Topographic Maps

Slides from introduction to laboratory exercise on Topographic Maps

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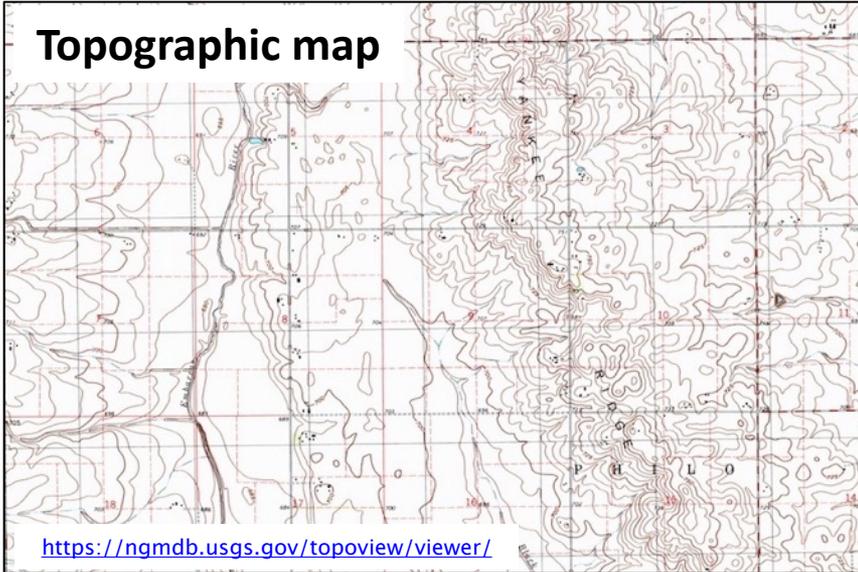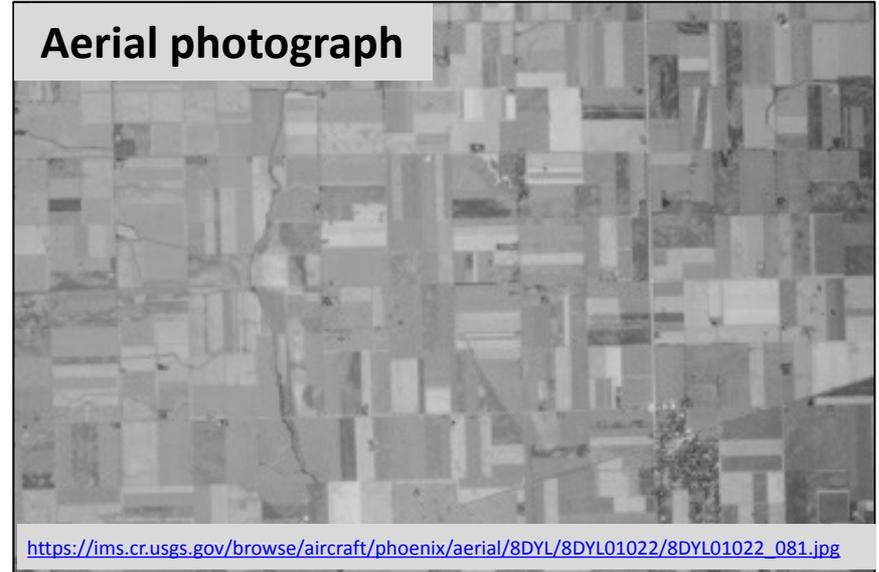
Choosing the Right Tool

- **Different maps and images are used for different purposes:**
    - **Each has advantages and disadvantages**
    - **Maps, aerial photographs, satellite images**
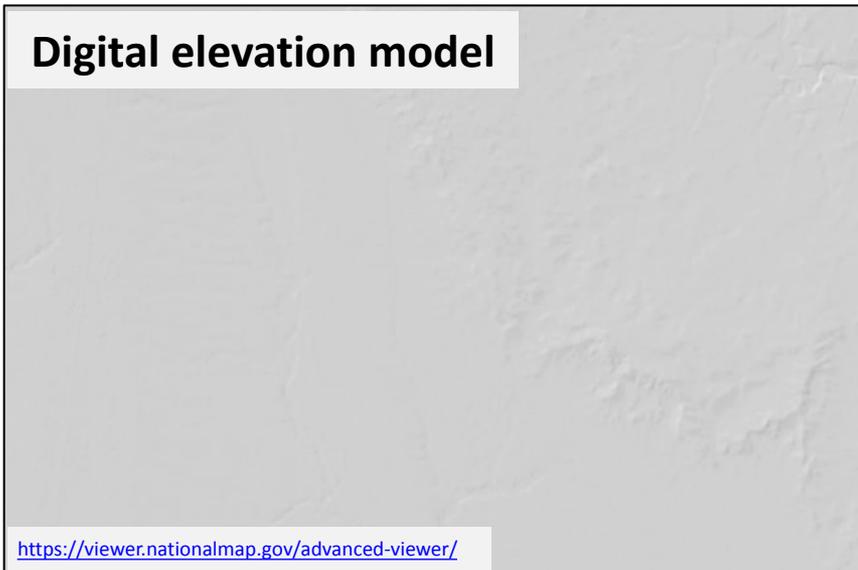   - **Analog and digital forms**

Different Views of Yankee Ridge IL

Topographic map

https://ngmdb.usgs.gov/topoview/viewer/

Aerial photograph

https://ims.cr.usgs.gov/browse/aircraft/phoenix/aerial/8DYL/8DYL01022/8DYL01022_081.jpg

Digital elevation model

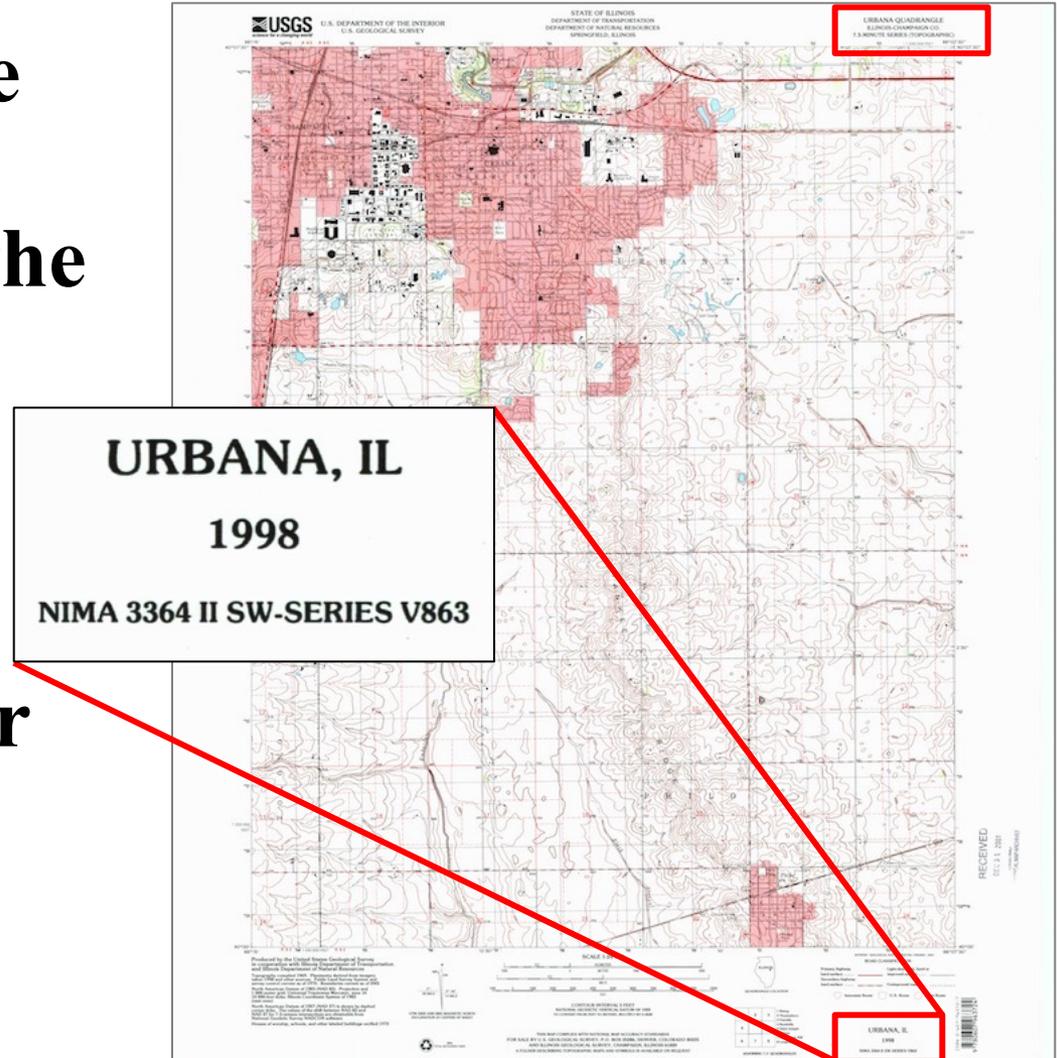https://viewer.nationalmap.gov/advanced-viewer/

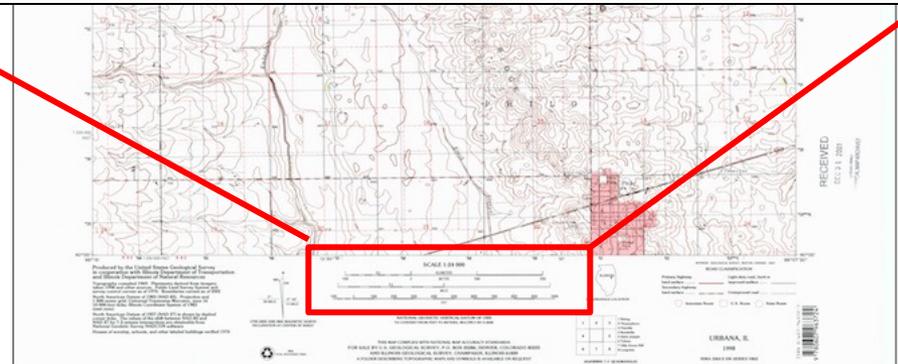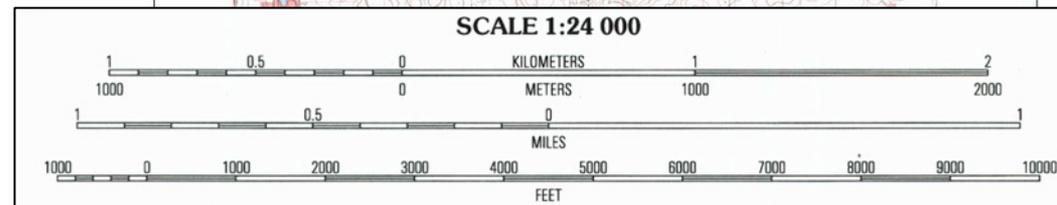**Satellite image**

Google Earth image

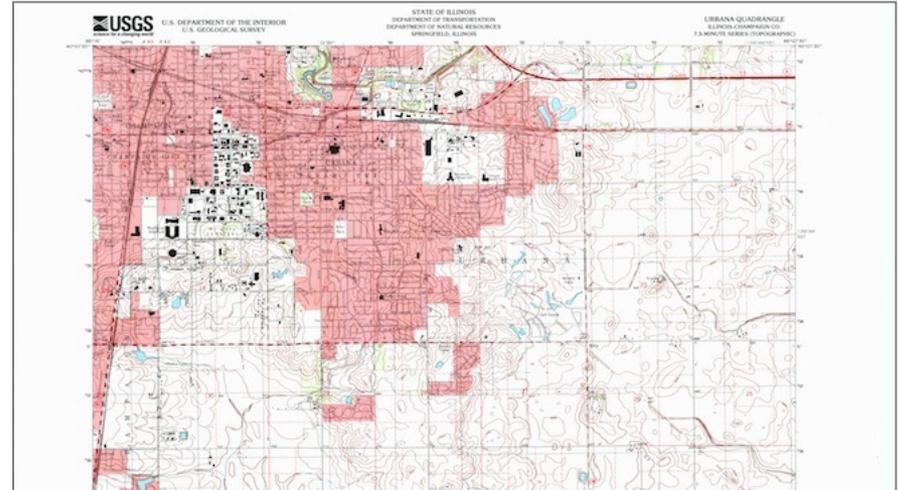# Topographic Quadrangles

- **Rectangular shape**

  - **Cover most of the country**

  - **Unique name**

    - **Found in upper & lower right corners**
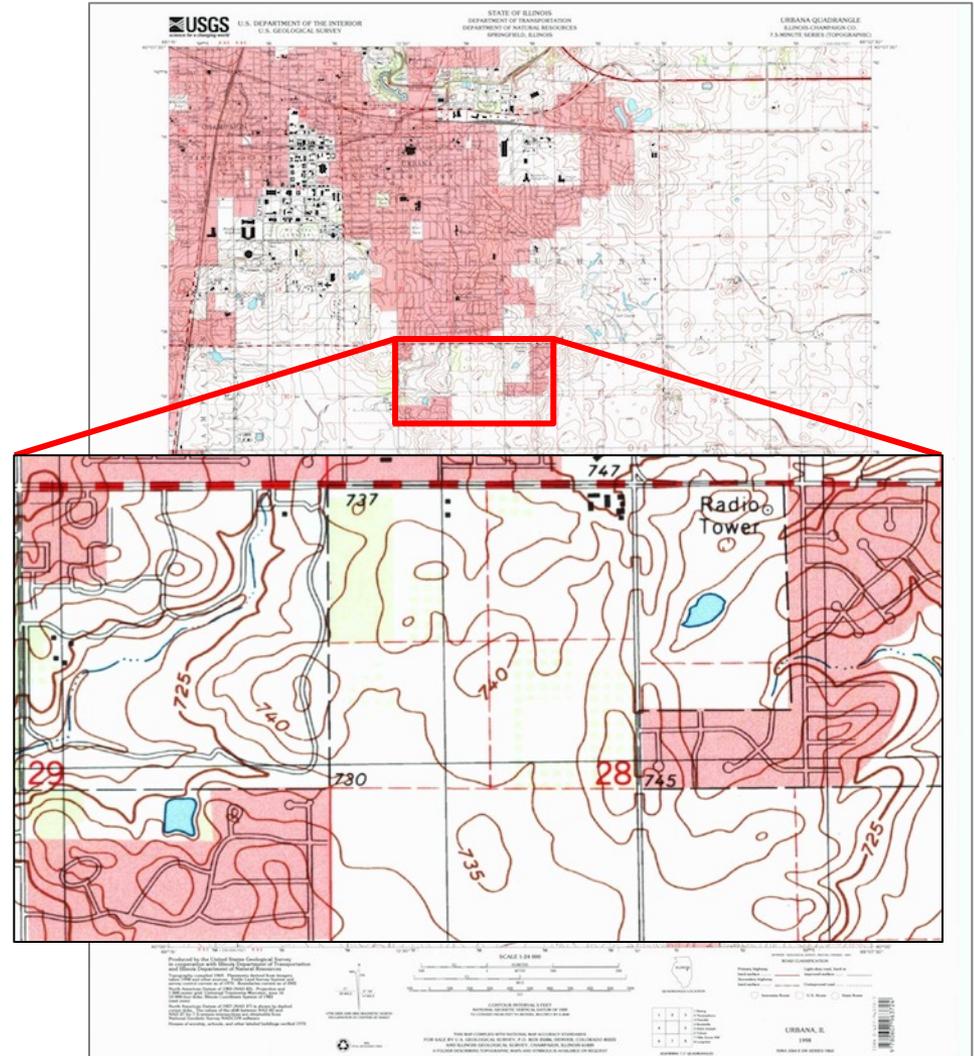

URBANA, IL

1998

NIMA 3364 II SW-SERIES V863

Scale

- **Graphic scale**
  - **3 scale bars**
  - **Km, m, miles, feet**

- **Fractional scale**
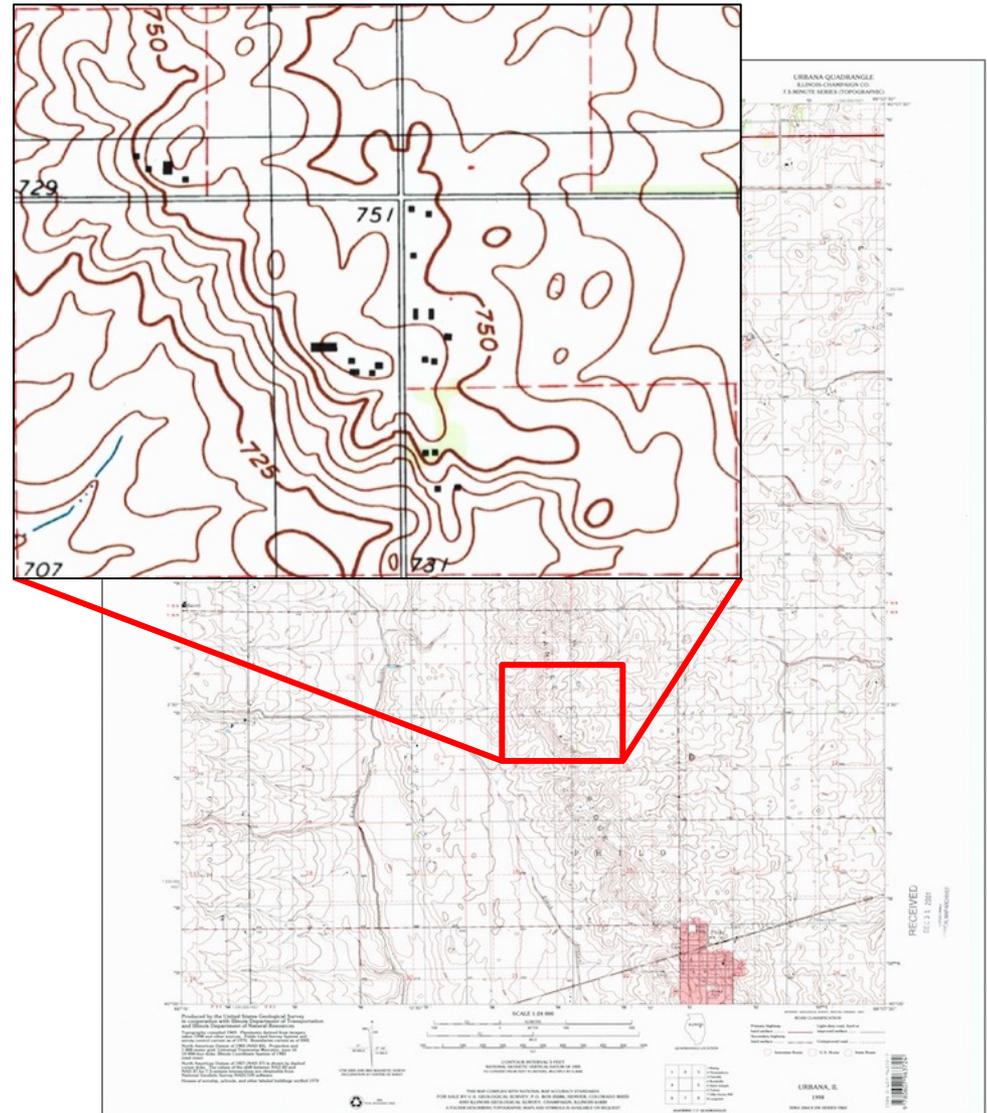 - **Ratio of map size to real world (1:24,000 here)**

Decoding Topo Maps

- **Colors**

  - **Urban (pink), woods (green), water (blue)**

- **Symbols**

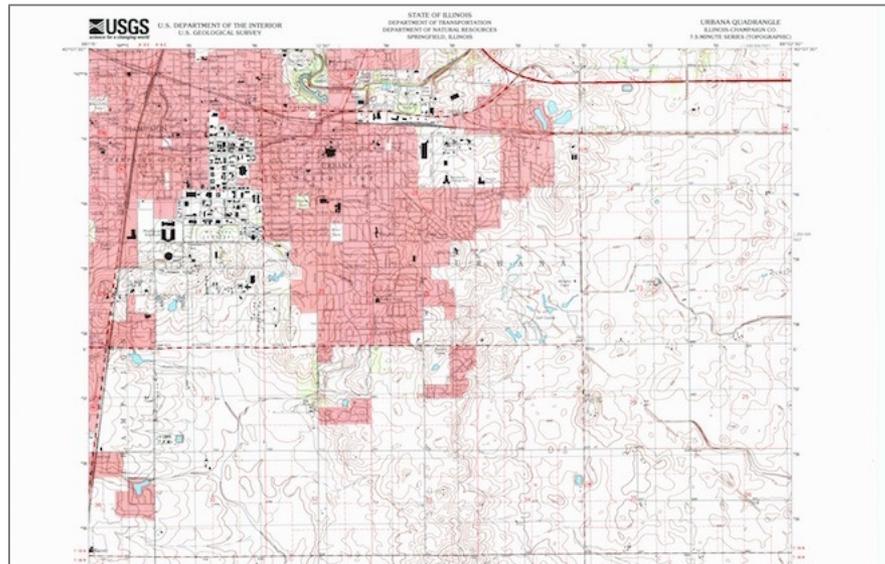 - **Buildings, roads, etc.**

  - **USGS booklet**

Elevations on Topo Maps

- **Contour lines connect points with = elevation**

  - **Trace shape of landscape**

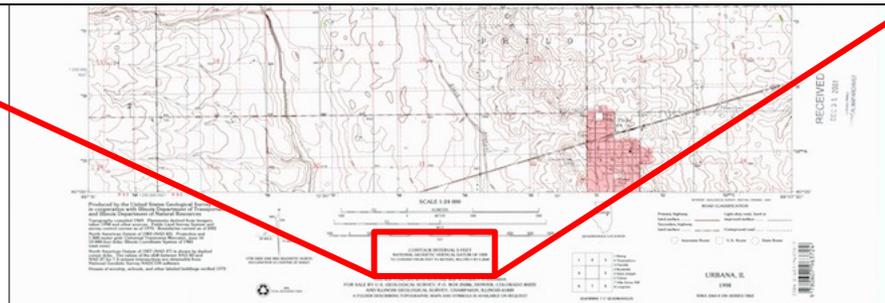 - **Index contours (thicker lines labeled with elevations)**

Contour Interval on Topo Maps

- **Elevation change between adjacent contour lines**

  - **Different for each map**

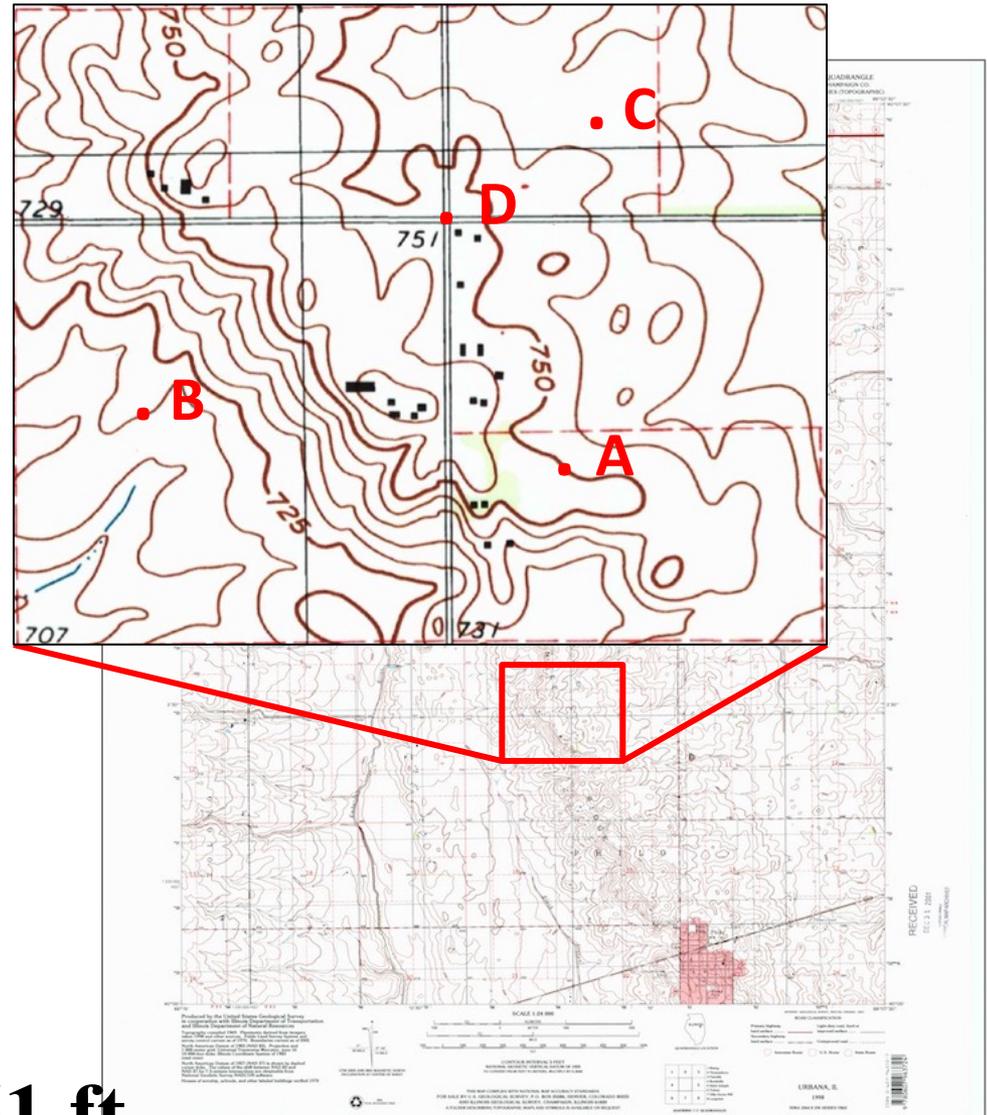 - **Large in mountains, small in plains**

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
TO CONVERT FROM FEET TO METERS, MULTIPLY BY 0.3048

Elevations from Contour Lines

- **Point A is on index contour = 750 ft**

- **Point B is one contour below 725 ft, so B = 720 ft**

- **Point C is between 745 and 740 ft, so C = 743 ft**

- **Point D is a "spot elvation", so D = 751 ft**

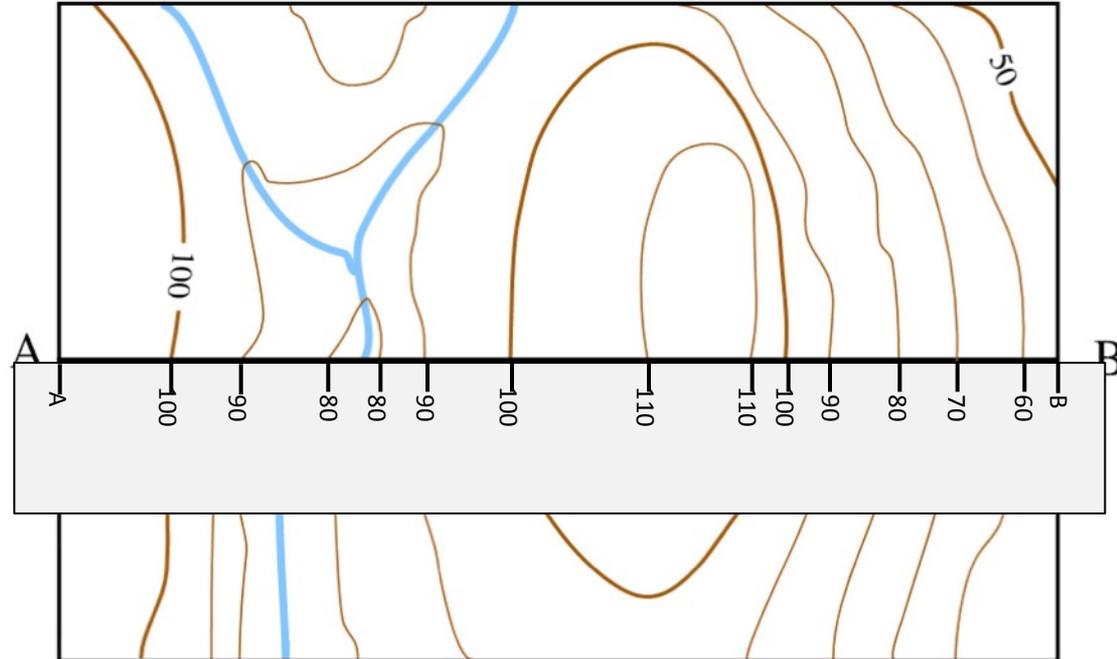# Topographic Profiles

- **Profile: graph of elevation along A-B**

  - **X-axis shows distance from A**

  - **Y-axis shows elevation**

  - **Plot points wherever line A-B intersects a contour line**
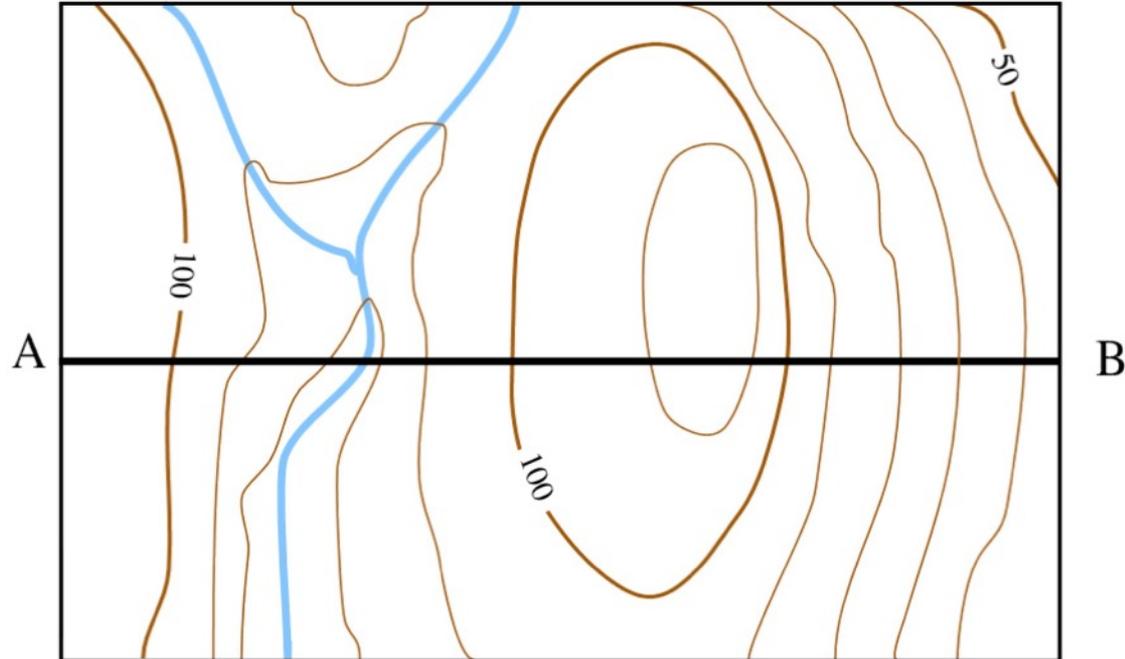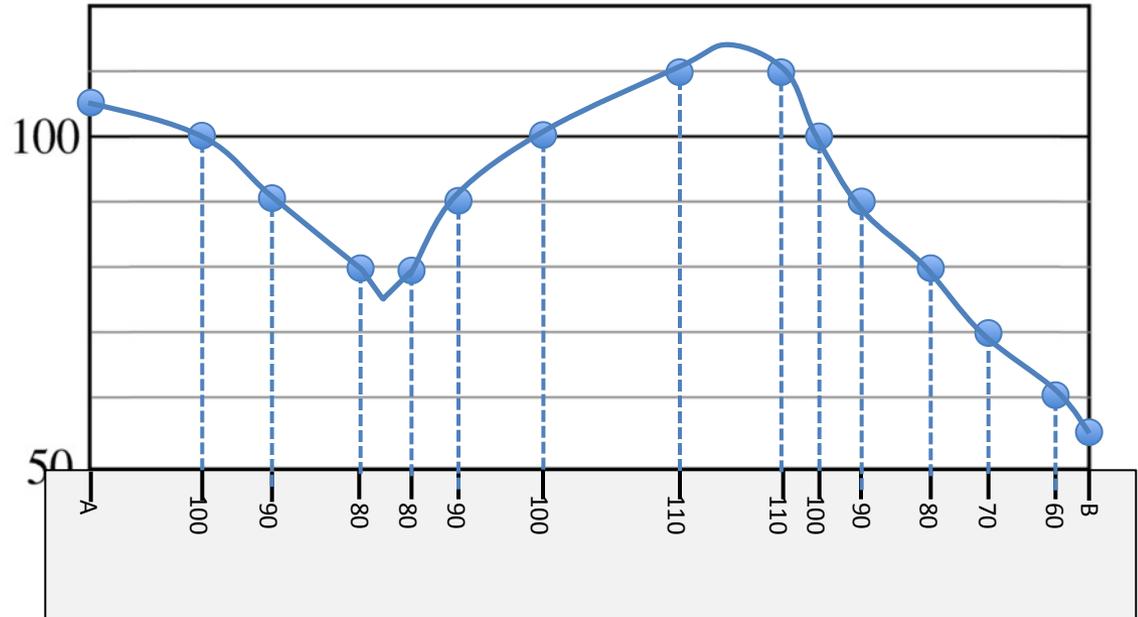
Marking a Topographic Profile

- **Lay the edge of a separate sheet of paper along line A-B**

  - **Mark each contour line**

  - **Label lines with elevations**

  - **Mark endpoints A and B**

Transferring Elevations to Graph

- **Project from each contour mark up to the correct elevation**

  - **Connect points with a smooth line**

Teaching Notes and Tips

This exercise is divided into three complementary sections. The exercise may be completed in one extended laboratory period, or individual sections may be assigned as separate, shorter activities or as homework.

Some students may find it difficult to work with a topographic map on a computer screen. If possible, making paper maps available can alleviate this problem. The map used in this activity is the 1958 version of the Antelope Peak, Ariz., quadrangle, which can be downloaded free from the USGS website. This map was chosen because the overall topography is uniform and most contour lines are easy to read. In addition, using an older version of the quadrangle allows students to consider how a map indicates an instant in time and may or may not continue to represent the area accurately.

The process of constructing a topographic profile is illustrated and described in the student instructions, but a physical demonstration by the instructor can be very helpful. Note that students need access to a printer for the topographic profile map; alternatively, the instructor may provide this map as a handout.

Calculating vertical exaggeration requires students to divide fractions and to switch between fractions and ratios (1/24,000 vs. 1:24,000). This process can be confusing, and it is recommended that the instructor work examples when introducing the activity.