

High School Students Can Research Mars

NSTA member Brian Grigsby has a way for high school teachers to “send” their students to Mars from the comfort of their classrooms: Have students analyze real data from an orbiting Mars spacecraft.

Grigsby, science department chair at Shasta High School in Redding, California, created and now coordinates the Mars Exploration Student Data Teams (MESDT) program, offered by NASA, Arizona State University’s Mars Education Program, and the Mars Reconnaissance Orbiter (MRO). In this free program, student teams work with scientists, mission planners, and educators on the CRISM (Compact Reconnaissance Imaging Spectrometer for Mars) team at Johns Hopkins University’s Applied Physics Laboratory. The teams image a site on Mars using the CRISM instrument, which is currently on board the MRO. CRISM’s primary mission is to search for mineral traces of ancient water as it images the planet in up to 544 wavelengths of light.

Student teams are not required to have extensive knowledge of geology, or even Mars, to participate, notes

Grigsby. He assures teachers MESDT can be easily integrated in classroom science programs because it is aligned with standards. The program was created to work with any planetary science curriculum “while providing a valuable resource for mission scientists as they analyze an increasing volume of data,” he explains.

MESDT student training sessions and meetings are conducted via distance learning methods, such as desktop videoconferencing, teleconferences, and communication via a bulletin board forum. The distance learning component also connects MESDT teams and their coaches to the Mars research scientists and the science, technology, engineering, and mathematics (STEM) content the MESDT teams are researching.

The distance learning aspect allows teachers/coaches to decide when and how much data students will analyze. “They can do as much or as little” as they like—whatever fits with their schedule, says Grigsby. Some teachers have incorporated MESDT into their geology program, while others make



U.S. high school students can conduct authentic Mars research by participating in the Mars Exploration Student Data Teams (MESDT) program.

it an after-school project. He points out some student teams are “very independent” and can do the work at home; others may need a full semester to “get up to speed.”

Teams are expected to meet independently, as needed, to learn material or accomplish projects or outreach activities. Once a month, teachers and students will participate in web-based conferences during which scientists, engineers, and program staff will pres-

ent background information on Mars, rovers, geology, and missions.

Typically, starting in the fall (although Grigsby says teams can start at any time during the school year), teams receive an overview of Mars and general information about the MESDT program. CRISM scientists provide the necessary background to help students understand Mars exploration within the context of a science mission. Once students have been introduced

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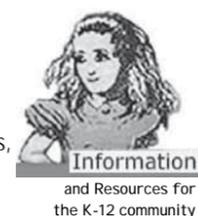
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to the program and given insight into how MESDT functions, they are then trained to use data sets through online sessions and curriculum showing them how scientists analyze data.

Throughout the year, teams use password-protected, online forums to post questions, list data analysis plans, or discuss their findings. This allows all participants to learn from one another, says Grigsby, making MESDT a truly student-driven program. "It becomes *their* research."

In addition, working side by side with real NASA scientists can inspire students to pursue STEM-related careers and "become the next generation of explorers," he observes.

Measuring Success

One measure of the program's success, according to Grigsby, is how many past participants have become interested in STEM careers. "One student [who] participated in MESDT

is majoring in astronomy/physics. His teacher, Rick Snyder of Kickapoo High School in Springfield, Missouri, reported, 'MESDT helped him realize astronomy was the field he wanted to pursue.'" Other MESDT alumni are pursuing degrees in technology, computer science, aerospace engineering, and geology.

"Student success is also measured through the submission of abstracts to the Lunar Planetary Science Conference (LPSC)," says Grigsby. This annual five-day conference in Houston, Texas, "brings together international specialists in petrology, geochemistry, geophysics, geology, and astronomy to present the latest research in planetary science." Because MESDT students worked with real data, he explains, they could apply to attend the conference. They wrote and submitted three abstracts that were accepted for last year's LPSC. "Two of the teams were able to raise the money to attend the conference

and present their findings to their peers. In this case, their peers were world-class scientists," he notes with pride.

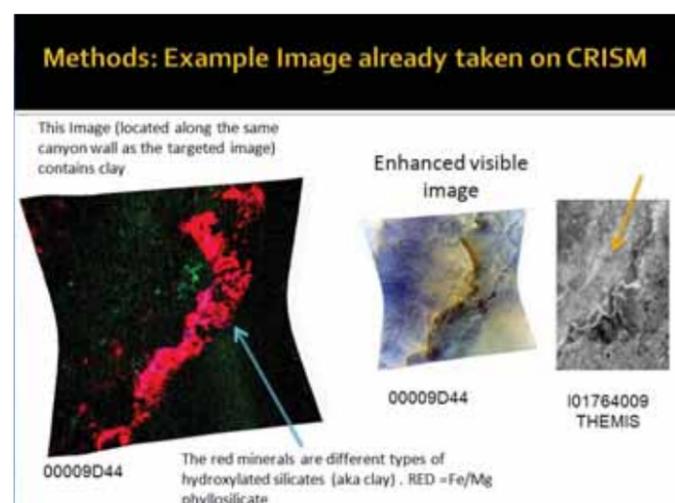
"MESDT participating teams even had their data released with Google Earth as part of its newest version (5.0), which included Google Sky and Google Mars," he adds.

Students also have learned other important facets of research during MESDT's beta-testing period, reports Grigsby. They observed the "trial-and-error" methods scientists employ "to get things to work." And because NASA scientists critique their efforts, they learn to be open to other

opinions. "They don't flinch," he says, because they understand the science.

To Start the Journey

For more information on MESDT, e-mail Brian.Grigsby@asu.edu, or visit <http://mesdt.asu.edu>. To apply to participate, complete the form at <http://marsed.asu.edu/mesdtform.php>. ●



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