

**THE USE OF A MAPPING ASSESSMENT RUBRIC TO HELP STUDENTS IMPROVE THE
CREATION AND COMPREHENSION OF GEOLOGIC MAPS**

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In a field-based course, flexible and clearly communicated expectations are essential for student learning and morale. Rubric-based assessment is increasingly used in traditional classroom settings as an assessment tool as it provides students with the evaluation criteria prior to the start of a project. Here we discuss an assessment rubric designed for the evaluation of geologic mapping projects. This rubric is designed to enhance student recognition of the key components of a geologic map and assist with field-data gathering for map creation. The rubric is based upon four primary categories that are divided into specific map elements identifying components common to all geologic maps regardless of complexity. The primary categories are: 1) General information, which includes fundamental map elements, lithologic key, and explanation of geologic symbols; 2) Presentation and Legibility, which includes appropriate colors/shades, map legibility and map and key agreement; 3) Primary Geologic Information, which includes correct contact and unit identification, contact-topography relationships, structures, and strike and dip information; 4) Geologic Cross-Section(s), which includes all necessary elements for a correct cross-section. Each of the elements within the four primary categories is ranked on a scale from four (Highly Competent) to one (Not Competent) during the evaluation process and summarized for a primary category score. Each of these scores is then weighted to calculate a final numerical score (between four and one) for the project. The rubric is designed to be flexible so that the user can add or subtract elements from the four primary categories as well as change the final weighting depending on the size, complexity, and emphasis of a specific mapping project. For example, a project that is more structurally complex will weigh recognition of structural elements greater than a project that emphasizes distinguishing difficult stratigraphic relationships. Our first use of this rubric was at the 2006 Miami University summer field geology course for undergraduate and graduate students. We discovered that the most challenging aspect of implementing the rubric was adapting prior grading schemes to its competency-based format and reporting the final rubric score as a "traditional" grade.

Note that the attached rubric is modified from the original associated with the above abstract/presentation. With each additional year of experience and with modifications to our field teaching approaches and expectations we adjust the rubric as needed.

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GLG 411/511 Mapping Assessment Rubric				[Summer 2008]
	4 - Highly Competent	3 - Competent	2 - Minimally Competent	1 - Not Competent
1. General Information (5 %)				
(title, name, date, north arrow, scale, lithologic key, explanation of geologic symbols)	All elements present and correctly portrayed (100%)	Most elements present and correctly portrayed (80-99%)	Some elements present and correctly portrayed (50-79%)	Minimal information (<50%)
2. Presentation and Legibility (15 %)				
a) Appropriate colors/shades	Yes	Most colors correct and/or shading mostly appropriate	Few colors correct and/or shading too light or too dark	No
b) Colors within lines	Yes	Most	Few	No
c) Inked and Legible	All text and symbols neat and legible and inked	Most text and symbols neat and legible and inked	Some text and symbols neat and legible and inked	Text and symbols hard to read and/or not inked
d) Map and key agreement	All map elements appear in the key	1-2 map elements not in key	3-4 map elements not in key	>4 map elements not in key
3. Primary Geologic Information (50 % to 80 %)				
a) Contact and unit identifications	Correct units and correct symbology and contacts within acceptable distance of correct location	Correct units and either correct symbology with contacts slightly outside acceptable limits or incorrect symbology with contacts within acceptable limits.	Correct units identified but little else going for it	Incorrect map units identified
b) Structures	Proper structural symbol(s) in proper location	Structural symbol(s) present in proper location with minor symbol problem	Structural symbol(s) present but major problems with symbol(s) or location(s)	Lack of agreement between structural symbol(s) and mapped geology
c) Strikes & Dips	Adequate number of strikes and dips to define map pattern and structure(s) and symbols plotted correctly	Inadequate number of strikes and dips or symbols inappropriately plotted	Inadequate number of strikes and dips and symbols inappropriately plotted	No strike and dip information provided
4. Geologic Cross-Section(s) (0 % to 30 %)				
a) Scales, vertical exaggeration, topographic profile	Everything AOK	Scales and vertical exaggeration correct but topographic profile askew	One of scales incorrect	Nothing is correct
b) Agreement with map	Perfect (100%) agreement	80-99% agreement	50-79% agreement	<50% agreement
c) Geologic interpretation	Interpretation sound and unit thicknesses appropriate (strong critical thinking skills exhibited)	Interpretation plausible but suspect and unit thicknesses appropriate	Interpretation plausible but suspect and problems with unit thicknesses or unit thicknesses appropriate but interpretation not feasible	Interpretation not feasible and inappropriate unit thicknesses (weak critical thinking skills exhibited)