Reading Topographic Maps

Symbolization - Showing elevation on a map
How cartographers show 3 dimensions using just 2?

Topo Map Symbols

COLORS OF THE MAP

BLACK: MAN-MADE FEATURES, SUCH AS BUILDINGS AND ROADS.
RED-BROWN: RELIEF FEATURES AND ELEVATION (CONTOUR LINES ON RED-LIGHT READABLE MAPS).
BROWN: RELIEF FEATURES & ELEVATION (CONTOUR LINES ON OLDER MAPS).
GREEN: VEGETATION (WOODS, ORCHARDS, VEGETATION).
BLUE: DRAINAGE (WATER).
RED: POPULATED AREAS, MAIN ROADS AND BOUNDARIES ON OLDER MAPS.

A MAP IS ORIENTED WHEN IT IS IN A HORIZONTAL POSITION WITH ITS NORTH/SOUTH CORRESPONDING TO THE NORTH/SOUTH ON THE GROUND.

ORIENTING THE MAP

TOPOGRAPHIC SYMBOLS MAN MADE OBJECTS

HEAVY DUTY

MEDIUM DUTY

IMPROVED ROAD UNIMPROVED ROAD
Symbolization - Showing elevation on a map

Shading and hachure

- In early maps cartographers used shading to show relief
- Later, map makers used short, controlled lines called hachures to show changes in elevation
- Hachure use ranges from the simple to ...

Topographic maps

- Also called quadrangles
- Nearly 54,000 for the U.S.
- Done by the US Geological Survey (USGS) since 1897
- Map out the entire country in a standard fashion

Topographic maps

- Till the 1940s, you climbed to the highest point and plotted what you could see from there
- Aerial photography after WWII
- Two overlapping photos are put in a stereoscope
- 10 photos for each 7.5 minute map
Topographic maps

- Show 2D features, point, line and area; also show 3D via contour lines
- Common symbols are in the appendix of the text
- Note the contour interval at the bottom of the map

Symbolization - Showing elevation on a map

Flooding a fish tank for science

- Another way of showing elevation is by drawing lines of equal elevation called isohypses or more commonly called contour lines
- Conceptually it’s like the high tide line at the beach
- Adding progressively more and more water to a fish tank will leave a series of levels on various shaped objects

Symbolization - Showing elevation on a map

Interpolating isohypses

- Each dot represents a measuring station, and the number next to each dot is the quantity measured at that station
- The approximate location of one or more levels of isohypses that form the surface is interpolated and marked by Xs
- The isolines are drawn
- The other isolines at 10-unit intervals are interpolated and drawn
- Shading is added for clarity

Symbolization - Showing more data on a map

- Contour lines or isohypses are types of isopleths
- There are several other types of isopleths that can show:
  - barometric pressure - isobar
  - air/water temp. - isotherm
  - wind/water velocity - isotach
  - rainfall - isohyet

TERRAIN FEATURES

- Five Major
  - Hidden Valley Ranch Salad Dressing
  - Hilltop, Valley, Ridge, Saddle, Depression
- Three Minor
  - Draw, Spur, Cliff
- Two Supplementary
  - Cut, Fill

Interpreting Contour Lines

HILL: AN AREA OF HIGH GROUND. FROM A HILLTOP, THE GROUND SLOPE DOWN IN ALL DIRECTIONS.
VALLEY: A STRETCHED-OUT GROOVE IN THE LAND, USUALLY FORMED BY STREAMS OR RIVERS.

RIDGE: A SLOPING LINE OF HIGH GROUND.

DEPRESSION: A LOW POINT IN THE GROUND OR SINKHOLE. THEY ARE REPRESENTED BY CLOSE CONTOUR LINES THAT HAVE TICK MARKS POINTING TOWARD LOW GROUND.

SADDLE: A DIP OR LOW POINT BETWEEN TWO AREAS OF HIGHER GROUND.

SPUR: A SHORT, CONTINUOUS SLOPING LINE OF HIGHER GROUND, NORMALLY JUTTING OUT FROM THE SIDE OF A RIDGE.

DRAW: A LESS DEVELOPED STREAM COURSE THAN A VALLEY. THERE IS ESSENTIALLY NO LEVEL GROUND AND, THEREFORE, LITTLE OR NO MANEUVER ROOM WITHIN ITS CONFINES.
**CLIFF**: A vertical or near vertical feature; it is an abrupt change of the land. The slope is so steep that the contour lines converge into one contour line or the last contour line has tick marks pointing to low ground.

**CUT**: A man-made feature resulting from cutting through raised ground, usually to form a level bed for a road or railroad track.

**FILL**: A man-made feature resulting from filling a low area, usually to form a level bed for a road or railroad track.

**DETERMINING ELEVATION CONTOUR INTERVAL IS 10M**

Contour Lines

![Contour Lines Image](image)

**DETERMINING ELEVATION CONTOUR INTERVAL IS 10 METERS**

![Contour Lines Image](image)
A Profile Map

A Profile map shows the landscape as if it was cut vertically and viewed from the side. The elevation values are shown with horizontal graph lines.

Creating a Profile Map

Concept

A horizontal line is drawn through the Topographic map.

The intersection points of the horizontal line and the contour lines are projected vertically to a graph.

Creating a Hand Drawn Profile

1. Draw equally spaced horizontal lines on the sheet of paper you will be using to create the profile map (graph paper is good to use since the grid lines help keep lines parallel).

2. Label the horizontal lines with the values of the elevations from the Topographic map.

3. Tape the Topographic map above the graph lines you created for the profile map.

4. Draw a horizontal line through the Topographic map at a desired location. This line will be referred to as a cutting line through the remainder of the presentation.

5. Draw vertical lines from the points where the contour lines intersect with the cutting line down through the graph lines. These are drawn as solid lines but are shown dashed here for better visualization.

6. Determine where the vertical lines intersect the appropriate graph lines and draw a dot, i.e. the vertical line drawn for the 20 contour line must be marked on the 20 graph line, etc.

Dots are drawn exaggerated for visualization.
Creating a Hand Drawn Profile

7. Draw curve lines through the dots to create the profile map.

Profile can be colored in to better visualize the cross section of the landscape.