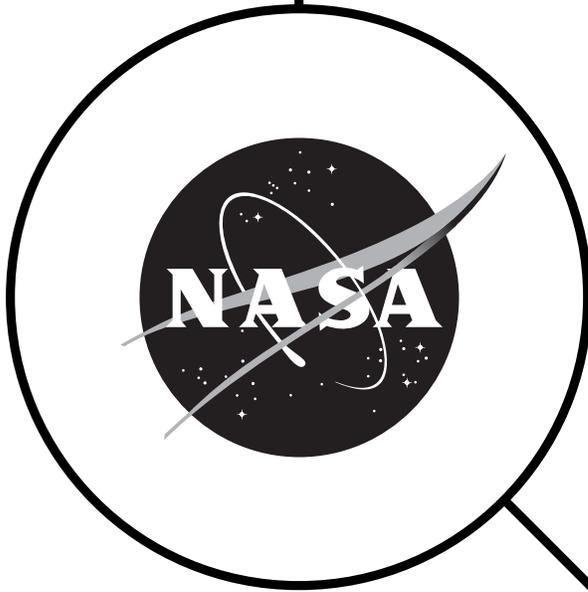


EXPLORING THE MOON

**a Teacher's Guide
with activities
for Earth
and Space
Sciences**



**National Aeronautics and Space
Administration**

**Office of Human Resources and Education
Education Division**

**Office of Space Science
Solar System Exploration Division**

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About the cover

Our knowledge and concepts of the Moon change over time as depicted by the three images.

A map of the Moon (circa 1700s) is overlaid by an Apollo 11 astronaut footprint (NASA photo AS11-40-5878) and a NASA painting of a future lunar habitation module by Pat Rawlings of Science Applications International Corporation.

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About this Book

These materials have been designed for use in upper elementary through high schools especially, but not exclusively, with the Lunar Sample Disk. See Page iv.

This book contains:

- information on the Lunar Sample Disk,
- Activity Matrices -- Skills & Standards,
- a Teacher's Guide,
- Moon ABCs Fact Sheet,
- Rock ABCs Fact Sheet,
- Progress in Lunar Science Chart,
- 17 activities,
- Resource Section for each unit,
- Glossary,
- NASA Educational Resources.

The "Teacher's Guide" titled "The Moon: Gateway to the Solar System," pages 1-16, provides background information about the Moon. It tells the story of the Moon's geological history and how scientists try to decipher the story. This background information may be useful reading for students as well. Key facts about the Moon appear on the "Moon ABCs" and "Rock ABCs" pages. These pages were named to emphasize the basic nature of the information. The "Progress in Lunar Science Chart" summarizes our knowledge about the Moon from 1959 to 1997.

The activities are divided into three units: Pre-Apollo, Learning from Apollo, and the Future. These correspond, at least roughly, to exercises that can be done before the Lunar Sample Disk arrives at your school (Pre-Apollo), while it is there (Learning from Apollo), and after it has been returned to NASA (The Future).

The length of time needed to complete an activity will vary according to the degree of difficulty and the development level of the students. Thus activities may take one to eight or more class periods.

"Activity Matrices" are provided to assist in identifying the science process skills and science and mathematics educational standards associated with each activity.

Classroom activities promote problem-solving, communication skills, and teamwork. Each activity consists of teacher pages and reproducible student sheets.

Teacher pages begin with a statement of purpose and background information with answers specific to the activity. Relevant pages in the "Teacher's Guide" also are listed. These are followed by sections on preparation, in-class suggestions, wrap-up ideas, and extensions. Words that are bolded appear in the Glossary.

Student sheets include a purpose statement, key words, list of materials, procedure, questions with space provided for answers, and charts. Key words are included in the Glossary. Materials for each activity are listed in order of use. They are bolded in the text of the procedure section as a memory aid for students.

A note on measurements: These activities use metric units of measure with the few exceptions when English units are used to describe items from the material lists such as pans or measuring cups.

About the Lunar Sample Disk

Legacy of Apollo

The collection of rocks and regolith from the Moon is a tangible legacy of the U.S. Apollo Space Program. NASA makes a small portion of this “extraterrestrial” material available for classroom use through the Lunar Sample Loan Program.

Lunar Sample Loan Program

Six samples of rocks and regolith are embedded in a 15-cm diameter plastic disk. Disks are sent via registered mail to educators for one- to two-week loan periods. The package also includes this book *Exploring the Moon*, an annotated slide set of lunar images (described more fully on Page v), and a collection of color photographs and descriptions of the six samples.

How to Schedule a Disk

Educators must first be certified to borrow lunar material by attending a training seminar on security requirements and proper handling procedures. This is the same certification as for borrowing the Meteorite Sample Disk. Then a written request must be sent to a NASA Educator Resource Center at least one month prior to the requested loan date. Contact the NASA Educator Resource Center that serves your geographic area for more information on certification seminars and request procedures (refer to Page 146 of this book for addresses and phone numbers.)



Ninth grade science students from Waipahu High School, Hawai'i view the Lunar Sample Disk as part of an activity from *Exploring the Moon*.

About the Slide Set

The Collection

A set of thirty-six 35-mm slides has been assembled to complement the activities in this book *Exploring the Moon*. Each slide is accompanied by detailed captions. Topics include what we knew about the Moon from telescopic and other astronomic observations before Apollo, Apollo missions, astronaut activities on the lunar surface, the Highlands, the Maria, how the Moon formed, and exciting ideas for future explorations.

How to Obtain a Copy

It is easy to obtain a copy of the slides. They are available from the Central Operation of Resources for Educators (CORE) in Ohio or from NASA Educator Resource Centers. Phone calls are welcome if you are unable to visit the Educator Resource Center that serves your geographic area. Please refer to Page 146 in this book for addresses and phone numbers for CORE and Educator Resource Centers.

