ED5640 Great Lakes Watershed Investigations ~ July 14-18, 2014

COURSE SYLLABUS

Coordinating Instructor
Joan Chadde, Director, K-12 Education/Outreach
Center for Science & Environmental Outreach
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Course Instructors
The institute will be taught by the following Michigan Tech faculty & staff experts:
Marcel Dijkstra, Ph.D. candidate, MTU Dept. of Civil & Environmental Engineering, mldijkst@mtu.edu
Joan Chadde, Director, MTU Center for Science & Environmental Outreach, jchadde@mtu.edu
Dr. Evan Kane, U.S. Forest Service and MTU School of Forest Resources & Environmental Sciences, ekane@fs.fed.us
Lynnette Potvin, U.S. Forest Service Research Lab, lpotvin@fs.fed.us
Cynthia Hagley, Minnesota Sea Grant's Environmental Quality Extension Educator, chagley@umn.edu
Dr. Alex Mayer, Dept. of Civil & Environmental Engineering, Michigan Technological University, asmayer@mtu.edu
Darrell Hendrickson, Science Teacher, Washington Middle School (Calumet), dhendrickson@clkschools.org
Jan Sneddon, Earth Force, jsneddon@earthforce.org
Shawn Oppliger, Director, Western U.P. Center for Science, Math & Environmental Education, shawn@copperisd.org
Lloyd Wescoat, Western U.P. Center for Science, Math & Environmental Education, lwescoat@mtu.edu

Course Credit: 2.0 graduate credits through Michigan Tech’s Dept. of Education/Cognitive & Learning Sciences

Course Description
This Institute is designed to teach educators about the physical, chemical, and biological components of the Great Lakes ecosystem, using Lake Superior as the classroom. This 5-day will enhance the ability of educators to integrate Great Lakes topics, including watershed dynamics, stream and lake assessments, amphibian monitoring, coastal wetlands, environmental stewardship, and building school-community partnerships to address a stewardship need. Participants will take a scientific excursion on aboard Michigan Tech’s research vessel, Agassiz, to sample water chemistry, zooplankton, phytoplankton, sediment, and benthic organisms. Participants will engage in hands-on data collection and analysis, field trips, lab experiences, and discussions with research scientists. Life, earth and physical sciences; technology; and social studies content expectations will be woven into the course content.

Course Requirements
- Pre-Course Readings & Reflection - Participants review selected readings (provided by the instructor) prior to the institute to provide a foundation of knowledge upon which to build and to maximize their educational experiences during the course. Participants should write one paragraph PER READING about how the ideas contained in each reading or web module will contribute to their understanding of the Great Lakes and its watershed, and how they might integrate the ideas contained in the reading into their curriculum. The papers should be similar to journal entries, and will not be graded for writing quality or grammar, but simply evaluated for evidence that you reviewed that reading. Due: Monday, July 14, 2014 (10%)
substantive discussion during sessions, with continuation on into informal discussions with peers. (50%)

- **5-Day Teaching Unit** – After the Institute, participants will design a teaching unit that: i) integrates topics addressed at the institute, ii) contains at least 5 days of activities appropriate for your teaching level that meet state or national Curriculum Frameworks, iii) incorporates an investigation, and iv) provides an opportunity for students to contribute to their community. **The teaching unit must be submitted to receive credit for the entire course. Due September 8, 2014.** See rubric. (40%)

**References**


Michigan Sea Grant Great Lakes Watershed Map (2'x3')

*Great Lakes: from Lake Champlain to Lake of the Woods* (NOAA #14500). (www.irnha.org)

**Curriculum/Activity Guides**


*Earth Force Curriculum* (2013)


Michigan Natural Features Inventory. MSU Extension. 2009. *A Field Identification Guide to Invasive Plants in Michigan's Natural Communities*


Alliance for the Great Lakes. (2006) *Great Lakes in My World (K-8)*.

**Great Lakes Websites**

Earth Force http://www.earthforce.org/

Great Lakes Information Network (GLIN) http://www.great-lakes.net/

EPA Great Lakes National Program Office www.epa.gov/glnpo

Lake Superior Streams http://www.lakesuperiorstreams.org/

Michigan Sea Grant http://www.miseagrant.org/

Michigan Tech Great Lakes Research Center http://greatlakes.mtu.edu/

National Oceanic & Atmospheric Administration http://www.education.noaa.gov/

National Data Buoy Center http://www.ndbc.noaa.gov/
Michigan teaching with Great Lakes data  http://greatlakeslessons.com/

NOAA education resources  http://www.education.noaa.gov/

Climate data viewer  http://gis.ncdc.noaa.gov/map/viewer/#app=cdo

Climate at-a-glance  http://www.ncdc.noaa.gov/cag/

NOAA Great Lakes lessons  http://www.education.noaa.gov/Freshwater/Great_Lakes_Eco-Region.html

Great Lakes lessons  http://www.great-lakes.net/teach/

Teaching with Great Lakes Data  http://greatlakeslessons.com/index.php

Volunteer Monitor (EPA)  http://www.epa.gov/owow/volunteer/vm_index.html

Graphic of every major U.S. river system (click "high resolution" tab to zoom in)  http://gearjunkie.com/rivers-of-america-map?sf14078492=1
Great Lakes Watershed Investigations Teacher Institute ~ 5-Day Teaching Unit Rubric

Due: Sept. 8, 2014. Email to coordinating instructor: jchadde@mtu.edu

Total Points Received:

Teaching Unit Grading Scale (50 points maximum per unit)

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<tr>
<th>Grade</th>
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<tr>
<td>A</td>
<td>47-50</td>
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<td>AB</td>
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<td>BC</td>
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<td>CD</td>
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<td>D</td>
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ASSIGNMENT: Develop a new five-day teaching unit that can be implemented in your classroom during the 2008-2009 school year. Teaching units should include the following components and relate to topics presented at the Institute.

All teaching units must include the following to be graded:

- Target grade and subject
- References cited properly.
- State Content Benchmarks written out and cited properly for 2 or more subject areas.
- Five-days of activities clearly described
- Submitted in electronic form (MSWord file)

Unit Overview (3 points) Provide a brief description of the overall theme/topics to be addressed in the unit. Show how this unit connects to the curriculum in your school and to units that you already teach in your classroom. Describe what you hope to accomplish with your unit.

Sources Consulted and Use of Books (3 points) List the resources consulted in developing your unit. Clearly indicate how the resources (lecture, field investigations, readings, shared ideas, etc.) from the institute are integrated into the unit. Resources should be referenced properly so that the reader can find the source. Resources should represent high quality, professional resources.

Learning Objectives (4 points) Identify the learning objectives for the unit. The objectives should be measurable and identify the knowledge and skills that students will gain after completing this unit and directly relate to content benchmarks listed in the unit.

Content Benchmarks Addressed (4 points) Identify and write out the content benchmarks (for your state or whatever your school requires) for two or more subject areas that the unit addresses. Show how the benchmarks relate to the learning goals of the unit. Include a minimum of four content standards.

Five-days of Classroom or Field Activities (20 points) Describe five days of lessons that will be effective in accomplishing the learning objectives of the unit. Include powerpoint presentations, lecture note outlines, student pages, and other support materials. The unit should incorporate a variety of instructional strategies that engage students in higher-order thinking, problem-solving, and connections to the real world and their community. Describe the activities in enough detail that another teacher could implement them in their classroom (or list source & page #).

Unit Assessment (10 points) Develop an assessment plan that describes how you will assess students’ accomplishment of the learning objectives of the unit using a variety of tools embedded throughout the unit, such as journal reflections, pre-/post-tests, quizzes, lab reports, projects, powerpoint presentations, etc. Assessment tools should require students to synthesize what they have learned, and be described in enough detail that another teacher could utilize it in their classroom. Include copies of the assessment tools to be used.

Suitability for Dissemination (6 points) The unit must be ready to publish to the web or in a journal. The unit should be complete and organized so that another teacher could implement it in their classroom.