

**Final Exercise**

**Geologic Mapping of the Grandview Area, Midway Township, St. Louis County, MN**

**Part I: Geologic Mapping**

Schedule:

SATURDAY (April 17)

- 8:00 AM - gather in classroom (Chem 207) through side door.
- organize field gear
- brief overview of the geology of the field area

8:45 AM - head to field area

9:15-12:00 - group traverse of the field area to introduce the main rock types

12:00-4:30 - disperse into mapping groups (2-4)

4:30 - gather at van for return to UMD

SUNDAY (April 18)

- 8:30 AM - gather in classroom (Chem 207) through side door.
- organize field gear

8:45 AM - head to field area

9:15-2:15 - disperse into mapping groups (2-4)

2:30 - depart field; return to UMD

You are free to return to the field area on your own to collect more data

What to bring:

- Lunch
- Water bottle
- Sturdy (waterproof?)boots/shoes
- Rain gear (no ponchos)
- Glove and Hat
- Backpack

Geology Gear

- Base Map and map board \*
- Brunton\* (may need to share)
- GPS\* (may need to share)
- Colored Pencils (at least 6)
- Notebook and pencil
- Magnet\*
- Walkie-talkie\* (may need to share)
- Handlens\* (bring it if you got it)
- Hammer\*(bring it if you got it)

\* will be provided

**Part II: Training in ArcGIS and Illustrator** (all classes in HH118 –computer room)

**No Lecture or Lab next week**

**Bring Flash drives.**

Tues (April 27, 2-4 PM) – Introduction to ArcMAP – compiling outcrop, structure, traverse lines

Thurs (April 29, 2-4 PM) – Introduction into ArcMAP – interpreting geologic linework and units

Tues (May 4, 2-4 PM) – Introduction to Illustrator CS4

Thurs (May 6, 2-4 PM) – Work on constructing map in Illustrator CS4

### **Part III: Creating Geologic Map**

**Required Elements for Final Geologic Map** (see attached grading rubric for weighting of each element)

Map Sheet: 11”x 17” page (landscape or portrait)

Geologic Map to include:

Topographic base

Outcrops (single color or color-coded to map unit)

Map Units (colored and labeled with unit abbreviations; e.g., TF for Thomson Formation)

Geologic line work - contacts and faults (qualify as to confidence of location by different line types)

Structure symbols – use different symbols for different structures (see <http://pubs.usgs.gov/of/1999/of99-430/> for USGS recommendations for symbols)

Traverse Lines

Cross Section line (labeled X – X’)

Description of Map Units to include:

Color box with map unit abbreviation, e.g.



Map units listed in chronologic order (youngest on top)

Map unit descriptions should summarize the various rock types, textures, and structures observed throughout the map unit. Also describe the contact relationships with the adjacent map units.

Correlation of Map Units diagram – arrange map unit color boxes with labels in proper chronological order. Unit that are closely related in origin or timing should touch; units with significant time gaps between them should be separated by a space.

Cross Section – draw a single cross section with no vertical exaggeration along an E-W line. Colorize and label the units the same as in the geologic map. No need to qualify the different line types.

Symbol Legend – key to all linework and structure symbols

Other Components:

Title (should include geographical references (e.g., Geologic map of the Tamarack Area, Swamp County, Minnesota)

Author, Affiliation, and Date

Scale Bar (in meters and feet), North Arrow, and Proportional Scale of map (e.g., 1:10,000)

**SUGGESTION – look at a published geologic maps to get ideas on layout and content.**

**Due Date: Tuesday, May 11<sup>th</sup> by 5PM.**

**What to turn in :**

- Adobe pdf file of your map<sup>1</sup>
- Arcview shapefiles (outcrop, traverse, structure, geo lines, geo units)<sup>1</sup>
- Field notes and Field map<sup>2</sup>
- Clipboard and any other equipment borrowed for project<sup>2</sup>

1) Send to Jim ([mille066@umn.edu](mailto:mille066@umn.edu)) by email attachment or drop off a jump drive (will be returned).

2) You can drop these in a box labeled “GEOL 3000” in the geology dept. office (Heller Hall 230).

Your map will be printed out on an 11 x 17 sheet of paper. The map, field map, note and your final grading rubric can be picked up from the geology dept. office after Friday, May 15<sup>th</sup>.

Grading Rubric for Final Geologic Map

Field Data (15 pts)

- Sufficient outcrop coverage \_\_\_\_\_/4
- Outcrop, stations, structures and traverses shown on field map \_\_\_\_\_/5
- Field notes: well organized, good lithologic description \_\_\_\_\_/4
- GIS data files submitted \_\_\_\_\_/2

Comments:

General Map (8 pts)

- Layout/Appearance \_\_\_\_\_/3
- All requested components are shown \_\_\_\_\_/5

Comments:

Geologic Map (14 pts)

- Outcrops, structure symbols, X-section line and traverse lines shown \_\_\_\_\_/4
- Map units colored and labeled with unit abbreviations \_\_\_\_\_/2
- Structures properly plotted \_\_\_\_\_/2
- Geologic interpretation reasonable based on lithologies, topography, outcrop control and structure \_\_\_\_\_/6

Comments:

Description of Map Units (8 pts)

- Map units listed in chronologic order with labeled color box \_\_\_\_\_/2
- Map unit descriptions adequately summarize the various rock types, textures, structures and contact relationships observed throughout the map unit \_\_\_\_\_/6

Comments:

Correlation of Map Units (5 pts)

- Map unit boxes with labels arranged in proper chronological order \_\_\_\_\_/2
- Spacing conveys reasonable inference about genetic relationships between units \_\_\_\_\_/3

Comments:

Cross Section (8 pts)

- Units colored properly and labeled \_\_\_\_\_/2
- Contacts along section properly located to map \_\_\_\_\_/2
- Subsurface interpretation reasonable based on lithologies and structure \_\_\_\_\_/4

Comments:

Symbol Legend (all linework and structure symbols properly keyed; 2 pt) \_\_\_\_\_/2

Comments: