

ENHANCING AND EXPANDING EDUCATIONAL OUTREACH PROGRAMS AT THE CENTER FOR METEORITE STUDIES, ARIZONA STATE UNIVERSITY. R. Hines¹, J. Stopar¹, W. Taylor^{1,2}, M.E. Minitti¹ and M. Wadhwa¹. ¹Center for Meteorite Studies, School of Earth and Space Exploration, Arizona State University, Tempe, AZ 85287-1404, ²Mars Space Flight Facility, Arizona State University, PO Box 856305, Tempe, AZ 85287-6305.

As a world-class research and educational institute, the Arizona State University Center for Meteorite Studies (CMS) is dedicated to the study and preservation of meteorites, the only objects to preserve a record of the formation and early history of our Solar System. With representatives of over 1600 individual meteorite falls, the CMS is home to the world's largest university-based collection and is committed to its objectives of curation and distribution of meteorite material for scientific research, education and public outreach.

In addition to cutting-edge research, education and public outreach are major components of the Center's mission; the CMS currently operates an on-campus meteorite museum, offers tours of its significant meteorite collection, offers free meteorite identification services, and actively participates in community events.

Recently, the CMS has begun implementation of a project that involves new educational initiatives aimed at impacting a broader community of educators and students and expanding the existing outreach and education program to reach local K-12 school children. New programs, developed in partnership with ASU's Mars Education Program, include both physical and virtual resources, and employ authentic meteorite specimens and data to inspire future scientists' and explorers' interest in math and science.

To date, this project has embarked on two significant initiatives:

1) The first initiative involves development and production of two loanable education modules targeting K-12 students

and educators. The themes for modules for which we have already developed prototypes are "Mars-Earth Comparison" (Fig. 1) and "Rocks from Space: Origins of Meteorites". Both these modules include high-quality meteorite specimens, lesson plans developed by curriculum specialists at the CMS and ASU's Mars Education Program, 3D models, and several other educational resources.



Figure 1. Classroom education module prototype: Mars-Earth Comparison. This loanable classroom module contains inflatable Earth and Mars globes, books, posters, DVDs, rock and mineral specimens (including a real iron meteorite), and a detailed educator guide. The guide is accompanied by a sequence of training videos, and all lessons and activities are aligned to the National Science Education Standards.

These modules will give both urban and rural Arizona students access to unique educational materials, and provide teachers with standards-aligned, inquiry-based materials designed to teach challenging topics within the Earth and Space Sciences. Future funding will allow the expansion of this program to the regional and, eventually,

national level by increasing the number of available modules for loan and increasing module availability through partnerships with other academic institutions. Loans will be provided free of charge to certified educators with a nominal refundable deposit (per institution), making this unique resource accessible to educators with limited budgets.

Onsite training for K-12 teachers, followed by classroom testing, begins at ASU in February 2009, as part of the ASU Spring Mars Educator Conference. Educators will benefit from hands-on instruction in classroom implementation of educational materials, specific detailed review of module lesson plans with NASA educators, and the opportunity to provide input into the development process. The teacher workshop requires only a nominal fee, which maximizes access to training for all educators. Attendance at the workshop is optional and will not be required for use of the modules. A detailed user guide, instructional videos, lesson plans, and background information are included with each module as part of the loan. Additionally, streaming movie and PDF instructions will be available from the CMS website (see below).

The goal of this initiative is to make meteoritic science accessible to K-12 educators while still providing a quality educational experience and inspiring young minds. With this new program, the CMS intends to complement current outreach and education activities and bring the wonders of meteorites to a new local and national audience.

2) The second initiative involves implementation of online virtual resources via expansion and enhancement of the CMS website. In order to serve a broader international audience as a gateway to meteorite information and distance learning, the CMS website is currently undergoing

redesign. The goal of the website redesign is to provide a dynamic interface that appeals to a wider audience and captures the imagination. The new website will ultimately include access to new virtual educational materials, answers to basic questions about meteorites, streaming movie clips that detail the research and collection activities of the CMS, and a searchable meteorite collection database.

Educator resources available on the website will include instructor guides, hands-on activities, educational website links and slide sets. The ideas and materials available in each section are derived from those that are currently available from ASU's Mars Education Program, NASA and other educational organizations. The resources are intended to provide educators with insightful new ways to present meteoritic science to K-12 students, including printable and streaming movie instructions on the use of the aforementioned loanable classroom modules. In addition, educational streaming movie clips feature ASU scientists as they describe the activities of the CMS. Movies will be available that provide a virtual tour of the meteorite collection, an explanation of how meteorites provide the keys to the formation of the Solar System and our place in it, and a demonstration of how scientists start with a meteorite in the collection, perform analyses in a laboratory and finish with insights into Solar System formation.

Current funding allows continued growth and development of the CMS website including the production of additional educational units, meteorite identification guides, and streaming videos.