The Frenchman Frolic – A Topographic Map Exercise—Creating a Cross-Section

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Introduction

A topographic map is a two-dimensional representation of a three-dimensional landscape of a specific area. A little study will reveal the meaning of the lines, symbols, and conventions that create this representation.

Materials

1. Topographic map (We will use the Frenchman Mountain quadrangle, but any one may be used)
2. Graph paper large enough to span the cross-section line drawn on the map
3. Ruler or straight edge
4. Pencil

Procedure

1. Study the topographic map
2. Develop questions about the map.
    a. What part of the world does this map show?
    b. What do the colors of the lines on the map indicate?
        i. What features are shown in what colors?
    c. What is the scale of this map?
        i. In what different ways is scale shown on this map?
        ii. What does the scale mean in "real world" distance?
    d. What does the magnetic declination symbol at the bottom of the map signify?
        i. Why is it important and how could it be useful?
    e. What is a contour line?
        i. What is the contour interval on this map?
        ii. What does contour interval mean?
        iii. How can you tell the elevation of any spot on the map?
        iv. How can you find out how steep the slopes are on this map?
    f. What is a Township? Range ? Section?
        i. How are these features shown on this map?
    g. What is latitude? Longitude?
        i. How are these locators shown on this map?
    h. Why are there so many different ways to describe location on one map?
    i. What are some different ways to construct an accurate three-dimensional scale model of the landscape represented by this map?
    j. How would you construct a topographic cross-section across this map, that is, a sideways look at a vertical slice cut through this map?
3. Discuss the questions with the group and the instructor.
4. Construct the cross-section across the map.
    a. Use a straight edge to draw a line across the map in the area of interest.
    b. Cut a thin strip of paper and place it along the section line.
    c. Make a mark on the strip at each spot where you cross a contour line or feature such as stream, hilltop or closed depression.

d. Below the mark on the strip write in the elevation at that point.
e. Now make a graph with the physical information or data points from your strip on the bottom axis and the elevation on the vertical axis.
    i. Draw the x-axis on the graph paper to correspond to the cross-section line drawn on the map.
    ii. Draw the scale on the y-axis to represent the elevations encountered across the cross-section line.
    iii. Transfer the elevations of the physical points to the y-axis at the corresponding x-axis points.
    iv. Connect the points in a smooth curve.

Resources

Websites on drawing cross sections:

- http://www.eoascientific.com/cartography/aaMaps_M4_profiles_Z.htm
- http://geology.isu.edu/geostac/Field_Exercise/topomaps/topo_profiles.htm
- http://ees2.geo.rpi.edu/field_methods/pictures/101901%20class/cross_section_all.pdf

Websites for more topographic map information and activities:
http://www.umkc.edu/sites/env-sci/module9/weblab9.htm#what%20topos%20show

http://interactive2.usgs.gov/learningweb/teachers/lesson_plans.htm#maps
lesson plans online from USGS on maps and map skills
http://geonames.usgs.gov/antform.html
search for topographic maps
http://mapping.usgs.gov/digitalbackyard/topobkyd.html