Guide Map: Instructor Guide

Title

Guide Map

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Discipline

Geography

Target Audience

Introductory, nonmajors

Keywords

Geography, geology, maps

Length of Time/Staging

Two hour lab

Abstract

How do you make a map useful to a blind person? In this problem, students first decide what needs to be included on a map. Second, they decide what equipment they need to do the mapping. Third, they map an area. Last, they produce the map and evaluate their results. The

problem helps inculcate previously learned concepts relating to latitude and longitude, planimetric maps, and topographic maps.

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Format of Delivery

Problem:

Groups receive the problem (usually in a lab setting). Students have two hours.

Field Site:

Students select a field site. (Note: The site depends on what is convenient for the class. The professor may want every group to do the same site or different groups may choose different sites).

Student Learning Objectives

Knowledge-based outcomes:

On completion of this problem, students should be able to demonstrate that they:

1. Are able to list and describe the important attributes of a map.
2. Are able to create a map that serves the needs of a particular user.

Skills-based outcomes:

On completion of this problem, students should be able to demonstrate that they:

1. Are able to work effectively as a group.
2. Are able to create a planimetric map.
3. Are able to read and interpret maps.
4. Are able to clearly present results in oral, written and graphic form.

Student Resources

Equipment and Data:

The following equipment is available: meter sticks, rulers, protractors, paper, colored pencils, survey rods, brunton compasses, hand levels, measuring tape, and other materials. You may use as much or as little of the equipment as you need.

Instructor Resources

Internet References for Basic Information

Hanson, L. (1998). Topographic maps. http://w3.salemstate.edu/~lhanson/gls210/gls210_topo.htm (July 22, 2003).

McLennan, M. (2003). Maps and references. http://atmos.cgrer.uiowa.edu/servers/servers_references.html (August 11, 2003).

USGS. (2002). USGS terraserver: Topographic maps. mapping.usgs.gov/digitalbackyard/topobkyd.html (July 22, 2003).

USGS. (2002). Topographic mapping. http://egsc.usgs.gov/isb//pubs/booklets/symbolsnew/ (July 22, 2003).

Print References for Basic Information

Almost every Physical Geography text includes information about topographic maps. I have recently used these texts:

Christopherson, R.W. (2002). *Geosystems* (4th ed.). Upper Saddle River: Prentice Hall.

McKnight, T.T, and Hess. (2002). *Physical geography: A landscape appreciation (8th ed.)*. Englewood Cliffs, NJ: 2000, Prentice-Hall,.

Strahler and Strahler. (2002). *Physical geography* (2nd ed.). New York: John Wiley and Sons.

Author's Teaching Notes

Preparation for Physical Geography:

Physical Geography students have covered the Geographic Grid in lecture and in lab. Both Physical Geology and Physical Geography students have learned the basics of interpreting and using topographic maps in lab.

Organization:

Students work in groups of four to five.

Problem:

Groups receive the problem (usually in a lab setting). Students have two hours.

Discussion:

Give each group 15 minutes to do the first three questions, then take 10 minutes to discuss their answers. Alternatively, you could discuss the first question or none at all and let them try their hands at the mapping with whatever ideas they arrive at.

Mapping:

Use a small enough area that mapping takes no more than 40 minutes. Try to find an area that has some variation in terms of elevation so that there is some challenge to creating the topographic map. At the same time, the area needs to include items that might be challenging to the blind.

Write-up:

Each group returns to the lab to finish their map. Then they turn in their answers to the first three questions and the last question, the map, and whatever data they collected.

Assessment:

At the beginning of the next lab, we discuss the answer to the last question and then I return the graded maps.

Follow-up:

In a later lab, I have students gather elevation information to add to their map (some may already have elevation depending on what they did for their first map, but it was not essential to have detailed information to complete the problem). Then they contour the map. The courtyard, though small, does actually have enough relief to make a one-foot contour worth the effort.

Assessment Strategies

Problem Answers and Map:

Each group turns in a map accompanied by answers to the questions. The grade for the map is also the grade for each person in the group. Normally, I have a short quiz at the end of lab, but in this case, the map substitutes for the quiz.

Lab Exam:

1. There are a number of basic questions on the lab exam that have to do with interpreting USGS topographic maps in terms of color, scale, direction, distance, and so on.
2. After the students finish the maps, they will have questions in later labs like the ones listed below. Then I will have another similar question on the exam.
    a. What would you put on a map designed for canoeists? Make a rough sketch of the map including a key.
    b. What would you put on a map designed for rock climbers? Make a rough sketch of the map including a key.
    c. What would you put on a map designed for people who fish? Make a rough sketch of the map including a key.
    d. And so on ...
3. In each case, I not only look for the most obvious details (north arrow, scale, streams), but I also look for what a user would need. For example, a canoeist might want to know about portages, canoe rentals, stream access, depth of water, speed of water, and more. Familiarity with the subject is not as important as the students demonstrate that they understand that location is not enough. Maps must give useful information to the user.

Solution Notes

1. For the first question, anything that could conceivably function as a map for blind person is acceptable. In most cases, students suggest (1) the use of some stiff paper (or other material) with raised ridges to indicate objects and (2) the use of Braille for labeling the objects.
2. Some parts of the second question are obvious. The blind need to know the location of the same things the sighted need to know: the sidewalk and the doors, for example. But they also need to know about anything that might present a hazard. For example, there may be trees overhanging the sidewalk. The student needs to know about the hazard. She may also need to know that there are steep slopes directly adjacent to the sidewalks.

Students should explain why these must be included. In the end, emphasize that cartographers design maps for both particular uses and particular users.

3. A standard planimetric map should suffice. Students could do their mapping using a measuring tape, a brunton compass and something to record the data. They map also want to create a rough map while they collect data. To identify the height of low hanging branches, students use either tape or survey rods. Alternatively, students could use the specific height of a particular user to define the limits of the hazardous area. So that a blind student is aware of slopes changes, students should also measure changes in elevation. For this, they need hand levels and survey rods.
4. Students need to be precise and accurate in organizing and recording data. They must enter information in a table or on a rough map. I encourage using both.
5. Each map must have details like a direction arrow, a scale, and a key. Students have already learned the necessity for these features in earlier labs. Beyond that, the map must have those things that would be important to a blind student. Most important, it must have the location of sidewalks, doors, and walls. But it must also include tree limbs that are lower than the height of the user, lampposts, tables (especially those that block the sidewalk), steep slopes, uneven surfaces, and any other possible challenge.
6. The first solution is to have a blind person test the map (with supervision, of course). The second solution is to blindfold a sighted person (also with supervision). There are other approaches but the students should understand that someone who is sighted might 'overlook' something.