Ν	am	e:

REGENTS EARTH SCIENCE Topo Maps: Contour Plates

Topographic maps enable geologists, builders, engineers, and hikers to "see" the shape of a particular landscape in 3 dimensions- think of it as the *length, width* and *height* of a location. The beauty of a topo map is that all of this information and more (street names, landmarks, highways, political boundaries, etc.) fits onto a flat piece of paper that can be folded up and tucked away. It takes a great deal of **practice** before one can easily read and interpret the information on a topo map. Perhaps the most difficult part is envisioning the various changes in elevations and features- steep slopes, hills, valleys, and plateaus. This activity is designed to help you **translate** the map- in other words, help you to "see" the 2-D map in 3 dimensions.

Procedure:

A. Each lab table is responsible for "constructing" a 3-D model of one of the given topo maps. Put a check in the box next to your map:

Mt. St. Helens	Mt. St. Helens	Depression	Stream Map	🗆 Hill Map
"Before"	"After"	Мар		

B. Each group is responsible for tracing **1 contour per piece of glass** from your given map. Make certain that *all* lines of the same elevation are traced. The best way to do this is to line up your glass with the **top left** corner of the map. Next, trace your chosen line with an erasable marker, being careful to **LABEL** your glass in the lower left corner (see Figure 1).

C. Once your group has completed ALL contours for your map, stack the contour plates on top of one another in order (lowest on the bottom, highest on top) on a WHITE PIECE OF PAPER. Make sure that your contours align properly. Refer to the paper topo map if necessary. See the diagram below (Figure 1).

Figure 1. Glass contour
plates are set directly on
top of one another with
the wood blocks up.



D. When your group has finished, display your model in the middle of your lab table, and begin making your interpretations below.

Interpretation:

In this section, you will be asked to consider a series of questions about each model. Move from model to model until you have completed your interpretation of each. Be sure answer the *conclusion* questions at the end.

NOTE: Models are best observed by looking from directly above!!

Name:	

1. Mt. St. Helens "Before"- This volcano, located latitude 46.20 N, longitude 122.18 W, is a stratovolcano (steep-sided with alternating layers of "flow out" and "blow out"). Located in the Cascade Range of Washington State, Mt. St. Helens is the fifth highest peak in Washington.

a. What is the total change in elevation on this map (highest contour – lowest contour)?

b. Calculate the total distance across the map using the scale: _____

c. Note the highest contour on this map: _____

2. Mt. St. Helens "After" - At 8:32 a.m. PDT on May 18, 1980, a magnitude 5.1 earthquake 1 mile below Mt. St. Helens triggered a massive volcanic eruption that blew 3.7 BILLION cubic yards of material into the air and over the land. An eruptive plume of material reached 80,000 feet into the sky in less than 15 minutes. When it was over, the summit of the volcano was significantly lower. The topography of Mt. St. Helens was permanently changed.

a. What is the total change in elevation on this map?

b. What is the highest contour now?

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c. Describe in detail how the appearance of the volcano has changed since the 1980 eruption.

3. Depression Map - Hachure marks on closed contours indicate areas of lower elevation, known as depressions (see example below). There is no surface drainage out of depressions.



a. What are the highest elevation and lowest elevations on this map?

High=	 Low=	
-		

b. Why are there two 650 lines drawn on this model?

Hachure marks indicating a depression.

c. Why are there two 670 lines drawn on this model? What is happening to the land in between the two lines?

4. Stream Map- Streams are often prominent features on topographic maps. Streams flow in one direction- down! As a result, contour lines can help us to determine the direction of stream flow.

a. Assuming North is toward the "top" of the model, in which direction is this stream flowing?

b. Describe the appearance of the contour lines as they cross the stream.
c. In what direction are the contours "pointing" as they cross the stream?
Is this uphill or downhill?
d. In general, contour lines always make a shape when crossing streams, with the
pointing (upstream or downstream).
5. Hill Map- Hills are frequently the most prominent and easiest to identify features on topographic maps.
a. What is the difference in elevation between the highest and lowest contours?
b. Describe the change in elevation in words if you were to walk from the top left corner to the bottom right corner.
c. Where is the steepest part of this model?What does the actual "steepness"
depend on?
Conclusion:
1. Summarize 3 "rules" or characteristics of contour lines that you have learned from this activity:

2. Determine the gradient of the BEFORE St. Helens map as instructed by your teacher.

BRAIN STRETCHER.... Assuming a scale of 1cm=1km, determine the gradient from the highest point on model 5 (Hill) to the southwest corner of the map (assume an elevation of 1150 at that point). Describe whether this is actually a steep hill or not. Justify your answer. Use a Separate Piece of Paper to Answer The Brain Stretcher....