GEOLOGIC MAPPING – TRIAL EVENT (DIVISION C)

DESCRIPTION: Working with geologic maps, topographic maps, other maps, and other data, teams will demonstrate knowledge of geologic mapping, topographic concepts, surface and subsurface structural geology.

A TEAM OF UP TO: 2   **APPROXIMATE TIME:** 50 min.

THE COMPETITION: Each team *must* have at least one protractor, one ruler, one non-programmable calculator, one set of colored pencils, one equal-area projection stereonet with several sheets of 8.5" X 11" tracing paper and thumbtacks. (It is permissible for the second team member to have his or her own set of these supplies or share them with his or her partner.) Each team member is permitted to bring one three-ring binder of any size containing information in any form, from any source. The material must be 3-hole punched and inserted in the binder rings (materials stored in notebook sleeves in the binder are permissible). A purchased or homemade UTM ruler is recommended. Students not bringing these items will be at a disadvantage. The event supervisor will not provide them.

Students must:
1. Be able to accurately locate positions on, or read positions from, maps using latitude and longitude to fractions of a degree, the Universal Transverse Mercator grid system, or the Universal Polar Stereographic system. Be able to calculate distances from UTM coordinates. Be knowledgeable of the various map projections, and their strengths and limitations. Be able to locate positions by celestial observations (Altitude of Polaris, position of the sun or solar time).

2. Be able to interpret topographic maps: calculate slope gradients, determine stream directions, draw topographic profiles, identify landforms, etc.

3. Be able to interpret geologic maps: rock types, rock structures and geometries, structural strikes and dips. Be able to add structural profiles of near-surface bedrock to topographic profiles. Given strike and dip information, be able to plot surface geology on topographic maps.

4. Use equal-area projection stereonets to represent on tracing paper geologic structures such as bedding plane geometry, fold axis geometry, fault geometry, etc. Use stereonets to determine true strike and dip from apparent dips.

5. Trigonometrically determine bed thickness as well as apparent vertical and horizontal dimensions, and outcrop width in the surface plane or map plane. For example, given strike, dip, and bed thickness determine the vertical distance of a well drilled through a rock strata.

6. Identify geologic structures: fault types, anticlines, synclines, monoclines, domes, saddles, stream drainage patterns, glacial landforms, etc. Know geologic time and relative age dating techniques.

SCORING: All questions will have been assigned a predetermined number of points. The highest score wins. Selected questions will be used as tiebreakers .