



The Minnesota Minerals Education Workshop wishes to extend its thanks to the faculty and staff of Macalester College for hosting this year's workshop, and we thank the financial donors who have supported this year's MMEW workshop.



MINNESOTA MINERALS EDUCATION WORKSHOP

PO Box 14345 St Paul, MN 55114-0345

www.mmew.org

MINNESOTA MINERALS EDUCATION WORKSHOP • 2010 REGISTRATION • SIDE B

Name _____	School name _____
Home address _____	School address _____
City/State/Zip _____	City/State/Zip _____
Home phone () _____	School phone () _____
Home fax () _____	School fax () _____
E-mail _____	E-mail _____
Grade level you teach _____	
<input type="checkbox"/> Registration fee of \$35 enclosed	<input type="checkbox"/> By registering for this workshop, I certify that I have health/medical insurance
<input type="checkbox"/> School district check to follow	TEACHER SCHOLARSHIPS. A limited number of scholarships are available for this year's workshop. Scholarship funds can be used to help pay for the workshop registration fee and travel expenses. Applications are due June 19 and awards will be made by July 8. Applications are available at www.mmew.org .
<input type="checkbox"/> UNIVERSITY CREDIT OPTION. Check here if you would like to receive information about continuing education graduate credits. 1 to 2 credits are available from U of MN-Duluth for participation in the workshop at a cost of \$95.73 per credit. For a credit application and more information, see the UMD credit link on MMEW's website: www.mmew.org .	FIELD TRIPS. Transportation as well as a complimentary box lunch will be provided for the tours. All participants must ride the buses to the field trip sites; no private vehicles will be allowed.
<input type="checkbox"/> ON-CAMPUS HOUSING OPTION. Check here if you would like to receive information about on-campus housing	CAN'T ATTEND THIS YEAR'S WORKSHOP? Please share this information with a colleague who may be able to register for the program. Or call 888-733-4649 if you would like to have your name removed from the mailing list.
SPECIAL NEEDS. Please note any special needs:	REGISTRATION DEADLINE: July 3, 2010 or until filled.
Access _____	RETURN THIS FORM ALONG WITH YOUR \$35 REGISTRATION FEE TO:
Dietary _____	Minnesota Center for Mineral Resource Education, PO Box 14345 St Paul, MN 55114-0345
Other _____	

MINNESOTA MINERALS EDUCATION WORKSHOP (MMEW) MACALESTER COLLEGE-TWIN CITIES • AUGUST 3-5, 2010

GENERAL INFORMATION. This three-day workshop offers geology, earth science, and mineral resources training for K-12 teachers, school administrators, science specialists, and librarians. Classroom sessions are presented by geologists, educators, and industry professionals. Field trips and tours are designed to provide an opportunity to explore first-hand many of the concepts introduced in the classroom. Participants also receive a variety of resource materials including rock and mineral sample kits, classroom exercises, posters, and information packets. A certificate for contact hours is provided upon completion of the workshop. Continuing education graduate credit also will be available through the University of Minnesota for an additional fee. Participants must attend all classroom sessions and all field trips in order to receive certification and/or college credit.

LIMITED ENROLLMENT. Enrollment for the workshop is limited. We will make every effort to accommodate your particular areas of interest, however, we cannot

guarantee that space will be available in every classroom session. Please indicate acceptable alternate sessions in the space provided on the registration form when making your class selections.

FIELD TRIPS. Participants will be led on two full-day field trips to include a tour of a groundwater remediation system, Paleozoic outcrops, aggregate mining facilities, and the Minnesota Department of Transportation MnROAD research facility. Please be advised that the field trips can be strenuous. Participants will be walking to some of the sites. Boots or sturdy walking shoes are required.

REGISTRATION INFORMATION. Fill out the enclosed registration form, selecting your first and second choices for classroom sessions. Return your completed registration form along with the \$35.00 workshop registration fee to:

Minnesota Center for Mineral Resource Education (MCMRE), PO Box 14345 St Paul, MN 55114-0345

MAKE CHECKS PAYABLE TO: Minnesota Center for Mineral Resource Education

QUESTIONS? Call 888-733-4649

NOTE: The registration fee covers breakfast and lunch meals at the workshop, transportation to all field trip sites, and resource materials.

OVERNIGHT LODGING. Rooms will be available on campus in residence housing or Days Inn. Information about additional lodging options and local attractions will be sent with your confirmation packet.

Workshop registration deadline: July 3, 2010 or until filled. Space is limited. Please register early.



COURSE DESCRIPTIONS (select one course and one alternate course from each section).

SECTION 1:

GROUNDWATER: OUR HIDDEN RESOURCE. Groundwater is our largest source of usable freshwater, yet because it is below the earth's surface, it is often overlooked. This session will compare the scale of water resources in Minnesota. We will cover the hydrologic cycle, identifying connections between surface waters and groundwater, and learn how human impacts on surface waters, such as pollution and climate change, affect groundwater. Several low-budget classroom activities will be presented.

URBAN GEOLOGY: CONSTRUCTING A FIELD TRIP IN THE CITY. This session will be a virtual building stone tour of downtown St. Paul. Through photographs, hand samples, and maps, we will "visit" the sites described in your notebook and talk about how these buildings help to tell the story of Minnesota's geology and natural resources. We will also share ideas for constructing similar explorations in your own area.

GEOLOGY OF INTERSTATE PARK. Interstate Park offers evidence of a broad sweep of the geologic events that shaped the face of Minnesota. From igneous rock formation along a continental rift 1.1 billion years ago to immense natural cisterns carved out by water from the melting of the glaciers 10,000 years ago, the park is a showcase of a great variety of geologic processes. You will also model an activity that you can do in the classroom, which illustrates the mechanics of how glaciers shaped our landscape.

ROCK IDENTIFICATION. Don't take all rocks for granite! In this class, you will learn about the three basic types of rocks—igneous, sedimentary, and metamorphic—and how common they are in Minnesota. This class will stress observing the differences between rocks—color, texture, and appearance—and using those qualities to classify groups of rocks. We will also learn about the interesting origins of these rocks. Teachers are encouraged to bring a rock they would like to have identified.

SECTION 2:

SHRINKING SPACE AND TIME. Using inexpensive stream tables to explore surface processes, this session will introduce a simple, reusable stream table appropriate for use throughout the K-12 curriculum. We will set up one table and run several of the

exercises included in your notebook. Finally, we will discuss how the tables can be used to help students gain a quantitative understanding of the landscape-sculpting power of rivers.

WHAT CAN CAVES TELL US ABOUT MINNESOTA? There are many caves located across the southeastern portion of Minnesota. These caves and the bedrock units in which they form contain a rich history of Minnesota. While bones and fossils of extinct animals and plants can be found in some caves, there is also a direct record of Minnesota's climate found in cave environments. Caves represent a window into how water, perhaps Minnesota's greatest resource, moves underground. This class will explore what caves can tell us about our state. .

GLACIAL GEOLOGY. If you think winters are bad in Minnesota today, you should have been here 20,000 years ago! During the last Ice Age, the ice was up to a mile high in places. Glaciers advanced across the state leaving a blanket of sediment that covers nearly all of Minnesota's previous geologic history—3,600 million years worth. Learn about Minnesota's relatively recent geologic history, a time when winter really did last all year long.

MINNESOTA IN THE WORLD OF CLIMATE CHANGE. Global warming, melting polar ice, climate change, cap and trade; confused about what all this means for Minnesota? Come to this session to hear the latest scientific understanding on natural and human controls on climate and what this means for Minnesota's environment.

SECTION 3:

SAND, GRAVEL, AND GEOLOGY IN THE CLASSROOM. Sand and gravel are locally produced resources that are used in daily life. Aggregate mines can be found in every county of the state. This session will highlight how to incorporate local geology into the classroom as well as demonstrate a lab activity, "Making a concrete garden stone," that shows how items surrounding every school, such as sidewalks, playgrounds, and buildings, are made.

CAREERS IN MINING. This session will explore the working world of the mining industry. We will discuss aspects of the blue- and white-collar careers in this industry and what type of education is needed for these jobs. With the current workforce

aging, the mining industry is a wonderful option for those individuals who love to be outdoors and don't necessarily need a college degree to earn a good income in this field. Participants will play a fun, interactive game matching careers, as well as a "career clustering" activity to see what type of interests can spark a career.

MINNESOTA FOSSILS: AN OVERVIEW. Minnesota is not as famous for its fossils as other states to the west, but it does have a rich fossil history. Learn about some of the oldest fossils in Minnesota's past as well as the more recent. A slide presentation highlighting fossil collecting around the state will illustrate our diverse fossil history. An overview of the fossil-bearing strata and geologic time line represented in Minnesota will be presented. Fossil collecting sites past and present will be discussed as well as some techniques for cleaning, storing, and preserving your specimens.

AGGREGATE EXPLORATION. (Exploration for high-quality sand and gravel deposits). Not all gravel is gravel, or at least, not all gravel is suitable for high-end uses such as producing concrete. In this session, you will learn about the science behind the exploration for high-quality sand and gravel deposits, and the techniques used to test and drill for aggregate resources. You also will have the opportunity to conduct your own aggregate exploration in a hands-on exercise that can easily be adapted for the classroom.

SECTION 4:

MINELAND RECLAMATION: TRUTH OR FICTION? Sometimes we think of mining as just big holes in the earth and large piles of rock. Proposed sulfide mining in northern Minnesota raises additional concerns about acid mine drainage and threats to our water resources. Can these mines really be controlled and reclaimed for other uses? Examine the background of mineland reclamation and learn how good mineland reclamation begins, even before the first shovel of dirt is moved. Look at what steps are being taken to reclaim old mining areas and prevent new mining from harming the environment. See if you can identify problematic mine waste, treat mine water, and beat your classmates in a game of "Reclamation Jeopardy."

EVERYDAY USES OF MINERALS. The fact that every material thing we take for granted in life is either made from

minerals, or depends on minerals for its production, is not commonly recognized or understood. Examples of common everyday items will be traced back to their mineral source to show how modern civilization is totally dependent on mining. A concrete-making activity that can be used in the classroom will be demonstrated.

SERVICE LEARNING IN THE GEOSCIENCES. Service learning is a growing approach to student learning in science education. This class will share information on how one geoscience service learning project arose and has engaged students in active, hands-on earth science work that is producing meaningful data for a local community. The model of how a successful geoscience service learning project can be constructed for your community will be discussed.

ENVIRONMENTAL MINE MANAGEMENT. Participants will be introduced to the complexities of predicting and preventing environmental pollution at mine

sites. You will learn how environmental researchers design experiments and collect data to address these real-world challenges. During and after mining, mine wastes might be contacted by oxygen and water, affecting the quality of the water, which will enter the environment. While some of this water will be potable, some will require treatment or changes in the mining operation to prevent a discharge of pollution. This session will identify and describe commonly generated mine wastes as well as the approaches used for environmentally sound management.

SECTION 5:

FIELD TRIP OVERVIEW. (all participants attend this session) This session will prepare participants for the Wednesday and Thursday field trips. The overview is part of the official curriculum; all workshop registrants will attend this session.

WORKSHOP SCHEDULE

TUESDAY, AUGUST 3

7:00-8:00 am Registration, Breakfast Buffet

8:00-8:15 am Welcome

8:15-9:10 am Keynote Presentation

9:20-11:50 am Classroom Sessions

12:00-1:10 pm Complimentary Lunch

1:20-4:00 pm Classroom Sessions

4:10-5:00 pm Field Trip Overview

WEDNESDAY, AUGUST 4

6:30-7:15 am Breakfast Buffet

7:30 am-6:00 pm Field Trips

(box lunch provided)

THURSDAY, AUGUST 5

6:30-7:15 am Breakfast Buffet

7:30 am-6:00 pm Field Trips

(box lunch provided)

Fossil Hunting one evening TBD.



MINNESOTA MINERALS EDUCATION WORKSHOP • 2010 REGISTRATION • SIDE A

QUESTIONS? Call 888-733-4649

REGISTRATION DEADLINE: July 3, 2010 or until filled.

The workshop consists of a series of classroom sessions, field trips, and tours. Many of the classroom sessions include hands-on activities. The information presented in each session can be adapted to all grade levels. Please read the course descriptions carefully. You will receive a class schedule upon your arrival at the workshop

CLASSROOM SELECTIONS. Select one class and one alternate class from each of the first four sections (labeled one to four). Indicate your course selections by the first and second choice in the spaces provided. We will make every effort to place you in your first choices, however, please note that class sizes are limited. Everyone will attend the class in section 5. Participants who want to receive contact hours or college credit are required to attend all classroom sessions and all field trips.

SECTION 1	Groundwater	Urban Geology	Geology of Interstate Park	Rock Identification	1.	2.
SECTION 2	Shrinking Space and Time	Minnesota Caves	Glacial Geology	Climate Change	1.	2.
SECTION 3	Sand, Gravel and Geology in the Classroom	Careers in Mining	Minnesota Fossils	Aggregate Exploration	1.	2.
SECTION 4	Mineland Reclamation	Everyday Uses of Minerals	Service Learning in the Geosciences	Environmental Mine Management	1.	2.
SECTION 5	Field Trip Overview (all participants must attend this session)					

RETURN THIS FORM ALONG WITH YOUR \$35 REGISTRATION FEE TO:

Minnesota Center for Mineral Resource Education, PO Box 14345 St Paul, MN 55114-0345.