Creating and Analyzing Folds in Visible Geology

Using a Chrome or Firefox browser navigate to http://app.visiblegeology.com
(You may want to create an account to help keep track of the models you build).

Introduction to the π-girdle – Part 1:

1) Click on "View Models" and select the Plunging Anticline model.
2) Click the "Explore" tab and select the Strike Decal tool.
3) Create a number of strike and dip observations on the top of the model.
4) Close the Strike Decal tool and select the Stereonet view.
5) Using the interactive stereonet create a π-girdle (double click on the stereonet) that intersects all of the poles to your strike and dip measurements.
6) Click and drag outside of the stereonet to switch to the 3D view.
7) Answer Question Set A.
8) Look down the pole of the π-girdle compare this view to looking in the same direction on the block model. Answer Question Set B.
9) Close the stereonet and create a W-E cross section through the middle of the model. In the 2D view, drag the cross-section to the middle of the screen and open the measure tool. Measure and record the dip of each limb of the fold (note that the bearing value needs to be converted to dip). Press the Escape key to cancel the tool. Answer Question Set C.

Creating your own model – Part 2:
1) Refresh the page to clear all your data.
2) Click on Geologic Beds and add ~10 beds with varying thicknesses and colors.
3) Close the Geologic Beds tab and open the Folds option. Add a fold with Strike: 000º, Dip: 90º, and Rake: 0º.
4) Under More Options, change the Period and Amplitude of the fold.
5) Add this fold, close the Folding menu, and open Tilting.
6) Add a Tilting Event and **record** the strike and dip.
7) Go to the stereonet view and answer Question Set D.
8) Answer Question Set A about the model you created. (Follow steps 2-6 in Part 1.)
9) Save the model with your name as the author and the keyword as follows (this is CaseSensitive and important!):
    Keyword: (CourseCode)###_Lab##_YYYY
    For Example: GLGY101_Lab01_2012
10) Find a partner who has also saved a model, and exchange models. Under View Models, search for the keyword and load your partner's model.
11) Answer Question Set A (by yourself!) for the model you received. (Follow steps 2-6 in Part 1.)
12) Attach a print out in map view of the model you received. Annotate the axial trace and indicate the youngest and oldest layers.
13) Submit your assignment with your partner.

Question Set A:

1) Determine and record the strike and dip of the Axial Plane.
2) Determine and record the trend and plunge of the Fold Axis.
3) Determine the rake of the Fold Axis.
4) What is the interlimb angle between the two limbs of the fold?
5) Classify the fold according to:
    a. Cylindrical vs non-cylindrical
    b. Fold tighness
    c. Axial surface
    d. Fold axis

Question Set B:

1) What is the relationship between the fold axis and the π-girdle?
2) What is the relationship between the π-girdle and all of your measurements?

Question Set C:

1) How does your measured angle compare to the interlimb angle you recorded earlier?
2) Return to the stereonet view, and print the stereonet when it is in 2D.
    a. Annotate the π-girdle
    b. Annotate the fold axis and axial plane.
    c. Annotate how to measure the interlimb angle, and the dip of each limb.

Question Set D:

1) How does the tilting change the orientation of the fold axis?
2) Create a new plane representing the tilting event (Click the New button and click on the plane icon). What is special about the intersection of these two planes?
3) Would you be able to analyze a conical fold using a stereonet in the same way as you have been doing? Explain with a drawing why or why not.