

What Do You Measure in a Topographic Field?

Introduction: Contours of Earth

Today's lab will be an introduction to topographic maps and the shape of the land surface. Topographic maps are maps that show the configuration of the Earth's surface by means of lines of equal elevation. They are constructed to scale, so that distance, directions, areas, elevations, slope angles and volumes can be measured with great accuracy. As scale models, they contain a vast store of information that may not be readily apparent to the casual observer.

Types of Map Scales:

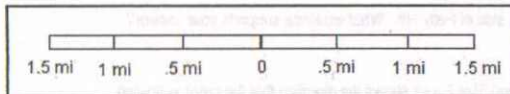
Ratio Scale: ratio where 1 unit on the map equals X units on the ground

Ex) 1:24000 (1 inch on map = 24000 inches in the real world)
Note that the units are the same (a ratio of inches to inches or feet to feet...).

Verbal Scale: 1 inch = 2000 feet

Bar Scale: a map "ruler"; graphical scale (example below)

Note that unlike the other map scales, the bar scale will always remain accurate for a map even when the map is reduced or enlarged.



Important Rules obeyed by Contour Lines:

1. Contour lines never run into a body of water
2. Contour lines never cross one another
3. ALL contour lines are closed loops

Contour lines point or "V" upstream

Additional things to know about Contour Lines:

- If contour lines are closely spaced it represents a steep slope.
- If contour lines are widely spaced it represents a gentle slope.

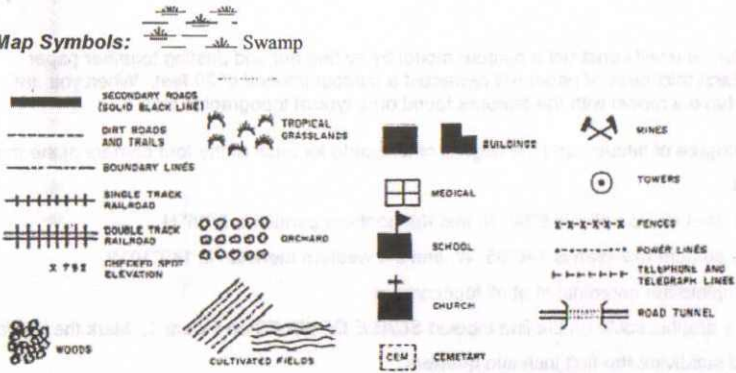
Materials: scissors, ruler, colored pencils, glue

Procedures:

In this investigation, you will construct a contour model by cutting out and pasting together paper contour levels. Each thickness of paper will represent a contour interval of 20 feet. When you are finished, you will have a model with the features found on a typical topographic map.

1. Write the degree of latitude and the degree of longitude for each of the four corners of the map in Figure 1.
 - The southern parallel is 5°00' N, and the northern parallel is 5°05' N.
 - The eastern meridian is 140°05' W, and the western meridian is 140°10' W.
 - Complete the coordinates at all four corners.
2. Construct a graphic scale on the line labeled **SCALE OF MILES** on Figure 1. Mark the line in inches and subdivide the first inch into quarters.
3. Next to **CONTOUR INTERVAL** write 20 feet.
4. To show the relief on the map, color each of the contour levels and cut out the contour levels in Figure 2. Do **NOT** use markers!
 - Base layer = green, layer 2 = purple, layer 3 = yellow, layer 4 = orange, layer 5 & 6 = brown, layer 7 & 8 = red
 - Paste each higher contour into the dashed space on the layer below it. Then paste the set of layers inside the dashed line on Figure 1.
5. The drainage on this island consists of a stream and one tributary. The V-shaped contours show the outline of the stream valley. **Use a blue colored pencil to draw the streams in the valleys on Figure 1 and color the water surrounding the island blue!**
6. Consult the symbols below for the representation of various features on a topographic map. Place the appropriate symbols at the following locations:
 - Swamp 5°03'N x 140°06' W
 - A town with a school, church and ten small buildings 5°01'N x 140°08' W
 - Mine 5°03'N x 140°09' W
 - A railroad connects the mine to the town
 - A paved road runs all around the shore of the island
 - A benchmark is on top of a hill with an elevation of 115 feet at 5°02'N x 140°08' W

Map Symbols:



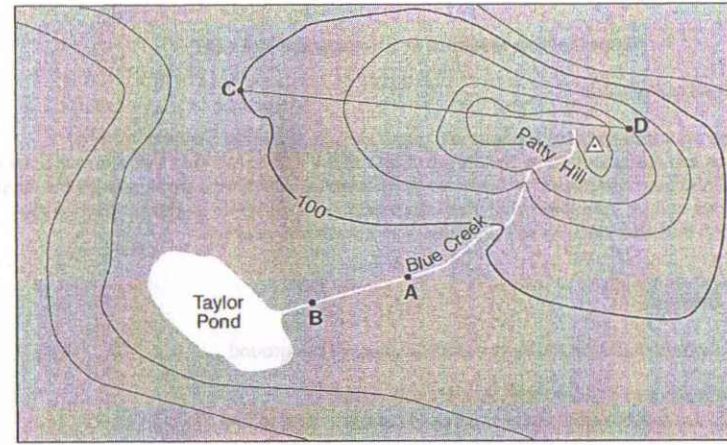
Questions and Conclusions:

- In what direction would you need to go to travel from the town to the mine? _____
- What is the total relief (highest point to lowest) on this island? _____
- Describe two (2) features on the map that indicates the slope of the land. _____

- Which direction is North on the map in Figure 1 and how can you tell? _____

- What value is measured and plotted in a topographic field? _____

Base your answers to questions 7 through 10 on the topographic map shown below. Letters A, B, C, and D represent locations on Earth's surface. The symbol marks the highest elevation on Patty Hill. Elevations are shown in feet.



Contour interval = 20 ft 0 1 2 3 miles

- What is a possible elevation at the symbol at the top of Patty Hill?
- Indicate, using a compass direction, the steepest side of Patty Hill. What evidence supports your answer?
- Explain how the shape of the contour lines crossing Blue Creek shows the direction that the creek is flowing.

FIGURE 1

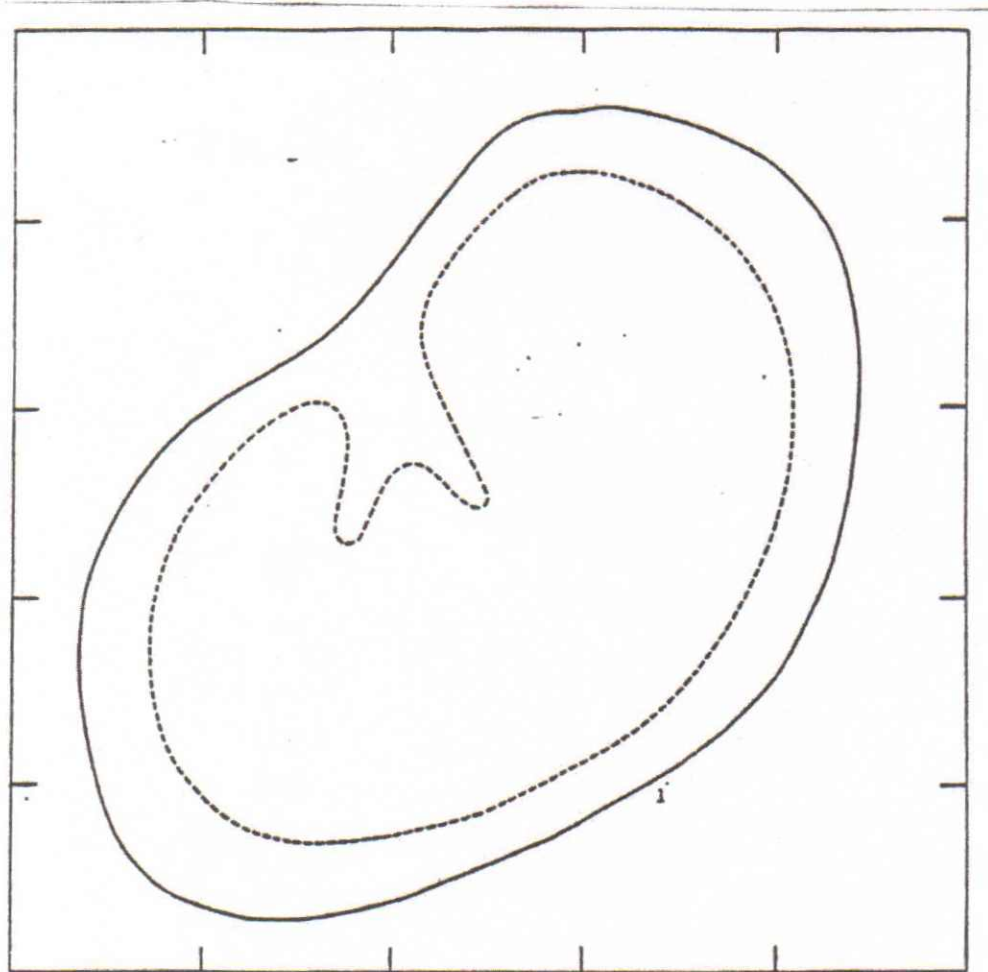


FIGURE 2

