

Teachers fly high at the European Space Agency

Eleanor Hayes reports on the recent teacher workshop at the European Space Research and Technology Centre.

In June 2010, I was delighted to be invited to take part in the European Space Agency's first human space-flight teacher workshop at the European Space Research and Technology Centre (ESTEC) in the Netherlands. Not only did I enjoy the contact with many enthusiastic European science teachers – the target audience of *Science in School* – but I was able to take part in some fascinating workshops.

'What are the obstacles to Martian exploration?' asked Anupam Ojha, physics teacher and director of education at the UK's National Space

Centre. He asked us to consider the best route from Earth to Mars (not the shortest one) and what the many challenges of the Martian environment are. Did you know, for example, that at the very low atmospheric pressure on Mars, your blood would boil instantly at well below body temperature? Or that the force of the air rushing out of your lungs could knock your front teeth out? No wonder Mars explorers will need space suits!

Over the course of 90 minutes, Anu took us on a dizzying tour of the interplanetary and Martian environment – with the aid of hypodermic syringes, marshmallows, liquid nitrogen, an orange and other basic materials. The emphasis of his workshop was to show how the topic of space can be used to teach science. At the end of the day, each teacher received

Image courtesy of Anneke Le Floch / ESA



Teachers building their own radios

a memory stick full of pictures, teaching ideas and other useful resources.

In the neighbouring room, a further group of 20 teachers was learning how to assemble a radio – and receive signals from local radio stations. "This is the first time I have ever soldered anything!" commented several of the teachers.

The Melas Chasma, part of the huge Valles Marineris rift valley on Mars

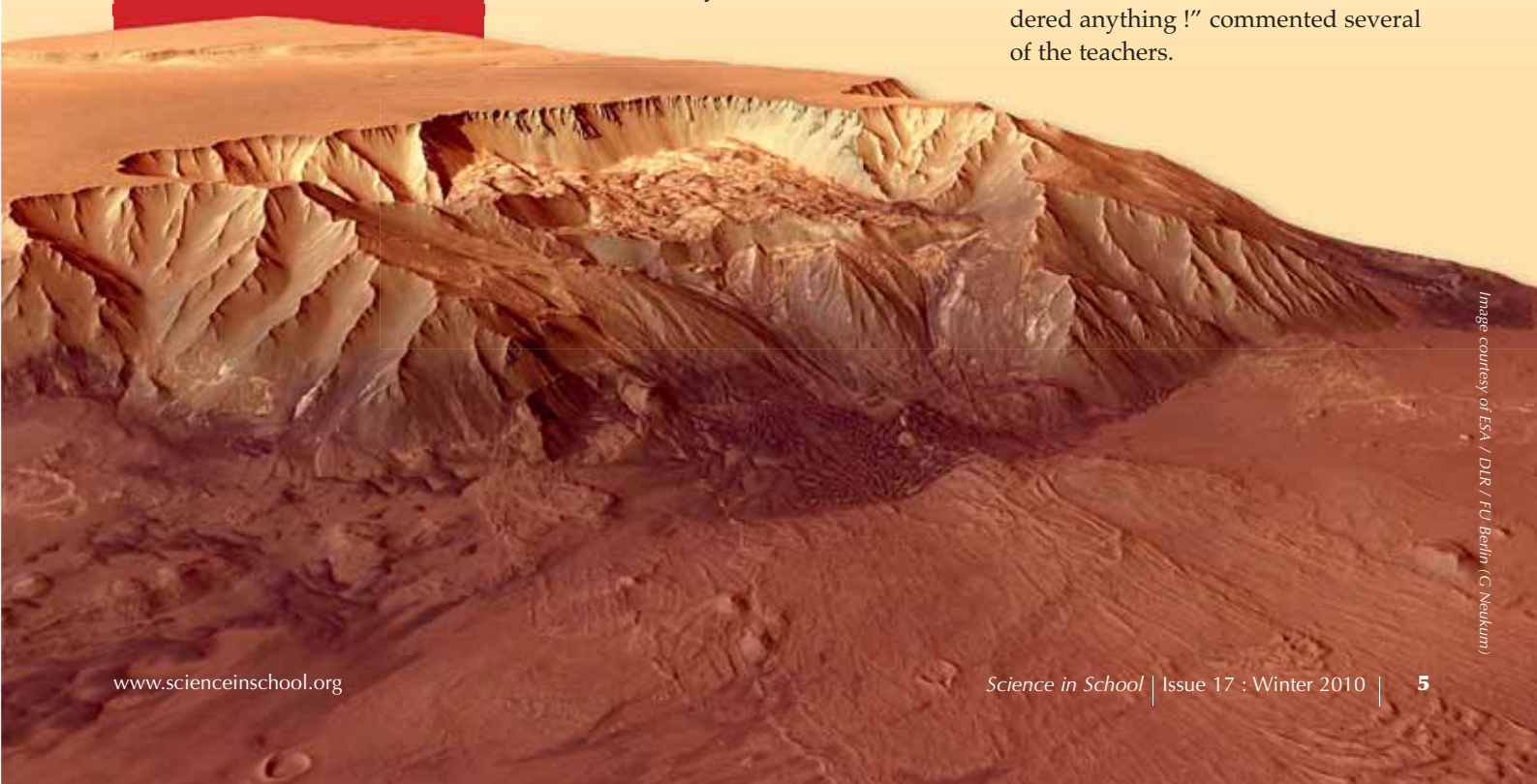


Image courtesy of ESA / DLR / FU Berlin (G Neukum)



Listening to teachers

Shamim Hartevelt-Velani explains why ESA values the involvement of teachers.

In my work – as a teacher working in the human spaceflight education department at ESA – it has always been important to listen to what teachers want. This workshop was one such opportunity, when we brought together 40 enthusiastic teachers from 18 member states of ESA. Not only did we immerse them in three days of hands-on activities, we also introduced them to some of the education materials that we have developed at ESA, and discussed how they could be used in the classroom.

The teachers were able to provide us with useful feedback on some of the educational resources such as the DVD *Feeding our Future – Nutrition on Earth and in Space*^{w3}, the educational game 'Spaceflight Challenger 1'^{w4} and the competition 'Take your classroom into space' (see Patterson, 2009).

During the workshop, the teachers also suggested possible future demonstrations and experiments that could be done on the International Space Station by the astronauts, similar to the outcome of the 'Take your classroom into space' competition – which was very successful in engaging students and teachers from all over Europe. We're even investigating how the students themselves can get involved in future: carrying out space experiments in short educational films.

The feedback we continue to receive from our workshop participants and other teachers helps us to improve our materials and gives us new ideas about what teachers need to assist them in making science teaching more innovative and interesting to students. It also illustrates that the workshop was the exciting beginning of an iterative process of sharing and collaboration between teachers and the ESA human spaceflight education group.

BACKGROUND

Image courtesy of Carmen Guerra



Teachers Bernhard Sturm (left) and Javier Mendez inside a replica of the Columbus module of the International Space Station

Later that afternoon, a panel led an animated discussion about how to use students' enthusiasm for space to engage them in science lessons. One of the outcomes of the discussion was a new thread in the *Science in School* online forum^{w1} – in which teachers can share their space-related teaching materials with other *Science in School* readers.

Later, the teachers met one of ESA's astronauts, Frank De Winne, who described some of the highlights of his OasISS mission as well as his role in the educational projects on the International Space Station (ISS). Being able to talk to Frank informally and ask questions about his work was one of the high points of the workshop.

For both the teachers and ESA, the workshop was a big success – and there will be another one in Summer 2011. Why not apply to participate? Keep watching the ESA Human Spaceflight website^{w2} for details.

References

Patterson L (2009) A classroom in space. *Science in School* 12: 50-54. www.scienceinschool.org/2009/issue12/spaceclassroom

To find out more about the 'Take your classroom into space' competition, see: www.esa.int or use the direct link: <http://tinyurl.com/2cpk4sq>

The 'Take your classroom into space' education kit can be ordered online here: <http://esa-hme-education.org>

Web references

w1 – To join the discussion about how to use space to teach science, visit the *Science in School* discussion forum: www.scienceinschool.org/forum/esahs

w2 – To find out when the next teacher workshop will be, and to learn about the wealth of materials developed by the ESA Human Spaceflight education department, see: www.esa.int/esaHS/education.html

For details of many more education materials produced by ESA, see www.esa.int/educationmaterials. All education materials produced by ESA are freely available to teachers in the 18 ESA member states. Many are translated into several European languages.

w3 – *Feeding our Future – Nutrition on Earth and in Space* examines food as a vital part of life on Earth and in

space. To order a free DVD or download the video (available with subtitles in 13 European languages), see: www.esa.int or use the direct link: <http://tinyurl.com/262fl52>

w4 – Become an astronaut on the International Space Station. 'Spaceflight Challenge 1' features science topics from across European secondary-school curricula. To find out more about this role-playing game, see: www.esa.int or use the direct link: <http://tinyurl.com/39tvgsy>

Resources

Below is a selection of space-related articles previously published in *Science in School*.

Hartevelt-Velani S, Walker C, Elmann-Larsen B (2008) The International Space Station: life in space. *Science in School* 10: 76-81 www.scienceinschool.org/2008/issue10/iss

Hartevelt-Velani S, Walker C (2008) The International Space Station: a foothold in space. *Science in School* 9: 62-65. www.scienceinschool.org/2008/issue9/iss

Wegener A-L (2008) Laboratory in space: interview with Bernardo Patti. *Science in School* 8: 8-12. www.scienceinschool.org/2008/issue8/bernardopatti

Williams A (2008) The Automated Transfer Vehicle – supporting Europe in space. *Science in School* 8: 14-20. www.scienceinschool.org/2008/issue8/atv

Warmbein B (2007) Down to Earth: interview with Thomas Reiter. *Science in School* 5: 19-23.

www.scienceinschool.org/2007/issue5/thomasreiter

For a complete list of ESA-related articles, see:

www.scienceinschool.org/esa

To browse all space-related articles in *Science in School*, see:

www.scienceinschool.org/space

Dr Eleanor Hayes is the editor-in-chief of *Science in School*. She studied zoology at the University of Oxford, UK, and completed a PhD in insect ecology. She then spent some time working in university administration before moving to Germany and into science publishing, initially for a bioinformatics company and then for a learned society. In 2005, she moved to the European Molecular Biology Laboratory to launch *Science in School*.

Shamim Hartevelt-Velani is a secondary-school teacher currently working under contract at ESTEC, in the Directorate of Human Spaceflight. She is the didactics specialist in the education group.



A perspective view of the Hebes Chasma, obtained by the High Resolution Stereo Camera (HRSC) on ESA's Mars Express spacecraft