

SPACE ROCKS! INCREASING THE IMPACT OF EDUCATIONAL INITIATIVES AT THE CENTER FOR METEORITE STUDIES, ARIZONA STATE UNIVERSITY. R. Hines¹, W. Taylor^{1,2} and M. Wadhwa¹,
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Originally established in 1960 as the Arizona State University Laboratory for Meteoritic Research, the ASU Center for Meteorite Studies (CMS) was created to house over 700 specimens from the Dr. H. H. Nininger meteorite collection. In the years following its inception, the CMS's meteorite collection and its role as a center for scientific research were expanded significantly. The Center acquired over 675 additional meteorites between 1966 and 1995 (including the Dr. R. Dietz and Dr. C. U. Sheppard collections), obtained and curated Dr. Nininger's archives and personal correspondence, became the publisher of *Meteoritics* (then a quarterly journal of the Meteoritical Society), and was a principal participant in the NASA's Apollo lunar sample analysis program, analyzing over 200 lunar samples between 1967 and 1986.

At present, the CMS houses the world's largest university-based meteorite collection (representing 1562 separate meteorite falls), and remains committed to its objectives of curation and distribution of meteorite material for scientific research, education and public outreach. As part of that commitment, the CMS currently operates a meteorite museum, conducts tours of its significant meteorite collection, offers a free meteorite identification service, and actively participates in local and regional community events.

In addition, we are now actively seeking ways to enhance the impact of our educational initiatives on a broader community of students and educators, and to expand our education and outreach program to reach new audiences, particularly local school-age children (K-12). In partnership with ASU's highly successful Mars Education Program, it is our goal to develop new programs and resources that use authentic data and specimens to inspire the next generation of explorers and scientists. Our primary objective is to use "Rocks from Space" as a means of sparking the interest of school children in science and math.

This project consists of two main initiatives:

1) The development of loanable education modules (Fig. 1) targeted at K-12 students and educators that will include specimens, lesson plans, 3D models, and other resources (DVDs, posters, books). Specific examples of education modules that will be developed include:

- "Rocks from Space: Origins of Meteorites"
- "How old is the Earth?"

- "How to Tell the Age of a Rock"
- "Earth-Mars Comparison"
- "How to Identify a Meteorite"
- "Rocks from Space: Origins of Meteorites"
- "Meteorites in Human History and Culture"

2) The improvement and expansion of the current CMS website through more accessible design, innovative animations, and access to online versions of the education modules. An improved website, including a new searchable collection database, will serve as a gateway for scientific information on planetary materials and distance learning resources.

Our goal is for these initiatives to have a local as well as a global impact. Loanable materials will give Arizona children (particularly from Phoenix-area public schools, but also from school districts in more rural parts of Arizona) access to unique educational materials, including real meteorites – some of the most significant planetary materials from space.



Figure 1. Prototype of the Earth Mars Comparison education module including hands-on specimens, 3D models, lesson plans, and other resources (DVDs, posters, books).

These unique loanable modules will provide educators with inquiry-based materials that are standards-aligned and designed to help teach difficult, sometimes intimidating, topics within the Earth and space sciences. Through interactions with real specimens, images, authentic data, and models, students will be en-

couraged to use their observational and critical thinking skills.

Each module will contain a broad range of materials including: 1) standard-based lesson plans for audiences of varying ages (appropriate for homeschool groups), 2) CD ROM with PowerPoint presentations, animations, image galleries, articles, and resources lists, 3) DVD/VHS materials, 4) books geared for K-12 students, 5) posters and images for use with specific activities, 6) teaching models, and 7) a detailed user guide.

Module activities have been developed by curriculum specialists at the CMS and ASU's Mars Education Program and emphasize how scientists actually "do" science. Educators will be able to register and reserve modules online through the CMS website at no cost. To ensure access to a broad range of populations, the Center hopes to make these modules available at local community centers and libraries in the metro Phoenix area. These resources will compliment the current educational outreach activities of the CMS and bring the wonders of meteorites to new formal and informal audiences.

Program effectiveness for the initiative described here will be evaluated in several ways: (1) Tracking the number of requests for educational materials; (2) Program evaluations completed by educators; (3) Number of visitors to the CMS website (including tracking input from the "Comments and feedback" section of the website; and (4) Google standing of the CMS website.