The Grand Canyon National Park is an amazing place to explore geologically. Exposed in the walls of the canyon there are igneous, sedimentary, and metamorphic rocks with a very diverse and interesting history. The Grand Canyon provides the most complete historical record in the Colorado Plateau for the period of time from the Precambrian through the Permian.

1. A fundamental term used in stratigraphy is a “formation”. From our class discussion, define a formation, a member, and a group. Give an example of each of these from the Grand Canyon.

2. Is there always a member for each formation? Are all formations a part of a group or sub-group? What does a “super group” mean?

3. An unconformity is:

4. What are the three common types of unconformities? Explain and illustrate (draw) each type. Give a specific example of a contact between two rock units in the Grand Canyon as an example of each type of unconformity. (there is additional space on the next page for your answer)
5. You will receive a worksheet in class to complete with the rock units (formations and groups). Include that diagram in your notebook with the relative age sequence of the Grand Canyon on another sheet of paper.

6. What are the Precambrian units found in the Grand Canyon? Where do we find them and what is their approximate age? Are all the Precambrian rocks metamorphic and igneous? Explain your answer.

7. What do the Precambrian rocks of the Grand Canyon tell us about the history of this region during the Precambrian?

8. Everywhere in the park, we find a(n) __________________________ separating the Precambrian and Cambrian Tapeats Sandstone Formation.
9. What types of rocks and what are the environments of deposition for the following formations?

Tapeats

Bright Angel

Mauv

10. What does the term “transgressive” sequence mean? What is the opposite of transgression? How would we determine if a sequence is transgressive or regressive? Is the Tonto Group transgressive or regressive? Explain your answer.

11. Are there Silurian rocks in the Grand Canyon? What is the evidence?
12. What was the environment like in the area of the Grand Canyon during the upper Paleozoic Era? What is the evidence of this?

13. Ron Blakey is a geologist who has studied the Grand Canyon's geology. A lecture on the geological history of the Grand Canyon is on You Tube at the URL below. There are a series of files, but this first one will get you started.

http://www.youtube.com/watch?v=r4QEF2uZD6k

I think you will find his explanations helpful in understanding the history we are discussing in class. Take notes while you listen and include those notes as a part of your course Notebook.

14. How did the canyon of the Colorado form? When did it start?

15. As the canyon cut through the layers of rock, erosion formed cliffs and slopes.

What types of rocks form the cliffs of the Grand Canyon and what types of layers form the slopes?
16. Lava flows are found in the canyon. Did they form before or after the cutting of the canyon? How do we know?

17. Imagine that you found two basalt lava exposures on the side of the Grand Canyon as illustrated below. The basalt lava exposure that is 6000 years old is found above the level of the 4000 year old basalt flow. Explain how these lava flows do not obey the Principle of Superposition.

17. Imagine that you have been hired by the National Park Service to write a short (less than 300 words) section of a brochure intended for the general public on the geology of Grand Canyon National Park. Write this statement below and on the back side of this sheet or you may use your own paper.