Activity: Topographic Map Basics
2020

WUFC Est. 1967

LEARNING OBJECTIVES: The primary purpose of this activity is to provide an opportunity to refresh our memories on how to read and interpret the basic elements of topographic maps, use topographic contours to calculate relief and slope

SUBMITTING YOUR WORK: This exercise will be graded for completion. For credit, please create a single PDF document containing clean scans of at least pages 2 and 3 of this assignment booklet. Upload your PDFs using the appropriate assignment on the Canvas site.

Part 1: Learning to Use Topography

Topographic maps render the three-dimensional "ups" and "downs" of terrain (real landscapes) on a two-dimensional surface (map). Topographic maps also usually show and name mountains, valleys, plains, lakes, rivers, and vegetated areas. They also commonly identify roads, boundaries, transmission lines, and major buildings. The most characteristic feature of topographic maps is the use of **contour lines**, which are lines of equal elevation that are used to portray the shape and elevation of the land. Contour lines are registered to a pre-defined datum (e.g., mean sea level). A **contour interval** is the vertical distance between two contour lines. When terrain is flat, such as in prairie regions, contour lines are widely spaced to reflect gradual changes in elevation. In steep terrains, contours are often tightly spaced to highlight rapid changes in elevation. Generally, darker contour lines, or **index interval**, are used to help the reader quickly register large increments of elevation. For example, a map may have normal contour lines for every 20 feet of elevation and an index interval every 100 feet.

Rules for contour lines:

- Close upon self or be truncated by map edge
- Reference a specific data plane (eg., sea level)
- Be constant (… almost always the case)
- Not cross (… but can merge)
- reflect change in slope if repeated

Contours can be used for a number of purposes:

- Look for closed circles: indicate hill tops or valley bottoms.
- **Relief**: difference between two elevations.
- **Maximum relief**: difference between highest & lowest points in an area.
- Calculating **slope**, which is the change in vertical elevation (**rise**) divided by the horizontal distance (**run**).
- When **interpreting slope using rivers**, pay attention to the way contour lines bend when crossing streams - the direction the contours "V" points upstream.
- When **slope changes** direction, contours will repeat.
- The **horizontal spacing of contours can indicate steepness of slope**. Gentle slopes are characterized by widely spaced lines. Steep slopes are characterized by tightly spaced lines.

Links to accompanying SketchFab block models:

- Questions 1-3: Block No. 121
- Question 4: Block No. 122

Contour interval = 50 m
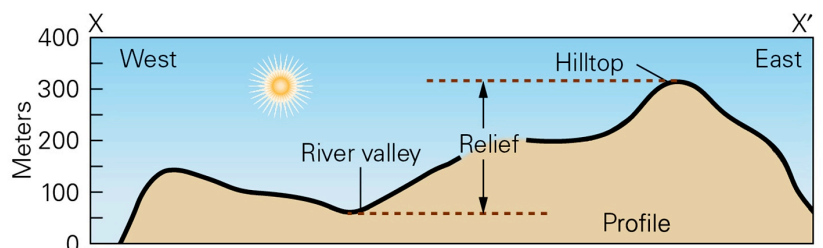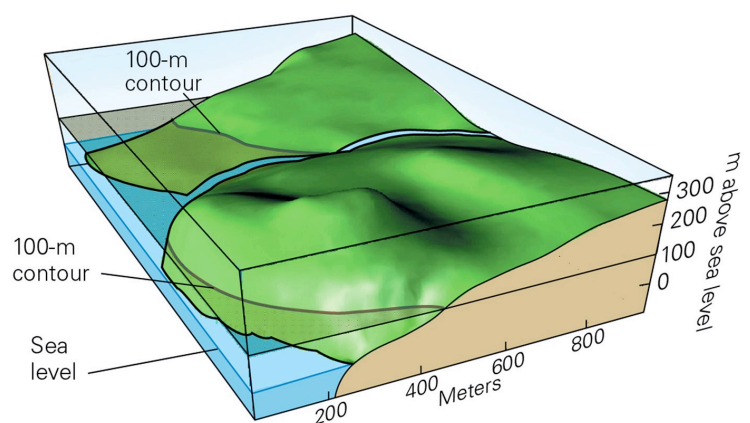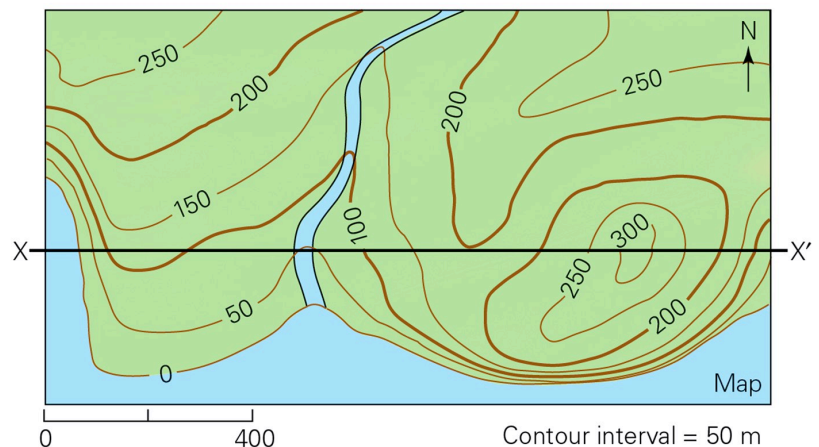
1. **Reading contours**: the figure at right shows the surface topography of Block No. 121 as defined by contour lines. The elevation (in meters) of one index interval is provided. Note the streams mapped using solid blue lines in the canyons throughout the map area. Using a colored pencil, please shade the area (s) with contours that represent(s) the highest points in the area.
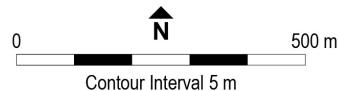
Block No. 121

N

0 — 500 m

Contour Interval 5 m
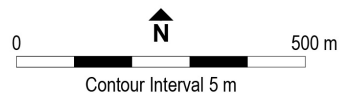
2. **Calculating relief**: use the elevations indicated with labeled points in the map area to determine relief. Remember, relief is the change in elevation between two points in a map.

Local relief between points A and B: _____

Total relief between points C and D: _____

Block No. 121

N

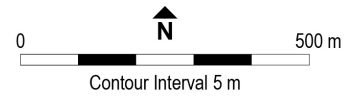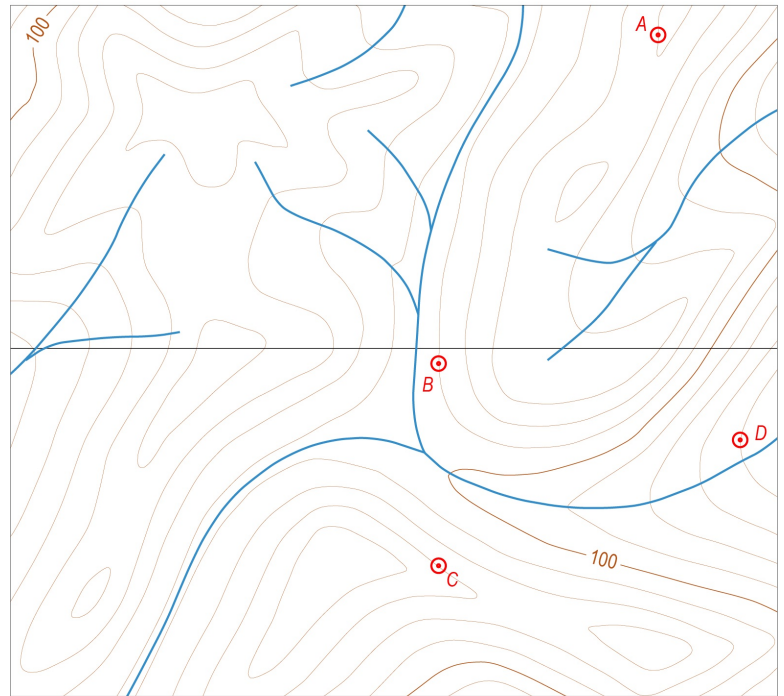0 — 500 m

Contour Interval 5 m

3. **Calculating Slope**: use the elevation indicated with labeled points in the map area to determine the slope between those points. Remember, slope is the change in vertical elevation (rise) divided by the horizontal distance (run).

Slope between points A and B: _____

Total relief between points C and D: _____

Block No. 121

0 ____ N ____ 500 m

Contour Interval 5 m

4. **Marking contours**: Complete the topographic map of the surface of Block No. 122. Using a contour interval of 5 meters, write the elevations (in the empty red boxes) of contour lines on the map that have empty red boxes on them (write your answer inside the boxes). *"Sea level"* refers to mean sea level (a.k.a. zero elevation).

Block No. 122

0 ____ N ____ 500 m

Contour Interval 5 m