

### SPARKING YOUNG MINDS WITH MOON ROCKS AND METEORITES.

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What could be more exciting than seeing pieces of other worlds? The Apollo program left a legacy of astounding accomplishments and precious samples. Part of the thrill of those lunar missions is brought to schools by the lunar sample educational disks, which contain artifacts of six piloted trips to the Moon. JSC is preparing 100 new educational disks containing pieces of meteorites collected in Antarctica. These represent chunks of several different asteroids, that were collected in one of the most remote, forbidding environments on Earth. These pieces of the Moon and asteroids represent the products of basic planetary processes (solar nebular processes, initial differentiation, volcanism, impact), and, in turn, these processes are controlled by basic physical and chemical processes (energy, energy transfer, melting, buoyancy, etc.). Thus, the lunar and meteorite sample disks have enormous educational potential.

We are developing new educational materials to accompany the disks. Present materials are not as effective as they could be, especially in relating samples to processes and to other types of data such as spectral studies, photogeology. Furthermore, the materials are out of date. We will be producing new background materials for teachers, assembling slide sets with extensive captions, and devising numerous hands-on classroom activities to do while the disks are at a school and before and after they arrive. The classroom activities will be developed by teams of experienced teachers working with lunar and meteorite experts.

**Background information.** Each disk will be accompanied by a booklet that provides essential background information to teachers. John Wood is writing the meteorite booklet. These booklets will be written for a general audience and will convey the scientific importance and excitement of the Moon, asteroids, and meteorites. They will integrate what we find out from sample studies with information from other sources, such as photogeologic studies of the Moon. Each booklet will also discuss future possibilities, such as lunar bases and asteroid mining.

**Slide sets.** Photos can make a subject come alive. Our slide sets will be accompanied by lucid captions that describe interesting features and the main message of each slide. The sets will tell the same basic story as the booklets, but in a more pictorial way. Slides also provide the opportunity to explore planetary connections. For example, lava channels on the Moon (such as Hadley Rille) can be compared with lava channels on the Earth. We hope to convert the slides to video format because video players are more common in schools than are projectors, and because many teachers feel more comfortable letting experts explain each slide, rather than relying on the captions.

**Classroom activities.** This is the heart and soul of the project. We will assemble groups of experienced elementary, middle, and high school teachers (six in Texas and ten in Hawaii) to help devise hands-on activities. Our goal is to use the sample disks as starting points for the exploration of planetary processes. For example, examination of the basalt samples in the disks leads to experiments in volcanic eruptions and the nature of volcanoes on Earth. The emphasis will be on experiments; there will be no crossword puzzles or find-the-hidden-word exercises. There will, however, be ideas for creative writing (e.g., suppose a big meteorite hit the Earth?), history (e.g., early exploration of Antarctica), and social studies (e.g., what type of government should there be at a lunar base?). The essential ingredient in this part of the project is the partnership between scientists and teachers. Each brings different knowledge and experience to the enterprise, and it helps forge solid relationships for future educational projects.

**Final product.** We will produce separate publications for lunar samples and meteorites. Each document will contain the background material (the booklet described above), the activities organized in units (e.g., volcanism, impact), and hints for using the activities effectively. Although independent, the two publications will refer to ideas and activities in the other and will be organized and laid out in similar ways. The sample disks, slides sets and booklets will be distributed as educational packages to schools by the Teacher Resource Centers at various NASA centers.