

**Study Guide #3**

This study guide consists of a “focus on” section, sample questions to help prepare you for the third exam, and some crossword puzzles.

**Focus On:**

**Ch. 6:**

- What is the basis for classifying detrital and chemical sedimentary rocks?
- If you are given a specific rock type, you need to be able to discuss the environment of deposition for that rock type (shale, sandstone, conglomerate, breccia, chert, limestone, coal, and gypsum)
- The text notes specific sedimentary structures, such as cross-bedding and graded bedding. You should be able to discuss what these sedimentary structures tell us about the depositional environment of the layer.
- What does facies mean and how does it apply to sedimentary rocks?

**Ch. 7:**

- When we see a metamorphic rock at the Earth’s surface, what must have occurred after the metamorphism of the rock?
- What is the difference between regional and contact metamorphism?
- You should be familiar with the parent rocks of the various common metamorphic rocks.

**Ch. 8:**

- You will need to be able to apply the principles of relative dating to cross-sectional views and determine the age sequence from oldest to youngest
- You should be able to distinguish the difference between relative and absolute dating
- What is an index fossil? What are the characteristics of an index fossil?
- Which one of the radiometric methods is used for dating young (<70,000 year old) samples? What is the reason that this method is not used to date old samples?
- You should be able to use the type of graph illustrated in class (the amount of an isotope as a function of time). You should be familiar with the idea of a parent and daughter isotopes and how the amount of these isotopes vary over and how they will appear on this type of graph.
- What does the term half-life mean? You should be able to determine the half-life of a radiometric isotope if given a graph of isotope abundance versus time
- You should be able to identify which of the relative dating principles you are using to determine the sequence.

**Ch. 9:**

- How are the stresses that form folds different from the stresses which form faults?
- How can rocks behave as a solid and fold without breaking?
- You should be able to draw a cross-section from a simple geologic maps, such as the maps we worked with in class
- Using strike and dip information and the relative dating principles in Ch. 8, you should be able to determine the relative ages of layers on geologic map
- Where are the oldest rocks in a syncline? in an anticline?
- You should be able to identify normal, reverse, and strike-slip faults from block diagrams

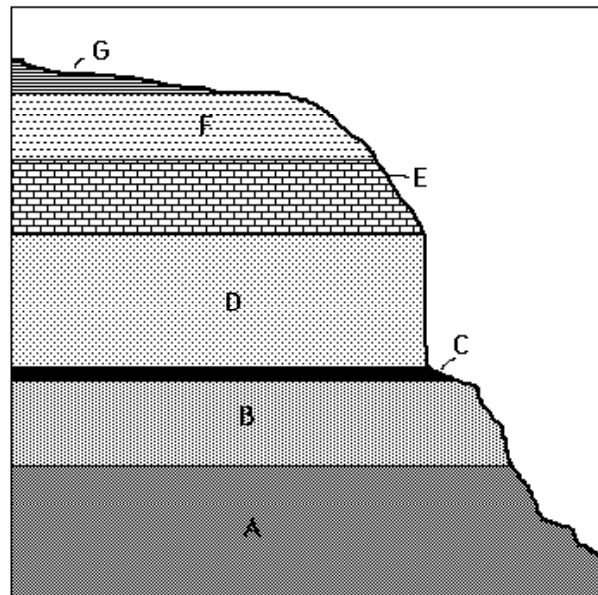
### Sample questions for Exam #3

1. In the diagram below, a sequence of sedimentary rocks with descriptions is shown in a cross-sectional view. (This is like looking at the side of a canyon.)

1a. Assume that layer A is the oldest layer in this sequence. Determine the environment of deposition for each of the layers, starting with the oldest layer, layer A, and progressing to the youngest layer, layer G. (Think of each layer as “chapter” in the history of this site. We are “reading” the history of each chapter based on the clues in each layer.)

1b. Once you have completed #1 above, look at the overall sequence of layers. What is the pattern represented by the entire sequence? What was happening here through the time from layer A to layer G?

**Cross-sectional View of a Sedimentary Sequence**



A= the coarsest of the detrital sedimentary rocks. The grains in the rock are rounded and are larger than 2mm. The rounded grains are cemented by silica. The long dimension of the small pebbles in this rock are oriented roughly parallel to each other.

B= these rocks have grains from 1/16 mm to 2 mm in diameter. It is cemented with silica and is composed of light colored quartz grains. There are a few grains of rounded pebbles in this layer. The grains are well rounded and there is cross-bedding.

C= is a black rock which is an organic sedimentary rock. It is composed largely of plant remains (leaves, bark, wood, and pollen).

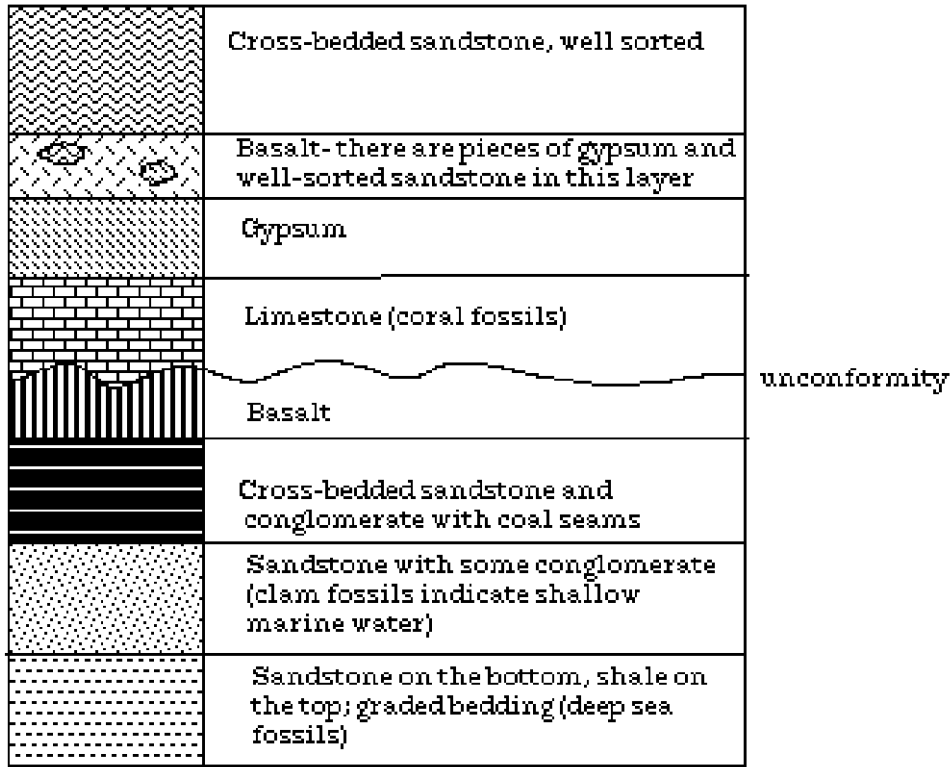
D= this layer consists of grains which are 1/16mm to 2 mm in size. The grains are well rounded and cemented with silica. There are some clam fossils in this layer. There are some finer layers in the under part of this unit. Some of these finer grained deposits have mudcracks.

E= composed of  $\text{CaCO}_3$ , many small fragments of fossils. Rock is massive (no apparent bedding)

F= contains particles which are smaller than 0.004 mm in diameter. Horizontal bedding. There are some microscopic marine fossils.

G= this unit has many layers, each exhibiting graded bedding. The particle size of the grains vary from sand and silt on the bottom of the layer to fine silt and clay on the top of each individual layer. (hint: see page 179 in the text!)

2. Why is the C-14 dating methods not used for most geologic applications? Explain.
3. In the following cross-section discuss the history of the area from the oldest to youngest events.



4. The half-life of a certain sample of a radioactive element is 3.0 days. At noon on May 10<sup>th</sup> the amount of the parent isotope was 400 milligrams (mg.).

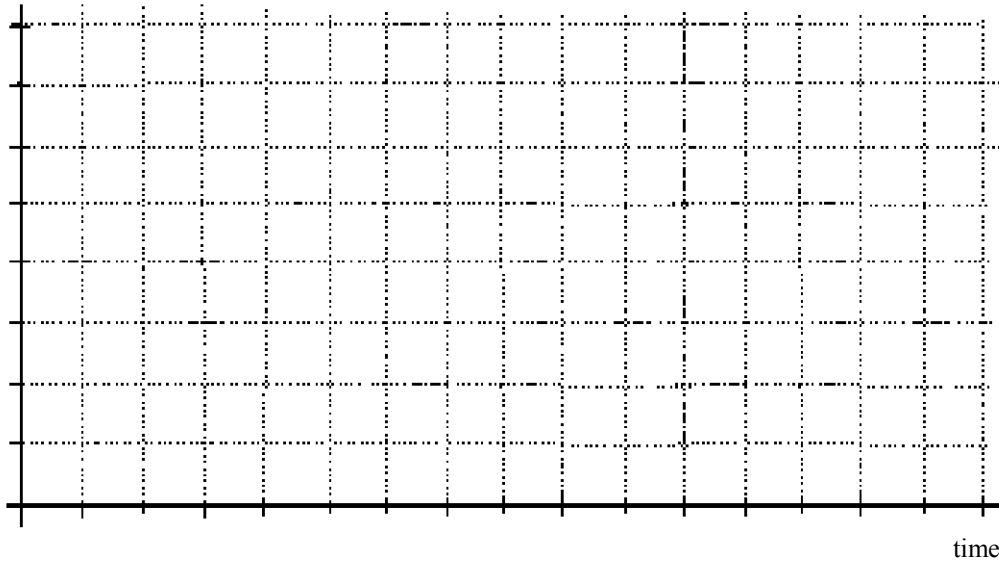
A. When will the amount of the parent isotope be equal to 100 mg?

Date	Parent	Daughter
		0 mg
May 7		
May 10	400 mg	
May 13		

B. What was the amount of parent isotope on May 1<sup>st</sup>?

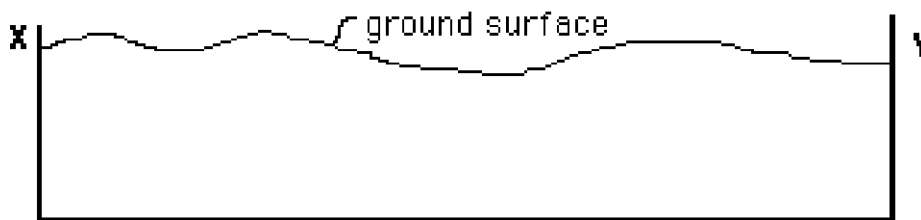
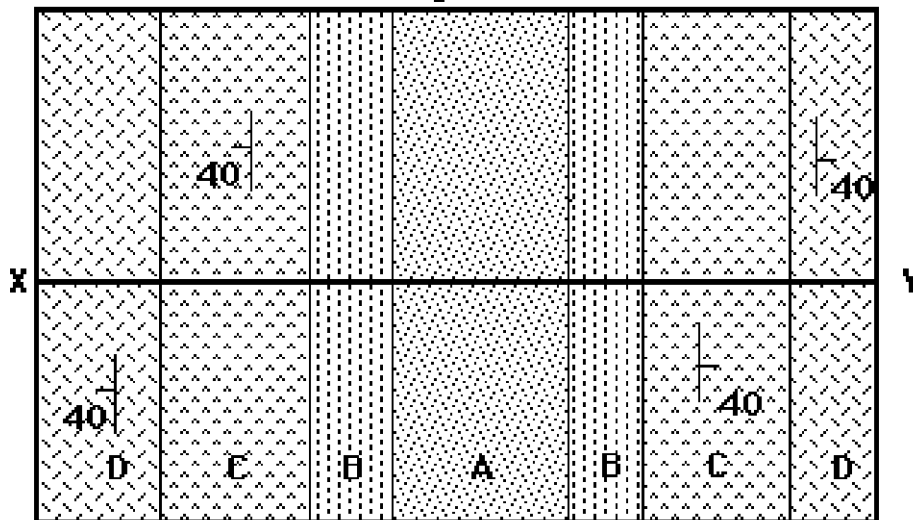
C. Using a solid line on the graph on the next page, show the amount of the parent isotope in the sample as time passes.

D. Use a dashed line to show how the amount of the daughter product changes at the same time.

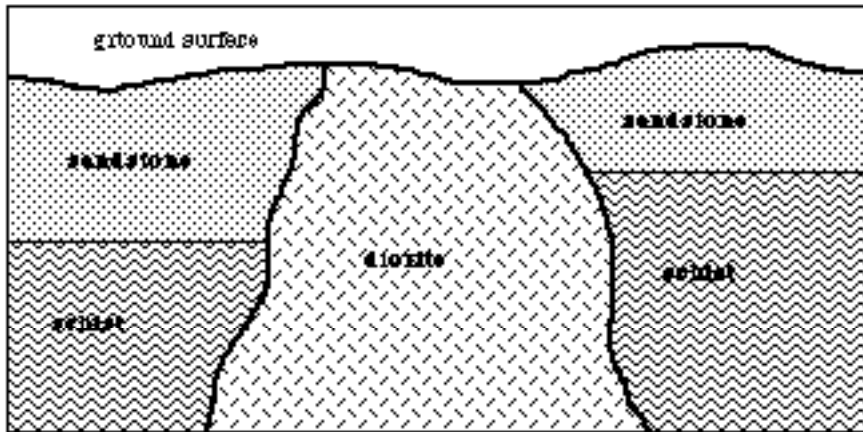


5. Complete the cross-section below:

### Geologic Map



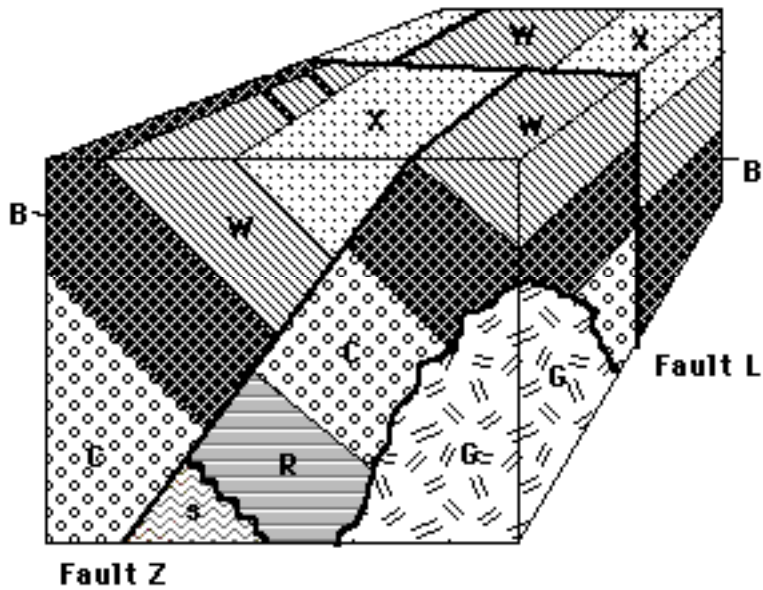
6. Discuss the history of the block below, from the oldest to the youngest. What might you expect to find at the contact of the sandstone and the metamorphic rocks?



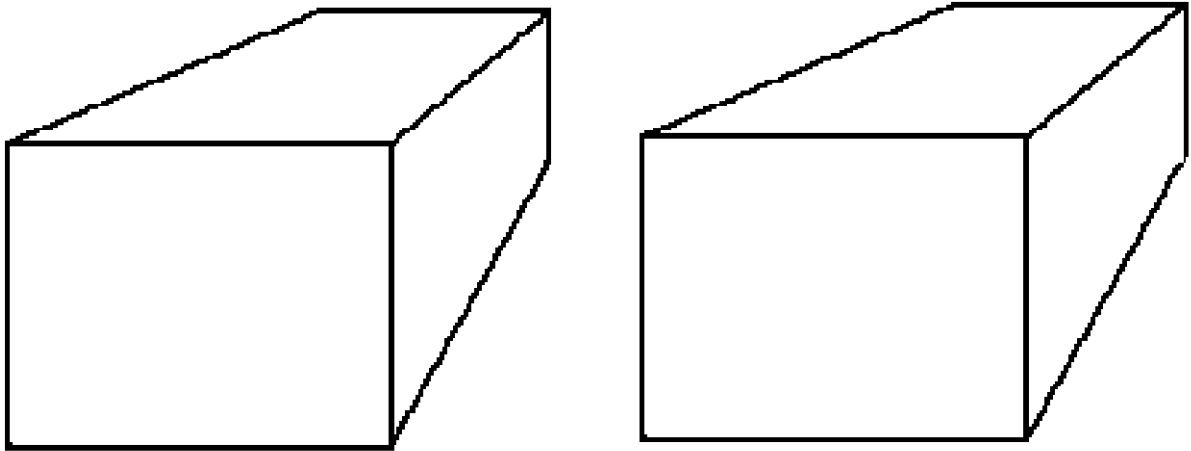
7. From the rock types given below, write the relative age history of the block diagram and the geologic history:

B= basalt                      X= shale                      W= siltstone                      s= schist  
 G= granite                      C= conglomerate                      R= rhyolite

What types of faults are L and Z?



8. In the boxes below, draw an anticline and a syncline:



9. From the cross-sectional diagram below, construct the relative age sequence from oldest to youngest event. Be sure to include all events, such as folding, erosion, metamorphism, etc. There are 23 events.

