STEAMing Ahead

VIRTUTE EXPERIAMUR

Our vision: To create a learning culture of curiosity in which students will engage in the world they are living in.

Term 3&4 STEAM Newsletter

Dear Parents and Caregivers,

We have reached the end of another amazing year in STEAM with lots to celebrate. We are very proud of our students and their achievements.

I cannot think of a better way to end the year than the Innovation EXPO held on the 27th November. The Expo provided a platform for the Year 10 STEAM students to celebrate the learning after 2 years of amazing learning experiences and share these with both the current Year 9 students as well as the parents and Year 8 students that have been accepted into the STEAM programme for 2020.

Here are some other recent successes that I would like to share with you.

Tahi Rua Tech Toru Auckland regional winners

Very proud of our STEAM studentS representing Westlake Girls High School at the Tahi Rua Tech Toru National Competition in Wellington with their tech innovation "Technior" to help senior citizens with the use of tech and internet.

Students run a workshop for teachers

I had the privilege to present with 15 of our Westlake STEAM students at the Computer Science for High School Conference (CS4HS), from Year 9 to Year 11, held at AUT recently. They planned and delivered seven mini workshops and were amazing. They were the experts!

The outcome of the workshop was to:

- Have teachers explore with the students some of the tools used and their potential applications.
- Explore the practical application of technology as a creative tool to engage students with 21st Century learning and build their skills in emerging technology that is shaping their future.
- Provide opportunities for STEAM integration and the importance of the A in STEAM, especially for girls. Examples include community projects developed as part of the STEAM programme at Westlake Girls High School and how they used technology to develop innovative solutions for their identified community issue. Hear from the students how the community projects have impacted them.

Could you help our students become tomorrow's change makers?

Westlake Girls High School is proud to launch STEAM Power-ED - a new partnership between Westlake Girls High School and Industry. It is designed to encourage our young women to pursue careers within the STEAM subjects (Science, Technology, Engineering, Arts, Maths) and entreprereurship.

To offer our students the widest range of opportunities, we are seeking to forge connections and establish mutually beneficial relationships with our business/industry community.

We appeal to our whanau to support our leaders of tomorrow and embark on this journey with us. Please email Susana Tomaz (TIC STEAM) to discuss ways you could partner with us. Industry visits, mentoring or classroom talks are just a few ideas.

Finally, I would like to thank the parent community for all your support, have a lovely Christmas and a relaxing holiday.

Susana Tomaz (Stomaz@westlakegirls.school.nz), TIC for STEAM, Robotics and FutureTech Teacher.

Year 9 STEAM

English and Social Studies

STEAM has had an eventful last two terms. From nuclear conflict to AI ethics, we've covered a broad range of thought-provoking topics in English and Social Studies. Our themes these previous two terms have been War and Peace, which covered topics around World War Two and allowed us to explore different systems of government, and Artificial Intelligence, which had us discussing some of the ethical issues surrounding this developing technology. Of course, being the Year 9 STEAM class of 2019, we had no choice but to add our STEAM flair to these topics. We made our own Berlin Wall art, wrote our own AI poetry, made up suffragette slogans, sashes and signs, met Hiroshima and Holocaust survivors, learned to debate, and did so much more. These experiences really helped us grasp the more complex topics and go even further into simpler ones. By and large, I'd say we've accomplished so much this year, and I look forward to next year with my incredible peers. Carpe Diem STEAM 2019, see you same time, same place, next year.

Maths and Science

Throughout term 3 the students explored the ideas of nuclear energy, sponsored content and making informed decisions on socio-scientific ideas. Within the context of a hypothetical referendum to decide if NZ should replace a hydroelectric dam with a nuclear power plant, the students were required to research nuclear power. They then had to consider the source, motivation and bias for the information they found. With this in mind, students were asked to make their own media using convincing statistics to sway the vote of the referendum either for or against a nuclear power plant in New Zealand.

Shared science and maths lessons this semester enabled interesting, interdisciplinary discoveries.

This semester, War and Peace was our main topic for term 3. We began with a research assignment around nuclear power, focusing on three main ideas: New Zealand's history with nuclear power and the use of nuclear power in war and in peace. It was fascinating to learn that, around the globe, there are already 450 nuclear reactors used to make electricity!

Our research showed us how significant NZ's history with nuclear power is to our society. Nuclear Free NZ - for more than 30 years - is something that we are all really proud of. It is a symbol of New Zealand's strong values, independence and unity.

Nuclear weapons have had a huge influence on society worldwide. They are a very controversial subject and I think it is important to understand the dangers of nuclear warheads in the future. This was one thing that we researched - the potential for a nuclear winter and mistakes that could trigger another massive war. We explored how nuclear bombs work and the fission and fusion designs. Unfortunately, during the Cold War, America and Russia competed to detonate the largest nuclear bomb. This brought major development in the technology, enabling the 50 megaton Tsar Bomba, which caused widespread damage of more than 55km.
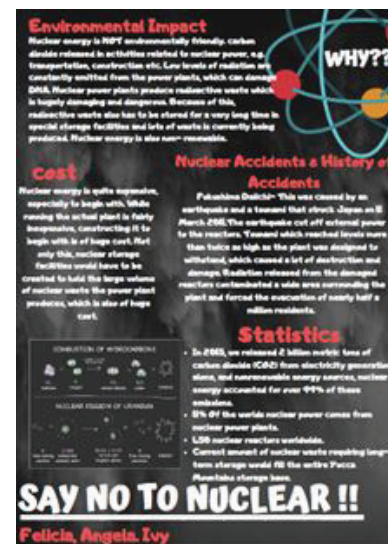
However, it is also important to understand the benefits that this technology brings to society. Nuclear power can improve major aspects of our lives, like agriculture, transport, and producing electricity. For example, in agriculture, nuclear development has enabled mutations of plants. Bangladesh created a new kind of rice, which in the last decades has tripled crops. This has brought improved yields, nutrition and economic benefits.

By Ivy Doak

Our main focus was in nuclear power plants. We realised that nuclear power plants have both their pros and cons. They are very efficient in producing electricity, but they can damage the environment, and the nuclear disasters that have occurred in the past have been catastrophic. This lead to a debate. In groups, we designed persuasive media that would argue our position - either pro or anti nuclear power plants. I thoroughly enjoyed this process because it allowed us to get a better understanding of the different positions. Through this exercise, we developed multiple skills - such as debating, researching, presenting and persuading, as well as learning to weigh up the pros and the cons and use this to make an informed decision.

Artificial intelligence was our topic for this term. It was fascinating to consider AI while exploring the history of computers. We went all the way back to the first calculating machine! We researched the differences between robot and human senses - understanding the structure and function of each part that contributes to the ability to hear and see.

Furthermore, we had the opportunity to use the design process to create a toy with digital interface that still encourages physical interaction or activity. This was a really educational process which again developed many

of our skills and was something that was widely and thoroughly enjoyed by our classes.

Term 4 focused on artificial intelligence. A guest session from Engineers without Borders lead a lesson on coding and machine learning. Then using the process of design thinking (empathise, define, ideate, prototype and test) students had to interview each other about their favourite childhood toys, define what it was that made these toys so special, then use those ideas and emotions to create a new special toy for a young child that incorporated a digital aspect.

As part of STEAM in year 9 we don't just do the four main subjects of maths, science, english and social studies we often conjoin them. This includes double periods of math/science and english/social studies. This term our focus has been on artificial intelligence (AI). So far this term we have completed two double periods of maths/science.

Our first session was fixing an app code for the game 2048. Not only did we have to fix the code but we had to play the game and try to get the highest score possible. Everyone got competitive, so it was a great environment. In addition we also had to program an app to recognise apples, chocolate and coke cans. To do this we had to upload photos from google of different angles of each of the objects. It was made into a competition who could finish first, and of course everyone was blazing to win as there was chocolate on the line. This helped us to build teamwork skills and to learn a little about coding.

Our most recent project, our two STEAM classes have come together and been divided into many groups to create a digital interface toy. The purpose of this task is to create a toy for children aged 2 - 5 that gets children off of Netflix and Youtube. We must follow the structure of 5 steps; Empathise, Define, Ideate, Prototype and Create. Our goal is to create a prototype that displays a creative idea. Some examples of what we will be making is augmented reality, microbit, smartphone hologram and sphero. This term has been packed with interesting lessons that have helped grow our mindset and inform us of the topic AI.

By Georgia Smith

Papertronics and E-Textiles

Students have been exploring the science behind electrical circuitry to develop paper circuit and e-textile projects incorporating LEDs, conductive thread and copper tape. This involved testing our circuit and integrating a pop-up feature into the design to make it interactive. Below are examples of projects that each shine in their own way.
View more papertronics projects here

Robotics

Students have been developing their skills in the integration and use of sensors into their application of robotics.
In the last few weeks students have been busy applying their learning to their robotics challenge: Driverless car. to program your robot to drive passengers to two different destinations.The green cubes represent the passengers going to work and the red represents a student going to school.
You must program your robot to pick up a cube, decide if it's going to work or school and take it to the correct destination until all passengers have been taken.
The teams had to recruit a Project Facilitator - Keeps everyone focused and on task, Software engineer - Mostly works with the code, Mechatroniscs engineer - Checks if there are any problems with the robot
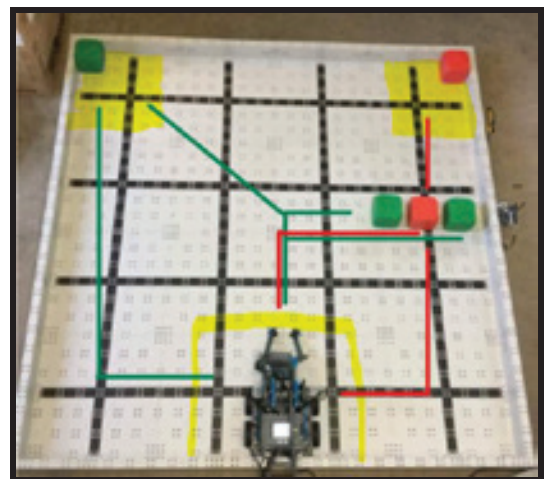
Food Technology

Exploring how ingredients function and interact with one another has been the foundation for students developing a structure with food this semester. Using the design process, research around structure, ingredients and flavours were synthesised to create unique and challenging outcomes. Opportunities to trial concepts in a practical environment allowed the students to resolve issues and build on their understanding to improve their products, some of the original outcomes failed but students were able to analyse and reflect on their results to make improvements. The final outcomes were exceptional.The two desserts below were both inspired by the iconic New Zealand sweet, pineapple lumps

Find more in our **Year 9 STEAM Blog**

Year 10 STEAM

English and Social Studies

Integrating classical mythology and "monsters" in literature, our Term 3 thematic unit, **Monsters**, allowed students to dabble in the depths of greek culture, walk among the pantheon of the Roman gods and take a peek into the stories of the year. In Social Studies we got to watch Disney's 'Moana' and spent many lessons creating our own twists of the traditional myths focused on the Māori hero 'Maui'. Our videos were filled with humour, knowledge and a good dash of stupidity but we captured the essence of the myths. Some even took a route into South American mythology and their deep culture to create a presentation showcasing the legends. To prepare us for exams, we spent our time learning more

about the world around us with the current events, focusing on the action globally such as the fire in Notre Dame, the Brexit deal, the Saudi Arabia oil attacks and the Climate Change strikes around the world. This revision set us up for our exams, informed us of how rapidly changing the earth and the people who are making a change. Altogether the year has been amazing; a year filled with learning and challenges that pushed us to strive for excellence in our work.

In English we studied Frankenstein and Edward Scissorhands to explore the concept of what it means to be human and what responsibilities we have for others. Students also created static images and persuasive speeches based on their Community Projects. The purpose of the static image was to market their solution to their chosen community issue. Their speeches were based on a scenario in which students imagined they were presenting their innovative design solution (prototype) to a Dragon's Den of industry investors in the hope of persuading them to invest in their prototype. They had to convince their audience that their solution was the best/ worth buying/ investing in.
After school examinations, students have been working on a combined project for English and Social Studies focused on Fast Fashion, exploring the concept of kaitiakitanga/ guardianship - what responsibilities do we have to look after our planet and the people on it?

Maths and Science

In Science we have looked at reproduction and genetics, how genes work and are passed on from our parents and worked out probability of inheritance of traits.
We also learnt about technology developments in Biology such as CRISPR, gene editing technology and the ethical impact of using it to edit the human genome. We also studied probability around inheritance of genes.

In Mathematics in term 3 we have studied Measurement. We looked at areas of 2 dimensional shapes, volume and surface areas of solids. Surface area of spheres was studied in great detail. In doing so, we have learned why it is impossible to create a map of the world on a flat rectangular surface without some sort of distortion. It was quite interesting and eye-opening experience to realise that all world maps are not what they seem, and that the world is a much bigger and smaller place at the same time.

In term 4 we have been studying Statistics. Statistics deals with the collection, organization, analysis, presentation and interpretation of data. Students worked on investigations based on real data form students in schools all over New Zealand. They had to follow the same process the real statisticians follow in their investigations.

We have learned about sampling methods and how useful they are when making inferences about populations. Samples, when done properly, can reveal a lot and help predict patterns in populations. Similarly, in everyday life it is important to have all the facts before making assumptions about issues.

Future Tech

One of the opportunities granted to students in the Year 10 STEAM programme is a class exhibiting technological elements alongside the expression of art, also known as Future Technology. The two-month course covers a variety of topics such as 3D Printing, Laser Cutting, Game Development, Virtual Reality and many more. The class itself was enlightening for STEAM students as it provided interactive lessons which were heavily student-led, allowing us to pursue choices of which are not limited to the teacher's specifications. We were empowered to demonstrate the creative parts of STEAM, alongside being educated of the emerging technologies we may face in the foreseeable future. The unit allowed us to develop research methods, become innovative and utilise the design thinking process upon the production of our project to ensure digital fluency.

The most exciting part of Future Tech for me had been the Game Development stage. We were instructed to develop a game using the program 'Gamefroot' of which teaches the player about educative subjects. My final idea consisted of a biology-themed game, specifically cells and plant life to be used as revision for Year 9 students. It was also designed in a way that is reminiscent of the movie 'Howl's Moving Castle'. Upon using the program named Draw.io, I was able to generate a flowchart of which displayed all the attributes, assets and questions that I needed to implement into my game. I produced a total of seven questions altogether that increased in difficulty as the player progresses. I installed these questions in doors so that the player knows they must answer the question correctly to move on. Lessons and informative tidbits were available to the player through the narration scripts thus, they are able to answer the questions. Throughout the map, I incorporated a variety of scripts and programmes such as life restorations and lp refills so that the player can regenerate their health to further achieve in my game. Alongside this, I included hazards such as NPC's, death traps and other devices such as moving platforms and teleportations to provide a varied yet interesting gameplay.

I was able to successfully improve on my game through the collation of feedback from various classmates. This allowed me to overcome obstacles to ensure my product had suited the needs of my audience. An example being that I required more lives for the player as it had been challenging to progress through the game. Overall, Future Tech had been an enjoyable experience, encouraging students to allow their creativity in STEAM to flourish.
By Natasha Solon

Community Projects and innovation Expo

We had our second Innovation Expo here at Westlake Girls, on the 27th November, where our STEAM students will be displayed their innovative prototype solutions to the community issue identified during their community project. Five groups where then selected to face a Dragon's Den. We have been privileged to have some amazing industry female role models as our judges.

Nicola Richardson- Executive General Manager People & Culture at Genesis Energy

Basma Hassan- Access DevOps Engineer at Vodafone New Zealand and Westlake Alumni

Emily Melhuish- Lead Data Engineer at Halter and Westlake Alumni

Anmar Taufeek- Integration Lead and Health & Safety, Environmental & Quality Manager at Auckland Council

Megan Darby- Entrepreneur, Director, Founder and Chief Disruptor

Alexia Hilbertidou,CEO of GirlBoss NZalso supported the students by delivering a workshop to show them how to set up their display area, engage with the audience and deliver an effective Dragon's Den pitch.

"Thank you for the opportunity to contribute to such a great cause. It is always amazing to see the ideas that coming out of the learners at such young age. Also never stop to admire the hard work that you and all the teachers putting towards the future generation" Anmar Taufeek

" A very fulfilling experience today being able to use my volunteering day with Genesis to be amongst the Westlake Girls STEAM Expo 2019. Humbled to be with the talent of the future...14 to15 aged students presenting their community and innovation projects blending design, engineering and tech skills altogether. Thank you to the team at Westlake for making this happen, a hugely positive force of change." Nicola Richardson