



# Build an Island

## **INTRODUCTION**

For this assignment, you will be creating a topographic map and three-dimensional model of a fictional island that you have designed. You will start by exploring some basic information about topographic maps and how they are created. See the **Background Information** section below for directions on how to do this. You may then begin by drawing a map of your island by following the **Part 1 Instructions** found below. After drawing your island, you must get it approved by your teacher. Approval will take place during class on \_\_\_\_\_.

Once your map is approved, you may begin building your model by following the **Part 2 Instructions** found below. The final map and model is due in class on \_\_\_\_\_.

## **BACKGROUND INFORMATION**

Before drawing your map, please read through the following explanation and description of topographic maps. You must also visit the “topos” page of our website ([www.83science.com/topos.html](http://www.83science.com/topos.html)) for images, animations, videos, and other helpful resources.

A **topographic map** is the two dimensional representation of part of the Earth's three dimensional surface, drawn to scale. Also called a “topo” map. The features shown on topographic maps may be divided into three groups:

1. relief, which includes hills, valleys, mountains, etc.
2. water features, including lakes, ponds, and streams
3. cultural features, man-made features like bridges, canal, buildings, and roads

**Relief** is the difference in elevation between any two points. Where relief is low, the area appears to be relatively flat as in river valleys or broad, flat uplands. When relief is high, the area is steep, as in rugged mountainous terrains. Relief is shown on a contour map by contour lines.

A **contour line** is an imaginary line on the Earth's surface connecting points of the same elevation.

A map's **contour interval**, is the difference in elevation between adjacent contour lines and must be consistent for a given map, though they may change from map to map. Usually every fifth contour line is printed heavier than the others and bears the elevation above sea level (an “index contour line”).

The **map scale** expresses the relationship between distance on the map and the true distance on the Earth's surface. This is generally expressed as a ratio or a fraction, such as 1:24,000 or 1/24,000. The numerator, usually 1, represents map distance, and the denominator, a large number, represents ground distance. Thus, 1:24,000 means that a distance of 1 unit on the map represents 24,000 such units on the ground. The unit here is not important — it could be meters, feet, or inches. What is important is the relationship between the map distance and the true ground distance.

### **Rules of Contour Lines**

1. Every point on a given contour line is of the exact same elevation; that is, contour lines connect points of equal elevation.
2. Contours do not cross or intersect each other (except in the rare case of an overhanging cliff, in such a case, the hidden contours are dashed).
3. All contours eventually close to form an irregular circle or run off the map.
4. Contours near the upper parts of hills form closures (circles). The top of a hill is higher than the highest closed contour.
5. Contours are widely spaced on gentle slopes. 6. Contours are closely spaced on steep slopes.
6. Each adjacent contour line must maintain the same increase or decrease in elevation.
7. Where a contour line crosses a stream or valley, the contour bends to form a "V" that points upstream or valley. In the upstream direction the successive contours represent higher elevations.
8. Depressions are shown by hatched contours. Hatched contours are contours with short lines on the inside pointing downslope. The bottom of the depression is lower than the lowest closed contour.

## **PART 1 INSTRUCTIONS**

1. On a piece of printer paper (not looseleaf!), please **neatly** draw a topographic map of an island. You may need to try it a few times before you get it the way you want it. Do it in pencil first, then you should go over it in marker to make the lines and other features stand out.

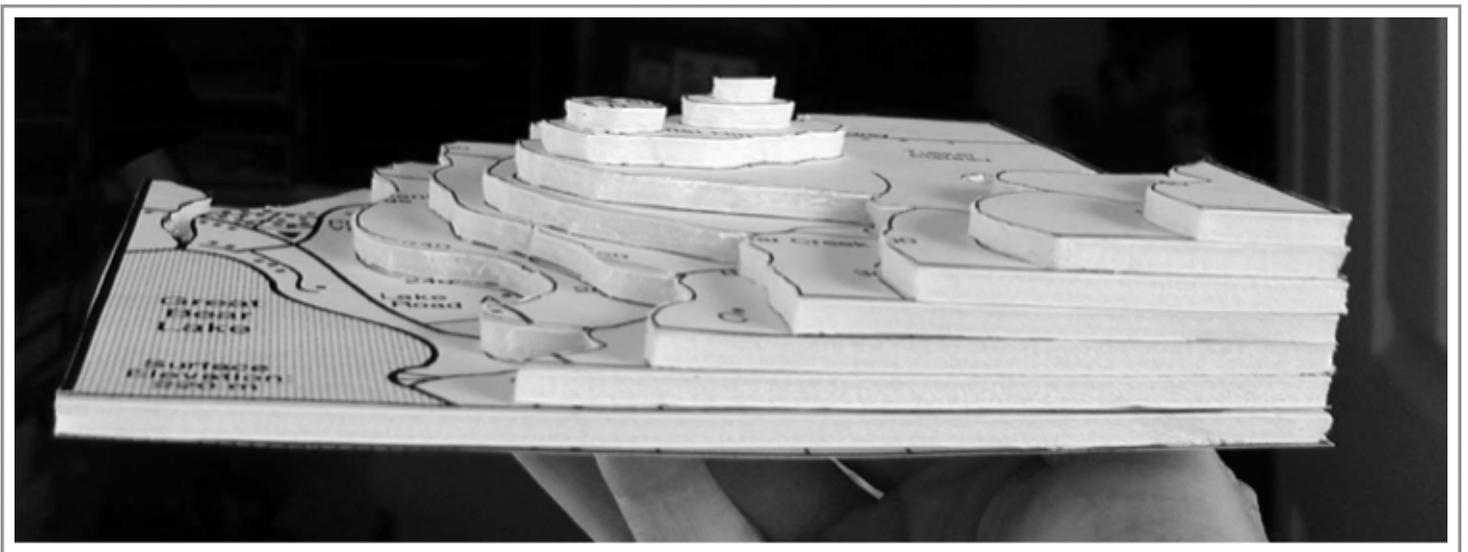
Your map **MUST** include the following features:

- ✓ A minimum of six contour lines
- ✓ A minimum of one high point (a mountain peak), marked with the maximum elevation (a “spot elevation”)
- ✓ A river
- ✓ A compass rose
- ✓ A statement of the contour interval
- ✓ A map scale
- ✓ A minimum of one depression
- ✓ Any landmarks or features that would be fun to show, such as roads, buildings or a lake.

2. Show your completed map to your teacher for approval before beginning part 2.

## **PART 2 INSTRUCTIONS**

1. Make a photocopy of your map. This is very important as you will need to cut your map up and you don't want to destroy your original. Remember, to get full credit, you must submit both a map and a model.
2. On your photocopied map, cut out the lowest elevation which should be the outermost and biggest circle, or contour line. There will be smaller circles in the middle. Ignore those for now. Trace your cut-out on the material you are making the model out of and cut it out (either foam board or thick cardboard). This is the base of your 3-D model.
3. Repeat this procedure for the rest of the lines on the topographic map. Cut out each contour line circle, trace onto the material, and cut out the material. Your circles should get smaller and smaller. Go ahead and discard your cut-up map pieces once you have the cut-outs to keep. Number the cutouts. Be sure to keep the cut-outs stacked up in order, so the biggest piece is on the bottom.
4. Glue or attach each cut-out to one below it. Let the glue dry.
5. Add color to show the features such as rivers, lakes, roads, etc. and label your model.
6. Create a Compass Rose on your map with four arrows that designate North, East, South, and West.
7. Add a Scale, which will represent the distance. For example, one inch represents one mile.
8. Add a Legend or Key to the elements on your map, and a statement of the contour interval.



## Building a Topographic Model

### INTRODUCTION

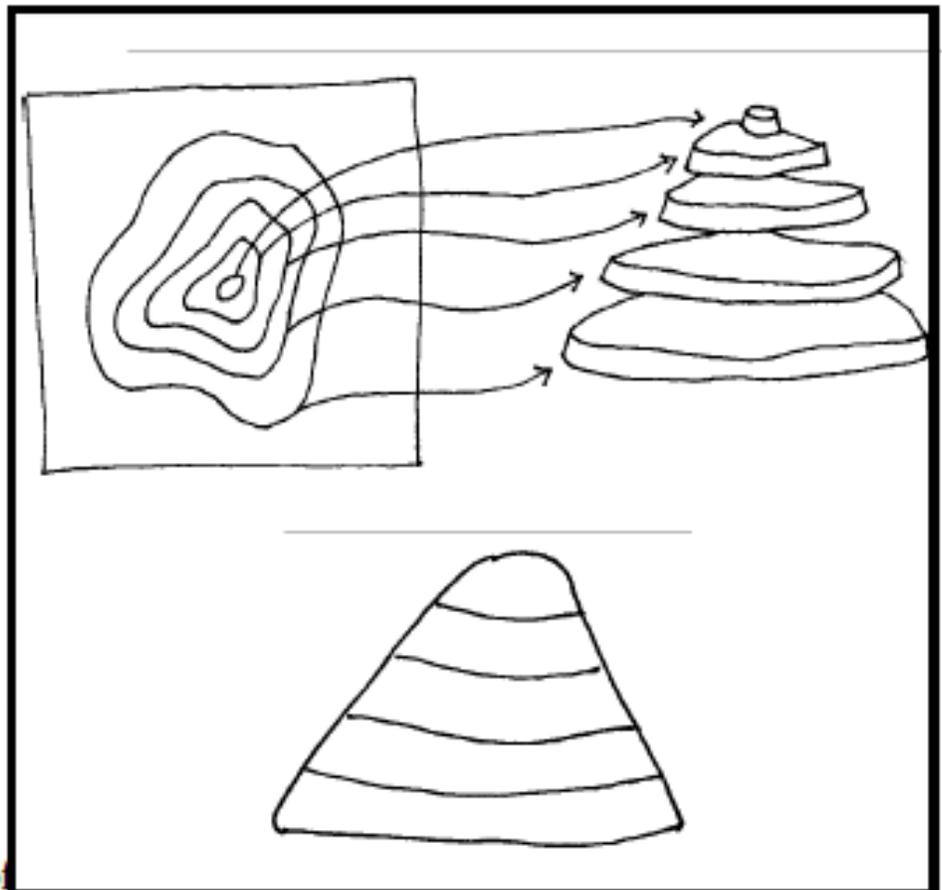
Topographic maps show the shapes and features of the Earth's surface using contour lines. Contour lines show places on the map that have the same elevation. Using contour lines as a guide, you can build a three dimensional model of a landform.

### MATERIALS

- Your hand drawn topographic map and photocopies
- Thick cardboard or foam core
- Heavy duty scissors
- Glue
- ~~Modeling clay~~
- Pen or pencil

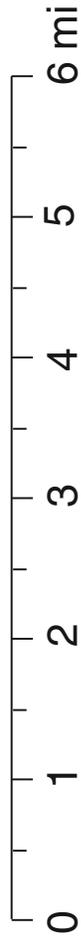
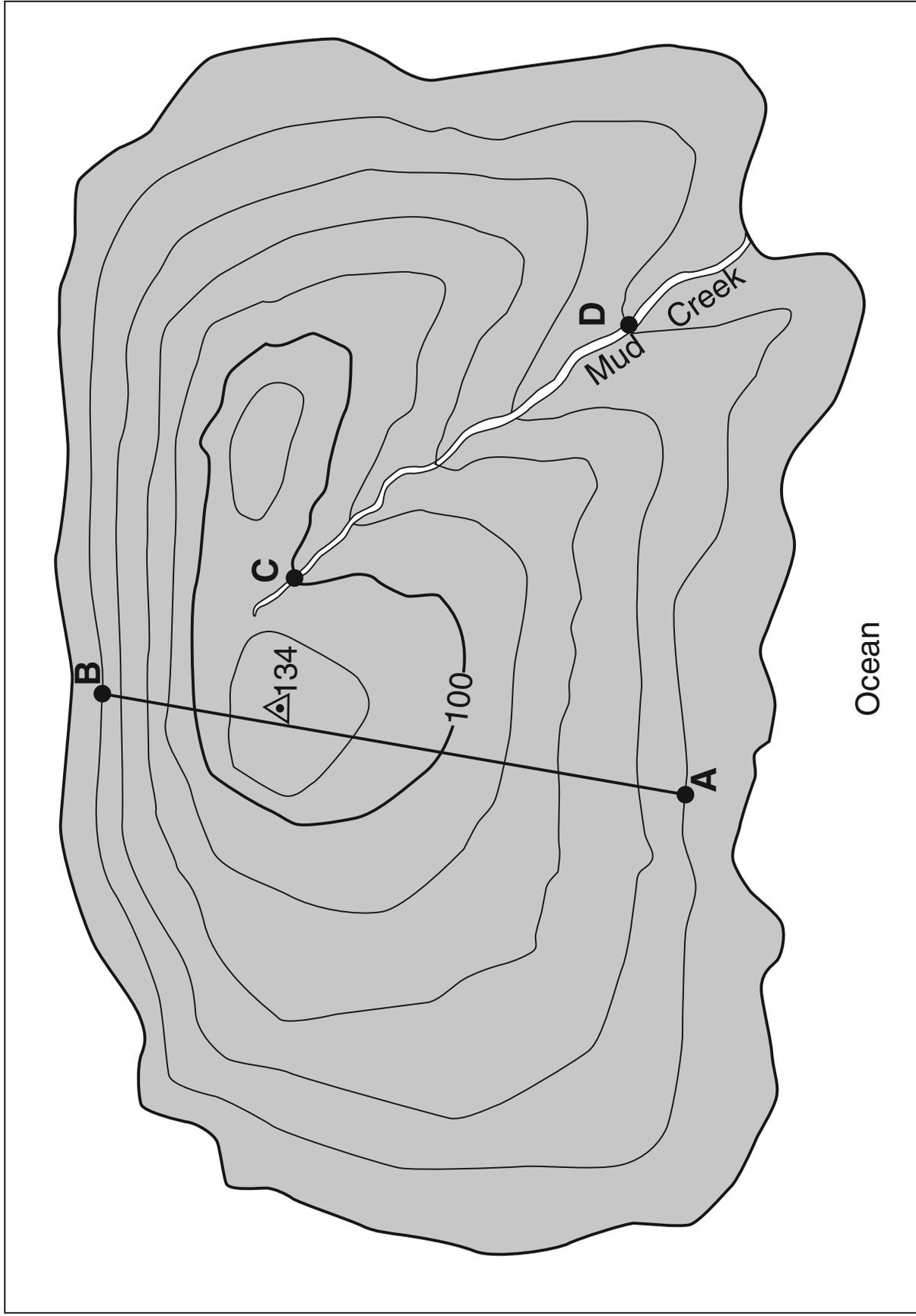
### PROCEDURE

1. Examine your map. On a separate piece of paper, draw or write a description of the landscape.
2. Cut along the outermost contour line on your enlarged map.
3. Use this as a template to cut a piece of cardboard of the same shape and size.
4. Cut along next inner contour line and use it as a
5. Continue this process, stacking the progressively smaller pieces of cardboard.
6. Glue stacked shapes together, then compare them to an uncut version of the map.
7. ~~To smooth the steps between contours, cover edges with modeling clay.~~
8. Use the map to find the location of creeks and rivers in your landform. Mark them on your model ~~by carving them into the clay~~ with a pencil or by using colored clay or markers.



Amy Hutzel  
template to cut the

# Sample Topographic Map of an Island



Contour interval = 20 feet

One inch = 1 mile

C. I. = 500'

