

Share the work on this Lab with a partner and turn in separate reports.

1. Block Diagrams of Folds and Faults

Obtain a set of three dimensional “Cardboard Model” block diagrams from the instructor (#1, 4, 5, 6). These drawings should be cut at the corners, and folded and taped or stapled to make a 3-D block.

Your instructor should review the concept of Strike and Dip, and the map symbol use for Strike and Dip, before you begin this lab. Learning to properly interpret this symbol, and to draw the symbol on a map is a primary goal of this exercise.

Make the set of blocks and study them so you can better visualize the subsurface extensions of layers from the surface, or map, patterns. These blocks may be kept or discarded at the end of lab.

At several points on each block top surface, designated by Roman numerals, draw in the appropriate Strike and Dip symbol for the rock layers or the fault plane. On Models 4 and 5 note how the Strike and Dip symbol changes around the end of the plunging folds.

2. Examples from the Snoqualmie Pass Geologic Map

Get out a copy of the Snoqualmie Pass Geologic Map, and its Legend and Cross Section pages.

What is the scale of this map? _____.

About how far on the map represents 10 miles on the ground? _____.

Find the fold near Longitude $121^{\circ} 40'$, and Latitude $47^{\circ} 15'$.

Is this fold plunging? _____. What direction does it plunge? _____.

Is the fold a syncline or anticline? _____. How do you know? _____.

What is the age and rock type of the unit labeled Khb at Latitude $47^{\circ} 07'$ near the east edge of the map? _____.

Are there any older rock units in the map area? _____. How did you find out? _____.

If so, what are they and where are they on the map?

3. *Geologic Maps, Chama Quadrangle*

This exercise uses the laminated map titled GEOLOGIC MAP OF CHAMA FIFTEEN-MINUTE QUADRANGLE, NEW MEXICO.

Geologic maps are a standard means of communicating information about rocks in a particular part of the world. They are made at all scales and use a standard set of colors and symbols, regardless of the language they are published in.

Part 1—Location of the quadrangle.

What state(s) is it in? _____.
What is the latitude _____ and longitude _____ of the SE corner?
Approximately how many square miles is the area of the map? _____.
What is the fractional (ratio) scale of the map? _____.

The geology is plotted on a topographic base map with contour lines, streams and cultural features.
What is the contour interval of the topographic base map? _____.
What is the approximate elevation of the town of Chama? _____.

Part 2—Ages of the rocks.

The ages are indicated by color, by notations on the map legend, and by the first letter of the rock unit symbols on the map. (You may need to look at a Geologic Time Scale to answer some of these questions.)

Find the dark pink rock units on the map with symbols beginning with a T.
What is the age of these rock units? _____. What is the absolute age? _____.
What kind of rocks in this area are this age? _____.

What is the beginning letter symbol for rocks of Jurassic age? _____ Triassic? _____.

Where is the Kiawa Mtn Formation located in this quadrangle? _____.
(Extra Credit) In the symbol for the Kiawa Mountain Formation, what does the “q” stand for? _____.

About how many years is the unconformity between the Morrison Formation and the Dakota Sandstone? _____; between the Chinle Formation and the Kiawa Mountain Formation? _____.

Part 3—Finding things.

What is the formation name and rock type for the rock unit Tbb? _____.
Where does the rock unit Tbb crop out (relative to town of Chama)?

What percent (approx.) of the map area is covered by Quaternary landslide deposits ? _____.

What is the rock type for Qm and Qg? _____.
What part of the map are these located in? _____.
Are these sedimentary, igneous or metamorphic rocks? _____.
What transported these rocks? _____.

In the NW corner of the map is a dashed line labeled Continental Divide; what is the Continental Divide? _____.

Part 4—Folds and Faults.

Review the concept of dip and strike, and the dip and strike symbol.

Compare the direction and amount of dip in the unit Pcq (east edge of map) with the nearby Kd unit. _____.

At about $106^{\circ} 35'W$, $36^{\circ} 50'N$, the unit Kg makes a looping map pattern, with Kd in the center of the loop and Kcl outside the loop.

Is this fold an anticline, syncline, basin or dome? _____.

What is the map symbol for a fault? _____.

In the NW part of the map is a fault that offsets mainly rocks of Cretaceous age.

What do the D and U mean on the sides of the fault? _____.

At $40' W$ and $50'N$ a fault symbol starts and goes about 1.5 miles E. Look up the relative ages of the Kd and Kcl units.

Which side of this fault should be labeled U and D? _____.

Assuming most of the faults on this map are normal faults, what are the implications for tensional or compressional forces affecting this area in the past? _____.

Some folds are present in the map area. What does this mean about tensional or compressional forces affecting this area in the past? _____.

Part 5 (extra credit, if you have time remaining) —View the landscape.

Use GoogleEarth to view the landscape various places in this map area. Especially try to see how the cliffs (tilt the view) are shown with the contour lines on the map, and notice the types of vegetative cover the geologists had to deal with when doing the field work for this geologic map. Write your observations/conclusions here: