Title: **Structural Geology Laboratory**
Level: **K-12**
Day/Time:

Acdemic Expectations
Core Content for Assessment:

Objective:

To model a variety of geologic structures and to prepare diagrams to scale of the resulting models. To learn to recognize geologic structures including flat-lying strata, anticline, syncline, and a variety of faults, as exposed by a vertical view into the earth , perhaps through exposure from a road cut or stream channel. To understand that compressive (pushing) and tensile (pulling) forces produce these structures. Compression makes the flat-lying strata shorter and tension makes the strata longer.

Materials:

Handouts with stratigraphic column and cross-sections
clay or play-doh - set of 4 colors
colored pencils or crayons to match clay
plastic knife
rulers
wax paper - 4 sheets 5" x 10"
rolling pins

Activity:

Part I.

1. Lay a piece of wax paper on the table

2. Select one color of clay from your set and roll it out on the waxed paper to approximately 3" x 6", using about 2/3 of a can of play-doh.

3. Repeat with the other 3 colors. Remove the wax paper and stack them so they are even along the edges. The knife can be used to cut the edges so that they are even. Imagine that this is a view of the earth from a road cut.

4. Using the Stratigraphic Column handout, color in appropriate squares with colors matching the clay in the order stacked. The bottom color will represent the oldest layer and the top color will represent the most recent or youngest layer of the four layers of strata exposed in the road cut.

Part II.

Using the "cross section" block in the handout, make a cross section to match the vertical appearance of the model. Use a scale of 1:1. Measure the length of your block and write it on the cross section. On your cross section, label the oldest layer of stratum.

Part III.

1. Push the ends of the model with your hands until the wax paper slides into an hill and a valley. You have formed an anticline (hill) and a syncline (valley) using compressive forces.

2. Make a cross-section to match the vertical appearance of the model as in Part II. Measure the length of the model and write it on the cross-section. Is the compressed model shorter or longer than the unfolded model? Why?

Part IV.

1. Pull the clay layers back to their original position by tensile force. Using the knife, make a fault in the clay by slanting a cut though the short width of the clay. Do not make the angle of the cut too steep. Imagine while cutting that you are small enough to stand in the cut. Your feet would be on the "foot wall" and above you would be the "hanging wall." The length of the footwall block will be shorter along the top of the stratum and longer on the bottom.

2. Use the extra play-doh to form another layer to thicken the bottom layer on the footwall so that the block stands a little higher. Push the two halves together so that they touch.

3. Make a cross section as in Part II. You have drawn a "normal fault." In a normal fault the hanging wall has moved down in relation to the foot wall. Measure the length of the block. Is it longer or shorter than before the model was faulted? What type of forces could cause a normal fault?

Part V.

1. Remove the clay that was added in Part IV and place it on the other block, which is longer on the top than the bottom (hanging wall). Push the two halves together so that they touch.

2. Draw the cross-section as in Part II. You have drawn a "reverse fault." In a reverse fault the hanging wall has moved up in relation to the foot wall. Measure the length of the block. Is it longer or shorter than before the model was faulted? What type of force could cause a reverse fault?

Part VI.

1. Remove the additional clay that was added in Part V Section 1. Use the knife or a pencil to scratch a lengthwise line on the top of the block. Image this is a road or

stream. Move the two halves of the model along the fault line so that the line is off-set a half-inch. You have created a "strike-slip" fault.

2. Place both hands over the fault with thumbs pointing along the fault line. If the far side has moved to the left, the strike-slip fault is "left- lateral." If the far side has moved to your right, then the fault is "right lateral." Try this exercise by changing your position to the opposite side of the model. Were your results the same?

3. Draw the cross-section as in Part II. Measure the length of the block. Is it longer or shorter than before the model was faulted? What type of force could cause a strike-slip fault?

PART I Stratigraphic Column

Example:

Youngest		white
		green
		yellow
Oldest		blue

Cross Section

Deformation: (Anticline, syncline faults etc.)

Origin: (compressional, tensile)

Adapted from materials provided by Women In Mining