# Teaching Tools

## New Traveling Trunk in Geology
### by Mark A. Gonzalez

North Dakotans, as much as or more than the citizens of any other state, are highly dependent on the local geology for their livelihood and well being. Farmers and ranchers know that geologic parent materials and soil types strongly affect their farming and grazing practices. Those employed in the mining industry know that geology affects the quality, location, and abundance of oil, natural gas, lignite coal, bentonite clay, sand, and gravel deposits. Rural inhabitants must know the subsurface to develop water wells for domestic use and irrigation. And city dwellers know that natural hazards, such as flooding, landsliding, and unstable and expansive soils, greatly affect the integrity and safety of their property. Consequently, it is imperative that our students receive a thorough, solid background in earth sciences.

Members of the North Dakota Geological Society (not to be confused with the ND Geological Survey) have teamed with Gateway to Science, a non-profit, educational center in Bismarck, to create a new traveling trunk in geology. The purpose is to provide all school districts with access to geologic curricula that are affordable and relevant to our students. The curricula were developed by the American Geological Institute (see Teaching Tools, *NDGS Newsletter*, vol. 27, no. 2, Winter 2000) and fashioned by the North Dakota Geological Society to provide local, relevant examples that are meaningful to North Dakota's students. The curricula are based on the National Science Education Content Standards for grades 7-8. They emphasize inquiry-based, hands-on, active-learning exercises.

The trunk provides materials for eight inter-related modules, including:

1. The basics of rock identification and the principle properties of igneous, metamorphic, and sedimentary rocks,
2. Rocks and landforms of North Dakota, including exercises to read geologic and topographic maps from the six physiographic regions of the state (i.e., the Red River Valley, Glaciated Plains, Missouri Coteau, Coteau Slope, Missouri Slope, and Little Missouri Badlands),
3. The basics of rock weathering and soil formation using materials of different chemical composition,
4. Experiments in rock abrasion using materials of different hardness ,
5. The formation of erosional landforms by moving water,
6. The formation of deltas and floodplains and the movement of sediment by rivers,
7. The erosion and deposition of sediment by glaciers,
8. The effect human activities have on rocks and landforms.

Each module employs the "Five E's" approach to an inquiry-based education, that is: engage, explore, explain, elaborate, evaluate. The curricula are tailored to local conditions, and in this way make learning relevant to students' lives. For example, students might study the flood potential and flood history of their local communities, and then compare them with selected communities around the country to better understand the local factors that affect flooding. Reports at the end of the program provide valuable opportunities for students to develop research, analytical, speaking, and writing skills, which are transferable to all facets of life.

Two trunks with the identical materials will be available for check out by teachers by the start of the 2002-03 school year. Teachers must successfully complete a training program through Gateway to Science to use the materials. For more information on availability, cost of rental and shipping, and a schedule of training workshops, contact:

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## Surfing Safari: Geology of National Parks

National Parks are not only beautiful places to view wildlife and magnificent panoramas, they also contain some of the most spectacular geologic features in our country. The National Park Service has developed a web site where teachers can explore the geology of several national parks where various geologic features are especially well developed. To learn more about the geology of national parks visit the Park Service's web site for educational resources: http://www2.nature.nps.gov/grd/edu/ .

The web site features a variety of resources. For example, one link is devoted to videos of various parks, such as Mount Rainier, Grand Canyon, and Yellowstone. Another link contains a list and description of some recent books written on the geology of national parks. Elsewhere, teachers can find PowerPoint presentations describing various geologic concepts and curricula on paleontology and the evolution of life on Earth.

Many exercises are rated by grade level. This is good because teachers can quickly determine if the curriculum is appropriate for their students. Also, there are some hands-on activities that illustrate geologic processes clearly and cheaply. For example, a series of laboratory exercises have been written to describe the formation of the Badlands National Park in South Dakota. These exercises are largely transferable to the features seen in Theodore Roosevelt National Park in North Dakota.

Can't squeeze in a field trip to Yellowstone or the Grand Canyon on your school budget? Then visit the web site of the National Park Service and see if you can find the images, videos, textbooks, lab exercises, or information to convey geologic concepts while fulfilling national science education content standards.

# NORTH DAKOTA GEOLOGICAL SOCIETY VCR TAPE LIBRARY

**Compiled by Linda Hagen**

The North Dakota Geological Society (a non-profit professional organization not to be confused with the ND Geological Survey) has a collection of video tapes that are available for use by schools, colleges, service clubs, or groups interested in programs dealing with earth science or the solar system. The Society has one copy of each geology tape and two copies of each NASA tape.

**Policy and Terms:** Loan period is 14 days. Tapes may be picked up and returned to the Tapes Librarian at the office of the North Dakota Geological Survey at 1016 E Calgary Ave., Bismarck, North Dakota, at no charge. Tapes will be mailed for a handling/postage fee of $5.00; return postage must be covered by the party obtaining the tapes. Make checks payable to the North Dakota Geological Society.

**GEOLOGY**

**(Viewing time, in minutes and seconds, is shown in brackets)**

| | |
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| AAPG-1 Before the Mountains [28:48] | AAPG-2 Birth of the Rockies [28:05] |
| AAPG-3 Modern Carbonates [17:00] | AAPG-4 Arid Carbonate Coastlines [31:00] |
| AAPG-5 Stratigraphic Traps: The Tidal Flat Model [13:00] | AAPG-6 Carbonate Petrography [28:10] |
| AAPG-7 Development Geology [46:00] | AAPG-8 Sample Examination [26:00] |
| GSA-1 The Earth Has a History [19:50] | RCV-1 Life in the Balance: The Study of Extinctions [28:00] |
| DK-1 The Beaches are Moving [60:00] | SM-1 Gems and Minerals [45:00] |
| SM-2 Gemstones of America [60:00] | AMOCO-1 Blowout at Lodgepole [61:00] |
| Basic Concepts of Sequence Stratigraphy [26:00] | Countdown on the Coast [15:00] |
| The Recent Ice Age [26:00] | Stemming the Tide [11:00] |
| Mysteries in the Dust [58:00] | |

**PALEONTOLOGY**

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|---|---|
| AAE 10101-Dinosaur! The First Clue-Tale of a Tooth [:48] | AAE 10102-Dinosaur! The Fossil Rush: Tale of a Bone: [:48] |
| AAE 10103-Dinosaur! Birth of a Legend: Tale of an Egg: [:48] | AAE 10104-Dinosaur! Giant Birds of the Air: Tale of a Feather [:48] |

**NASA TAPES**

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| 1AB-Planet Mars: [28:30] | 1AB-Voyager 2: Neptune Encounter [29:00] |
| 2AB-Earth Views From Shuttle Flights [26:00] | 2AB-Comet Halley Returns [29:00] |
| 3AB-New Look at the Old Moon [28:30] | 3AB-Assignment: Shoot the Moon [28:00] |
| 3AB-Moon: An Emerging Planet [13:00] | 4AB-Our Star the Sun [28:30] |
| 4AB-Earth, the Planet [28:30] | 5AB-Veil of Venus [28:30] |
| 5AB-Apollo 12: Pinpoint for Science [28:00] | 6AB-Eagle Has Landed: The Flight of Apollo 11 [28:00] |
| 6AB: Four Rooms: Earth View [28:00] | 7AB: Fourth Planet: Mars [28:30] |
| 7AB-Mercury: Exploration of a Planet {28:00] | 8 ABC: I Will See Such Things [28:30] |
| 8ABC: 19 Minutes to Earth [14:30] | 8ABC: Picture the Solar System [14:30] |
| 8 ABC: Earth-Sun Relationship [5:30] | 9AC: Life on the Moon [28:30] |
| 9AC: Mars-Is There Life [14:30] | 9AC: Life [14:30] |
| The Prize/Tape 1: Our Plan & Empires of Oil | Tape 2: The Black Giant and War and Oil |
| Tape 3: Crude Diplomacy and Power to the Producers | Tape 4: The Tinderbox and the New Order of Oil |

**THE UNDERWATER WORLD OF JACQUES COUSTEAU**

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| The Forgotten Mermaids [60:00] | The Dragons of Galapagos [60:00] |
| The Flight of the Penguins [60:00] | Whales [60:00] |
| A Sound of Dolphins [60:00] | The Smile of the Walrus [60:00] |
| Octopus-Octopus [60:00] | |

**MISCELLANEOUS**

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| AAPG: Hydrology & Waste Mgmt Seminar (A Seminar Held March 1987, Dallas TX) | EXT: Abandoned Well Plugging – Better Safe Than Sorry [12:00] |
| Energy For the World – How to Ship Over 100,000,000 Tons of Coal in Seven Minutes [7:07] | CD Tape: A Topographic Field of Washington, DC |
| | US Forest Service: Exotic Canyon [8:05] |