



## 2018 Short Course Selection Form

Date: \_\_\_\_\_ Name: \_\_\_\_\_

School Affiliation: \_\_\_\_\_ City: \_\_\_\_\_

Using the dropdown menus, choose your first and second preferences for each session. Email this form to Sara Welna ([sarawelna@gmail.com](mailto:sarawelna@gmail.com)) and use the subject line “MMEW Course Selections” in the subject line.

Schedule	A	B	C	D
<b>Session 1</b> Special Plenary Talk 9:00 – 10:15 AM	<b>Earth Science Curriculum Development – The Wows and Hows of Teaching Earth Science from Our Backyard to Yours!</b> <i>Jean Dunstan, Deirdre Erbisch, Lloyd Wescoat</i>			
<b>Session 2</b> 10:30 – 11:45 AM	<b>What Mineral Is This and What Do We Do With It?</b> <i>Maggie Upton</i>	<b>Orienteering</b> <i>Cheryl Sill</i>	<b>Plate Tectonics and the Rock Cycle</b> <i>Jim Miller</i>	
Preference:				
<b>Session 3</b> 1:45 – 3:00 PM	<b>Base Metal Deposits (Cu, Pb, Zn)</b> <i>Maggie Upton</i>	<b>Taconite: Minnesota’s Gold; Mining 101</b> <i>Larry Schmelzer</i>	<b>Benefits of Beneficiation</b> <i>Ted Anderson</i>	
Preference:				
<b>Session 4</b> 3:15 – 4:30 PM	<b>Minnesota Caves History and Lore</b> <i>Greg Brick</i>	<b>Naturally Occurring Arsenic in Drinking Water Aquifers: Natural ≠ Healthy</b> <i>Mindy Erickson</i>	<b>What We Can Learn From Minnesota’s Glacial Till</b> <i>Scott Alexander</i>	<b>Radon in Minnesota Homes</b> <i>Marc Katz</i>
Preference:				CANCELED

## ***Short Course Descriptions***

### **Earth Science Curriculum Development – The Wows and Hows of Teaching Earth Science from Our Backyard to Yours!**

*Jean Dunstan, Middle School Teacher, Stanton Township Public Schools, Atlantic Mine, MI*  
*Deirdre Erbisch, Middle School Teacher, Stanton Township Public Schools, Atlantic Mine, MI*  
*Lloyd Wescoat, Education Program Assistant and Service Learning Specialist, Center for Science and Environmental Outreach, Michigan Technological University, Houghton, MI*

Grade Level: Elementary School, Middle School, and High School

Come and explore the world beneath your feet with hands on, rock solid ideas. Earth Science Literacy Principles can help form the bedrock of your science lessons. Investigate the Minnesota Earth Science Standards (K-12) with activities and connections to place-based learning. Learn how to utilize community partnerships to tell the story of geoheritage in your backyard. Session materials will be available to participants on Google Drive.

### **What Mineral Is This and What Do We Do With It?**

*Maggie Upton, Graduate Student, University of Minnesota – Duluth*

Grade Level: Elementary School

This lesson will dive into investigating mineral uses and their identifications. First, we introduce what a geologist does, and how we need different tools to do our job successfully. Next, we discuss how minerals are used in everyday life and do a matching activity. Lastly, we talk about mineral properties and how to identify the minerals using observational skills while completing a worksheet. We will then use teamwork with a classmate to discover what mineral you have. This lesson can easily be tailored to various elementary age groups to include (or not) different age appropriate activities. Participants will receive the lesson plan outline, worksheet, mineral matching cards, suggested materials list, and references for further reading.

### **Orienteering**

*Cheryl Sill, Chemistry/Science 9 Teacher, ISD 742, St. Cloud, MN*

Grade Level: Upper Elementary School, Middle School, and High School

Orienteering has become a sport requiring a compass and a map, navigating from point to point. Our students may use “Siri” or at least a GPS program to help them get about, like Google Maps. Yet, the fun of navigating on our own has never gotten old! Learn out to teach our students to use a compass, maintain a bearing and maybe even navigate in the real world using geospatial skills.

## **Plate Tectonics and the Rock Cycle**

*Jim Miller, Emeritus Associate Professor, Dept. of Earth and Environmental Science, University of Minnesota Duluth*

Grade Level: Middle School

Rock cycle diagrams graphically portray the recycling of earth materials and the dynamism of the Earth driven by plate tectonics. This class introduces a couple of fun ways to get students to really understand what the rock cycle is demonstrating and how one can travel the rock cycle through plate tectonic events. One way is to introduce the Rock Cycle Game which has students collectively put the rock cycle together by placing earth material and earth process terms in their proper sequence on a blank rock cycle diagram. Another is to use the rock cycle and plate tectonic processes to create a story telling game about the global travels of a piece of earth material as it makes its way around the rock cycle and the plate tectonic globe. These activities are best suited to middle school students who know the three basic rock types, how they form, and the fundamental principles of plate tectonics.

## **Base Metal Deposits (Cu, Pb, Zn)**

*Maggie Upton, Graduate Student, University of Minnesota – Duluth*

Grade Level: High School

Did you turn a doorknob, turn water on, or zip a zipper on your jeans today? Most these everyday activities use materials are composed of the metallic alloy, brass. Copper and zinc, commonly with minor amounts of lead, through metallurgical techniques are combined to create brass. This course will explain the ideal base metal deposit where all three of these metals can be mined. The tectonic environments, structural controls of mineralized fluid movement, and ore minerals these metals are found in will be demonstrated during this course. Instructor will explain the formation of these deposits, basic mining exploration techniques, and provide examples of currently known deposits of this type located in the Upper Midwest. Participants will be given directions on how to create demonstrations for their own instructional use, list of references for further reading regarding this topic, and directions on how to obtain classroom use ore samples.

## **Taconite: Minnesota's Gold; Mining 101**

*Larry Schmelzer, Retired Mining Engineer, United States Steel*

Grade Level: High School

This course offers a brief overview of iron ore (taconite) mining in Minnesota. We will look at what constitutes a mineral resource and how we determine if mining the resource is economical, which includes understanding reserves and making a mine plan. Next, we will look at the extraction process, which includes uncovering the crude ore (i.e., stripping) and stockpiling of the waste material; drilling

and blasting; loading and hauling; crushing; and processing the ore. Lastly, we will discuss permitting regulations in Minnesota for mining (with specific citing of Minnesota Mineland reclamation rules).

### **Benefits of Beneficiation**

*Ted Anderson, Engineering & Mineral Operations Manager, Minnesota Department of Natural Resources*

Grade Level: Middle School; Adaptation Possible for Elementary School and High School

Have you ever wondered what it takes to turn a chunk of rock into a toaster, smartphone, or a car? In this course we will take a look at the first steps needed to turn rocky mineral ore into the appliances in your home. Using edible specimens, this course will run a series of hands-on experiments to demonstrate how mineral ores can be processed through grinding, screening, concentration, and drying. In addition, you will learn why some methods will work for some ores but not for others and how the steps work together to create a useful mineral product that can be used in factories. Participants will receive instructions for replicating these experiments in their class and video clips of industry examples.

### **Minnesota Caves History and Lore**

*Greg Brick, Research Analyst, Minnesota Department of Natural Resources*

Grade Level: Middle School and High School

The instructor presents a powerpoint tour of Minnesota caves highlighting caves with significant narrative history, illustrated with historic images, never before published, from the National Cave Museum in Kentucky, based on his book of the same name (Arcadia Publishing, 2017). While most of the caves still exist, many are not publicly accessible, and some never did exist except in the minds of explorers.

You will also learn about the author's "classroom cave" at Hastings, MN, where he taught a SPELEOLOGY 101 course. Having led cave and geology tours for years, he will share some practical advice based on this experience.

### **Naturally Occurring Arsenic in Drinking Water Aquifers: Natural ≠ Healthy**

*Dr. Mindy Erickson, Hydrologist, U.S. Geological Survey*

Grade Level: Middle School and High School; Adaptation Possible for Elementary School

Did you know that about 1.1 million Minnesotans drink water from their own private wells? In contrast to drinking water provided by public utilities, private wells have no testing requirements or enforceable quality standards. Natural elements such as iron, calcium, arsenic, and manganese are commonly present in private well water. In fact, tens of thousands of drinking water wells in Minnesota have naturally-occurring arsenic and manganese at concentrations that are higher than

recommended for safe drinking water. This course will be a mixture of lecture, interactive Q&A, and basic activities to introduce course participants to important geologic and geochemical factors related to drinking water sources and naturally-occurring drinking water contaminants. Participants will be provided with copies of the lecture notes, background information (links or pdf files of scientific articles, reports, and maps), and example exercises.

### **What We Can Learn From Minnesota's Glacial Tills**

*Scott Alexander, Research Scientist, University of Minnesota Dept. of Earth Sciences*

Grade Level: Middle School and High School; Adaptation Possible for Elementary School

In this lecture with hands-on demonstration, you will learn about the glacial geology in Minnesota, with an emphasis on glacial tills. Glacial tills benefit wildlife and agriculture while protecting groundwater. Participants will receive lecture notes. Some sample till "kits" will also be available.

### **Radon in Minnesota Homes**

*Marc Katz, Planner Principle State, Minnesota Department of Health, Indoor Air Unit*

Grade Level: Middle School and High School

This lecture style course provides an introduction to Radon in Minnesota. The learning objectives include: health concerns, how radon enters buildings, how to test for radon, how radon can be fixed, radon policies and laws, and how to incorporate radon into your course curriculums. Opportunities for question and answer are provided throughout the course. More information on radon can be found at the MDH: [www.health.state.mn.us/radon](http://www.health.state.mn.us/radon)