

# A space education

A recent mock mission to Mars gave New Zealand students a chance to find out more about the red planet.

New Zealand students recently had the rare opportunity to chat with crew members on a mock Mars mission. KATE BLEASDALE spoke to the woman who made it possible and looked at the learning outcomes.

THERE IS A possibility that humans could inhabit Mars, although they would have to contend with high levels of radiation, the toxic atmosphere, and chilling temperatures.

Students at Te Awamutu College posed this question and many others to a team of researchers who embarked on a mock Mars mission for two weeks in February.

Named TasMars, the mission into the Utah-based Mars Desert Research Station (MDRS) was a follow-on from the KiwiMars mission in 2012.

Like KiwiMars, it had a joint Australian-New Zealand crew, with additional participation from crew members from the United States.

The crew had a number of education-focused mission objectives, which included:

- delivering an engaging science learning experience,
- producing resources for schools in New Zealand,
- developing and refining methods for effective tele-education and outreach,
- educating the public about the importance of space science missions,
- fostering international science and education connections and generating future opportunities for New Zealand partnerships.

### Earth and space science

KiwiSpace Education Coordinator, Haritana Mogosanu, said the work done by the crew at MDRS while on their mission covered a range of areas, such as human interaction, geology and geography, palaeontology, nutrition,

engineering, and biosecurity.

This year, Haritana said they had students studying Earth and space science (ESS) making requests to chat to the crew.

Each school made a booking to chat with the crew and were allowed an hour. For the first five minutes of the conversation, the classroom has a quick Skype session with the crew, so they can see their living conditions, then it switches to a live chat function, which is visible on the KiwiSpace website.

Haritana also sits in on the conversations because as a former crew member she may be able to help out with answering some questions.

The learning doesn't stop after the hour is up, as classes will have access to relevant resources that

volunteers at KiwiSpace have uploaded onto their website.

"We're compiling all the resources from last year and this year, and we'll compile them all so it's a science repository related to Mars missions," Haritana said.

"We've been working to relate the materials with aspects of *The New Zealand Curriculum*."

The education programme will also include post expedition activities such as school visits, classroom presentations, development of learning resources, and distribution of the final science and expedition reports.

### What do you want to know?

Haritana said she was "very impressed" with the line of questioning coming from students during their chat sessions.

"It tells me that their knowledge is very profound."

Questions that popped up the most were around the general living set up of the crew, such as what do

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you eat? (dehydrated, freeze-dried, and concentrated food), how do you wash? (mostly using Wet Wipes), and is Earth similar to Mars? (in some ways, but humans couldn't live there in an unsupported environment).

There were also plenty of questions about the Curiosity rover that successfully landed on Mars last year.

Haritana said one of the crew members was involved in the Curiosity team, and they had information about the rover to share with students.

"These kids that they hooked up with, many of them were interested in Curiosity and had seen the landing."

KiwiSpace even set up a live viewing of the rover's landing at the Carter Observatory in Wellington last year.

Te Awamutu College science teacher Nataliia Kravchenko said when she asked her Year 13 students what they wanted study at the beginning of the year, many of them had an interest in Mars as a result of seeing coverage of the Curiosity rover project.

Soon after adding it to her teaching programme, Nataliia found out about the TasMars project and booked an online chat with the crew.

Following their conversation in early February, Nataliia spoke with her class about what the experience meant for them, and said many students noted the value of the chance to speak directly with scientists about their specialist subject field.

The class is working on a different topic at the moment, but Nataliia said they will go back to their Mars learning, and students will refer to the KiwiSpace website to help find more in-depth information.

"When we go back to the topic, I'll use the questions and answers to jog their memories."

Along with having a transcript of their conversation saved on the website, Nataliia said having access to other resources on the site will help when planning for future classes on the subject.

When the time comes to study Mars again, Nataliia said the class will already have some understanding of the topic, because of the chance they had to chat with the TasMars crew.

### Changes to the format

Last year, KiwiSpace ran a similar education programme with the

MDRS crew from the Carter Observatory. During those two weeks, Haritana said they had students of all ages visiting the observatory to learn more about Mars.

Now that the format has changed to an online chat platform, it means schools from all over the country can get involved more easily.

With this change, Haritana said they initially want to focus on fine-tuning the programme to cater for secondary school students learning ESS, but they are always paying attention to what the schools want.

"It's a dialogue. We do these sessions and then we get feedback from the teachers. It's a transformation of the programme."

If a school requests something, Haritana said they try to make it possible.

Eventually the programme could be opened up further to include primary-level students, and Haritana said the interest is definitely there.

Following her own MDRS mission in 2011, Haritana visited schools around Wellington and spoke to them about her experiences.

"I had shells and fossils and rocks, so every session I went to was very interactive."

Haritana aims to make the programme an annual event, and hopes one day a crew made up of teachers from New Zealand could experience the MDRS themselves.

"My dream is to have teachers because they can go back to the schools and inspire more students." ❖

## TE AWAMUTU COLLEGE'S QUESTIONS

*Education Gazette* picked out some questions posed to the MDRS crew by Year 13 students at Te Awamutu College.

Q. Is it worth a manned mission to Mars or can a rover do better?

A. We don't know enough about how what humans perceive compared to rovers. That has actually been part of our work here. Human eyes can detect and analyse things, some of which may be hard to detect with instruments.

Q. What temperature is Mars?

A. The highs at the equator get to 20 degrees C, but winter is very cold, especially at the poles – carbon dioxide freezes. The average temperature on Mars is below zero, and often it gets colder than Antarctica.


Q. How do radiation levels differ from that on Earth?

A. They are really high compared to Earth. That's one of the big problems for astronauts going to Mars – and any life on Mars.

Q. How different is gravity on Mars to Earth, and what effect does that have on the human body?

A. Gravity on Mars is about one third of Earth. It's less than Earth but more than the Moon. We know we can do things on the Moon, but after a long space journey to Mars [about six months] it will be really hard on the astronauts. They will feel weak arriving on Mars, and even risk broken bones from bone density loss in zero gravity.

Crew members of TasMars 2013 were: manager at Ministry for Primary Industries, Melanie Newfield, of New Zealand; mechanical engineer Emma Braegen, of Australia; senior research scientist Jen Blank, of California; and mechanical research and development engineer David Willson, of California.


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