etc and the students had to conduct a fair test to investigate which retain more heat.

Sujata plans to run the project again this year.

"This will be our third year of doing this unit, and with each year we learn, reflect and build on the model," she says.

"It's evolving, but we can already see the value in offering a holistic approach to learning – when we work together, we achieve together!"

"At Taita College our vision is to offer a meaningful curriculum that meets the needs of our students.

"This programme demonstrates the power of collaboration and partnership, and encompasses an integrated approach to learning where student voice and leadership is at the forefront."

STUDENT OUTCOMES

Through the authentic context of digging an outdoor oven and preparing a hangi, students are learning to understand the scientific processes at work in cooking food.

This project also promotes the values of cooperation, manaakitanga, kotahitanga and whanaungatanga, as students must work together to carry out investigations and host a memorable event for their whānau and wider community.

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