I. Objectives

1. Construct a material model of typical terrain found in a landscape.
2. Construct a topographic map corresponding to the terrain model.
3. Learn how to interpret topographic maps

II. Introduction

In physical geography and other scientific disciplines, the use of maps is vital in helping researchers not only portray the locations and separation distances among places across the globe, but also to assist them in displaying and interpreting various terrain and geologic features at a variety of spatial scales across a geographic region. Topographic contour maps serve the latter purpose.

III. Materials

Two hunks of playdoh, paperclips.

IV. Prelab Definitions

1. cartography

2. topography

3. contour map

4. contour interval

5. contour lines

6. map scale

7. quadrangle

8. Digital Elevation Model [DEM]

V. Lab Procedure

Your goal is to construct miniature landscapes out of playdoh and construct the corresponding topographic map.

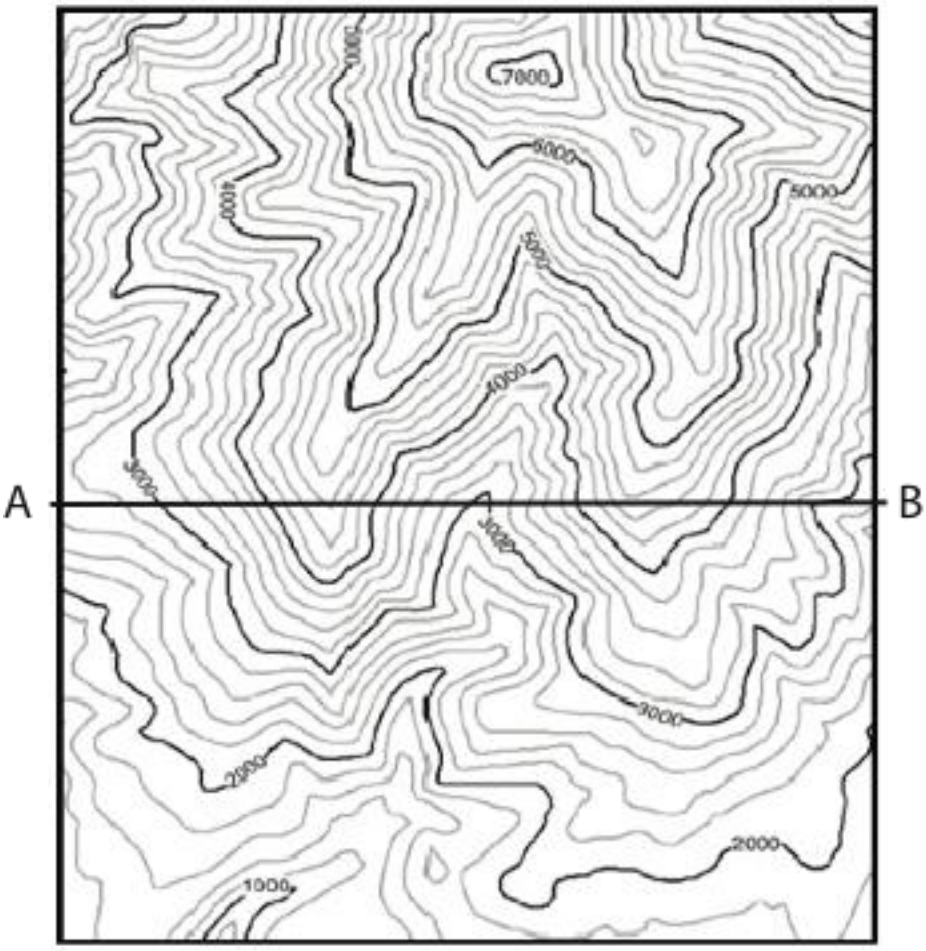
1. Build a landscape: You have two pieces of playdoh of different color. Construct a small landscape with the playdoh including some high regions (a mountain), some low regions (e.g., where a lake might form) and some valleys. Make the total relief (vertical distance between highest and lowest point) approximately 3 inches. One color of the clay should be the "lower" layer, and the other the "upper". That is, do not mix the clays but imagine them as two different rock types that lay on one another horizontally.

2. Contour the landscape: Unfold the paperclip to use the end to score the clay. Holding the paperclip at a constant elevation, score the clay as you rotate it. Once you have scored the entire landscape at that elevation, move the paper clip up or down (slightly) and repeat. Do this as many times as necessary to get to the highest elevation in your landscape. Important: Make sure your contour interval (the amount you move the paperclip up) is the same every time. Make the contour interval small enough (approx. 1/4 inch) so that you make 8-12 contour lines.

3. Construct a topo map: View your landscape directly from above (so you can't see the sides) – this is your topo map! Sketch your topo map in the box below. Draw all of the contour lines you see. Label the contour lines as 0, 1, 2, etc. (0 being the lowest elevation).

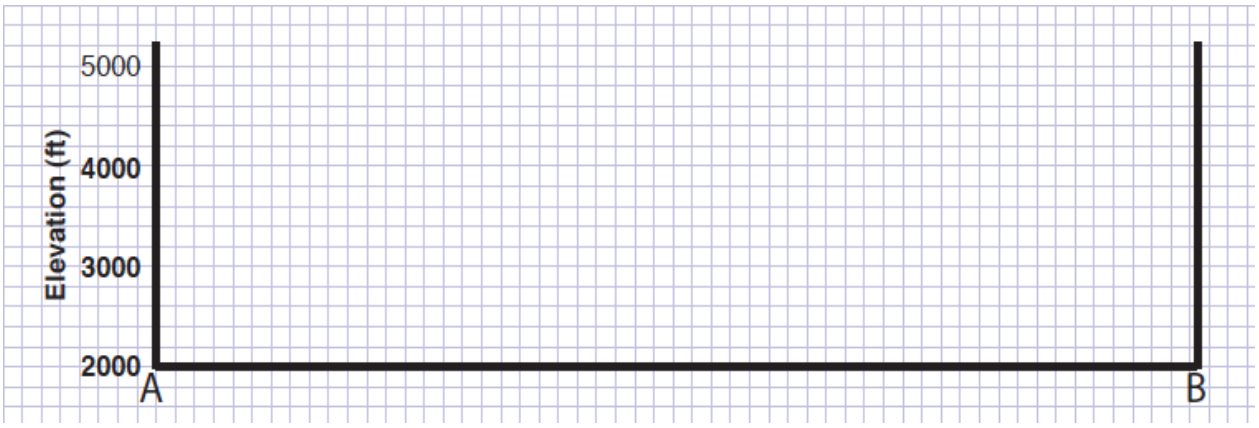
Place the clay terrain here

Draw topo map here



4. Create a topographic profile with the topographic map shown above. Use a blank sheet of paper with the edge along A-B. Mark the A and B points on either end of the profile. At every point a contour line crosses A-B, put a tick on the sheet of paper and note the elevation.

   Transfer the elevation profile data to the graph below. Place the piece of paper with the tick marks along the base of the graph, and at every tick mark, make a dot on the graph at the corresponding elevation. Connect all the dots – this is the topographic profile along the path from A to B. (The last page of this lab has an example of constructing a profile). Attach your piece of paper with the tick marks to this lab when you turn it in.



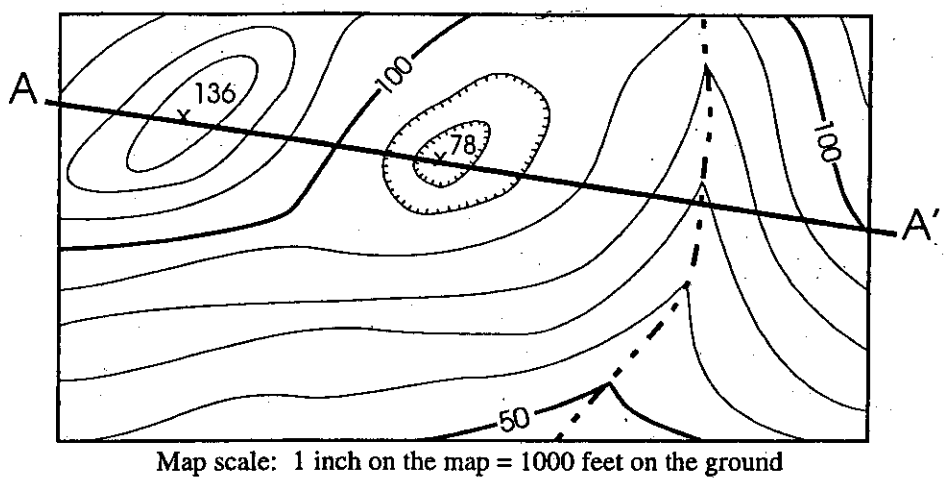
5. Using a real USGS topo map (make sure the scale is 1:24000), create another topographic profile following the procedure in #4. The profile should be 2 km long and can go anywhere on the map as long as there is some "interesting" topography (don't pick a flat area). Plot the profile on the graph paper below. DO NOT WRITE ON THE TOPO MAPS.

6. Can two contour lines ever cross? Explain why or why not. Think carefully about what a contour line is.

7. What is the elevation <u>difference</u> between Mt. Lemmon and Tucson in feet, miles, and meters? Use the topographic maps in class to find the answer. If you can't find the elevation in one of these units, convert from one of the others.

Lab courtesy of Dr. Dana Kerola

Example of finding a topographic profile:



Map scale: 1 inch on the map = 1000 feet on the ground