MiSP TOPOGRAPHIC MAPS
Teacher Guide, L1 - L3

Introduction

There are many aspects of topographic maps that can be part of an intermediate-level or Earth Science Regents science course. Teachers will determine what learning, beyond the core curriculum, should be included in this topic. The MiSP unit focuses on graphing and unit rate of change (slope). Students will learn that contour slope, shown by contour lines, is a unit rate of change (slope).

The following resources for topographic maps may be useful:

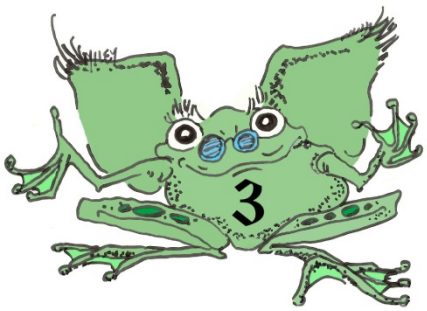
http://egsc.usgs.gov/isb/pubs/booklets/symbols/
http://www.digital-topo-maps.com/

Standards

ILST Core Curriculum — Process Skills Based on Standard 4:
Physical Setting Skill 7
Physical Setting / Earth Science Core Curriculum:
Standard 4 Major Understandings: 2.1q
Standard 6 Key Idea 2, Key Idea 3

Lesson Objectives: After completing this unit, students will be able to:

- Identify and interpret teacher-selected aspects of a contour/topographic map
- Determine the height above sea level of a location, using contour lines
- Draw a profile from a map, using graph paper
- Determine the terrain's slope / unit rate of change (L2)
- Determine and use an equation for a line that represents a slope (with a best-fit line, if needed), and use the formula to calculate height at any particular location between contour lines (L3).



Day 1 — Topographic/Contour Maps Introduction

Day 1 introductory teaching and learning builds on prior instruction on maps and isolines or is a stand-alone overview of maps.

Instruction should include:

- General features of a contour/topographic map (consistent with course syllabus): map symbols, map key, scale, compass rose, contour lines, index contour lines, hachured contour lines showing depressions, contour interval
- How to use a map scale to calculate actual distances, using map measurements
- How to determine the elevation above sea level of a location on a map, using contour lines

For some useful visuals and exercises, see the following resources:

http://academic.brooklyn.cuny.edu/geology/leveson/core/linksa/maptop.html
http://egsc.usgs.gov/isb/pubs/teach-pack/mapshow/mapshowindexpdf.html

A suggested activity sheet that is part of Lesson 4: How to Read a Topographic Map may be found in the second link above.

Question of the Day

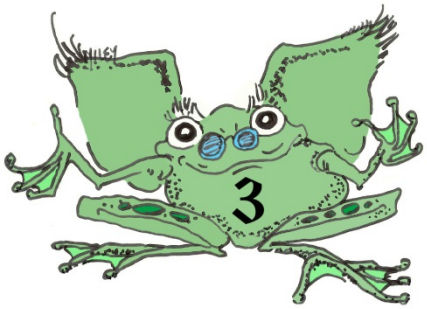
What do you need to know if you are planning to use a map to travel to a location on it?

Day 2 — Slope (Unit Rate of Change) and Topographic Contours

A simplified map with a make-believe island is used to graph distance traveled relative to the ground versus elevation. Mathematical slope (unit rate of change) is related to terrain slope.

Question of the Day

Typical maps include latitude and longitude lines. Lines of latitude and degrees latitude can be useful in determining north-south distances on a map, but lines of longitude and degrees longitude are not as useful in determining east-west distances. Why not?



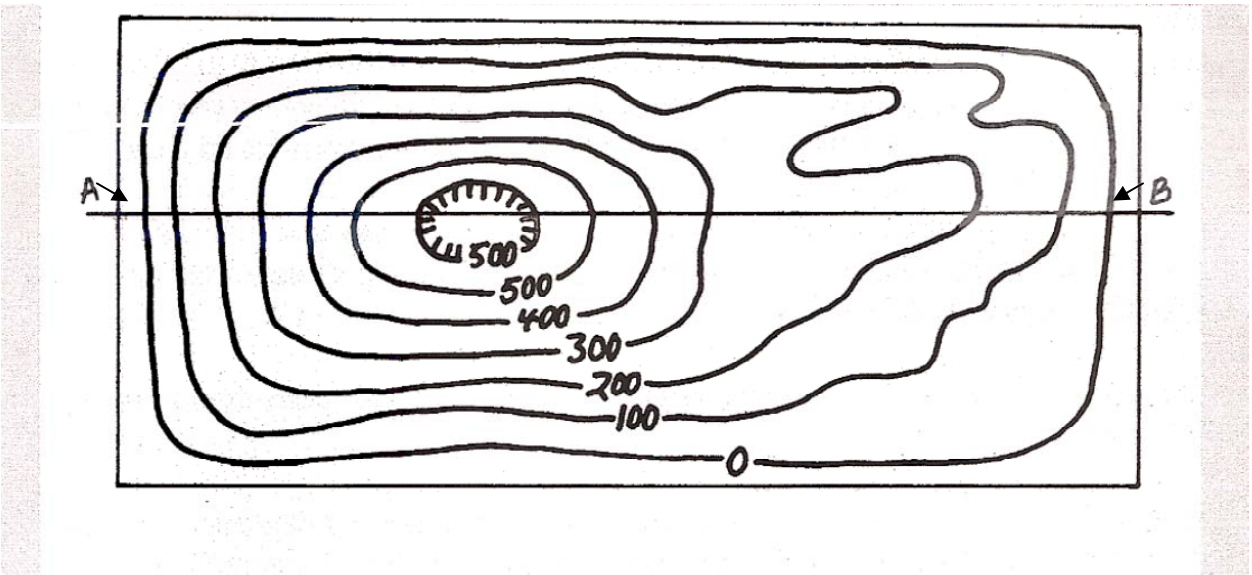
Days 3 and 4 — Constructing and Studying a Contour Map

This worksheet is the traditional plastic mountain in a shoe box activity. Most teachers use the Mt. Capulin model, available from vendors such as Ward's Natural Science:

http://wardsci.com/product.asp_Q_pn_E_IG0003921_A_name_E_Contour+Model

Teachers who use other versions of this lab will have to make modifications to the instructions.

Typical results:



Teachers, especially Regents Earth Science teachers, may want to do profiles at this point in course instruction. A profile may be constructed quickly and accurately across any straight line on a map by following this procedure (see http://imnh.isu.edu/digitalatlas/geog/basics/topo.htm):

1. Lay a strip of paper along a line across the area where the profile is to be constructed.
2. Mark on the paper the exact place where each contour, stream, and hilltop crosses the profile line.
3. Label each mark with the elevation of the contour it represents.
4. Prepare a vertical scale on profile paper by labeling the horizontal lines corresponding to the elevation of each index contour line.
5. Place the paper with the labeled contour lines at the bottom of the profile paper, and project each contour to the horizontal line of the same elevation.
6. Connect the points.

Day 5

Administer the appropriate level assessment.