

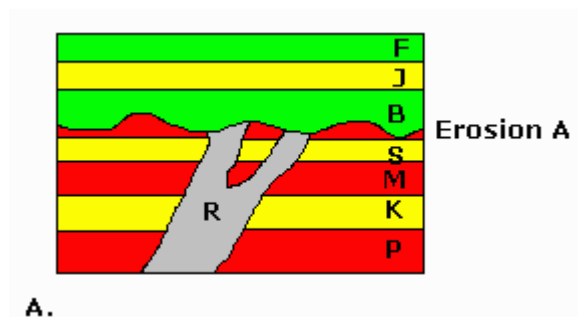
## Laboratory 1

# Relative Dating Exercises

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Examine the geologic cross sections which follow, and determine the relative ages of the rock bodies, lettered features such as faults or surfaces of erosion, and other events such as tilting, folding, or erosion events. Always start with the oldest rock and work toward the present. List the letters in order, with the oldest at the bottom.



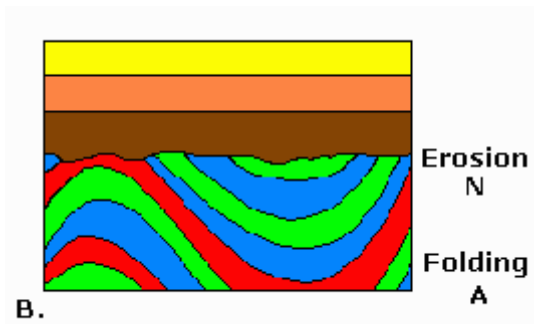
For each of the relative dating diagrams, you are to think about them like the side view of a layer cake. In general, the oldest units are on the bottom and the youngest units are on the top. There can be lots of complexities, such as folding events, faulting, erosion events, intrusion by magma, etc. You have to put these events into the order in which they occurred, starting with the oldest, and working toward the youngest. Figure out "what cuts what". If a fault cuts a bed, then the bed is older than the fault.

For Block A above, the sedimentary units are in sequence, P, K, M, and S. Then something happened. A body of magma (INTRUSION R) has intruded or cut through all of the previous layers. So it comes next in the sequence.

The intrusion is eroded off at the top. (The previous layers are eroded off at the top too.) So the event *after* the intrusion is EROSION A.

After EROSION A, beds B, J, and F were deposited.

So your answer for this would be: P, K, M, S, intrusion R, erosion A, B, J, F.



Let's look at Block B. There are no letters or numbers on it. But you could either label the diagram A, B, C, starting at the bottom, or even easier, describe the units in order. You can see that units green, red, blue, green, red, blue, green, blue, green were deposited. Then FOLDING EVENT A occurred. Then EROSION N occurred. Then units brown, orange, and yellow were deposited. And that is the solution to the second problem.

### Instructions:

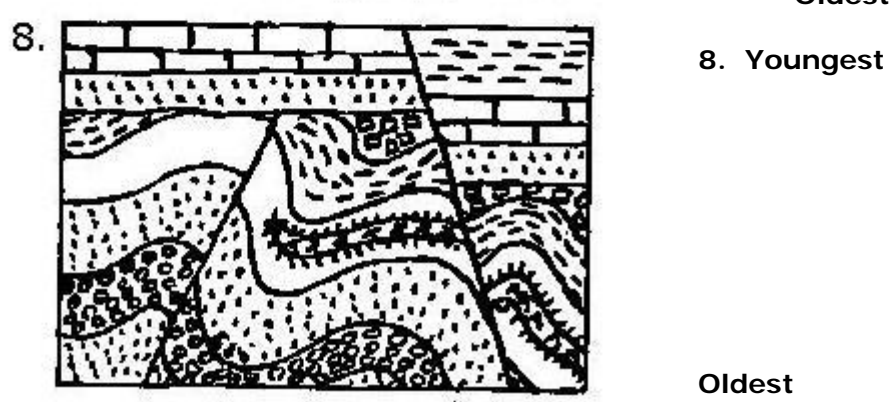
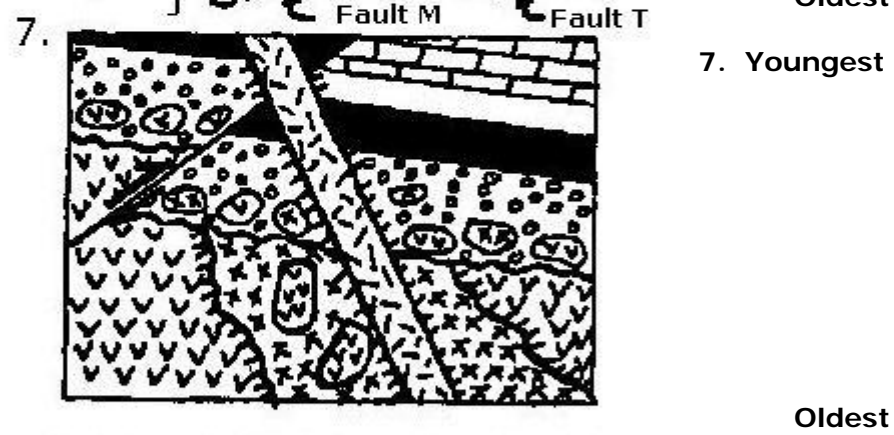
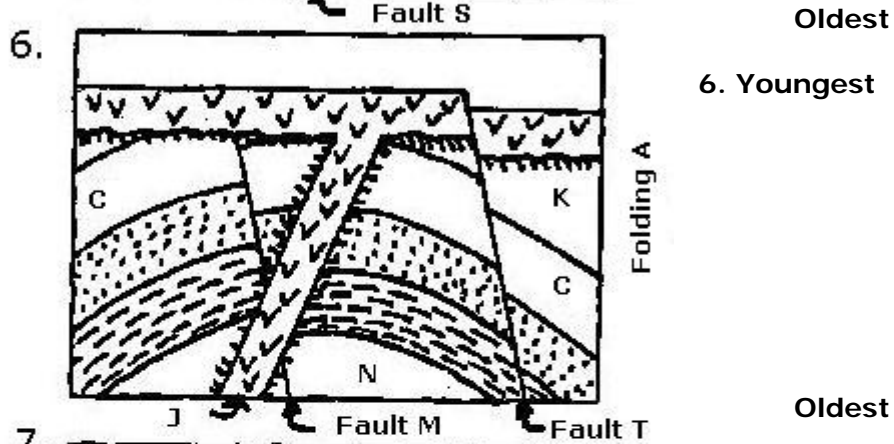
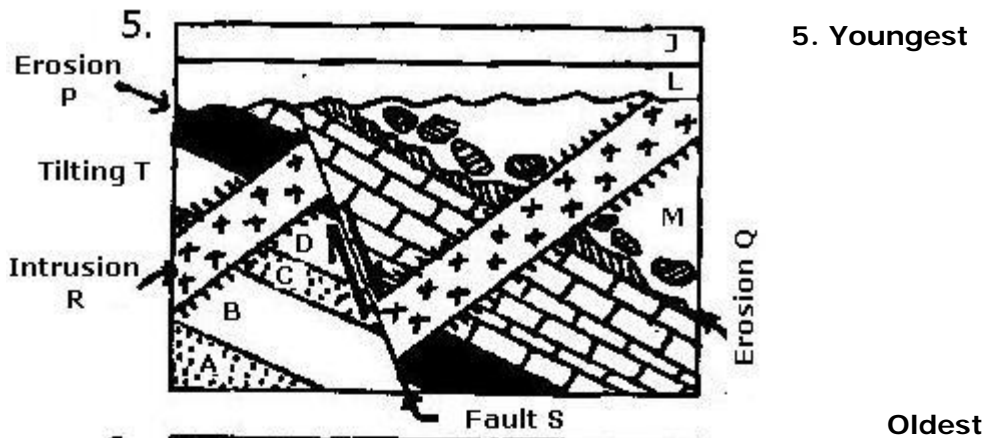
The diagrams below are similar to the examples above. If the block has units with letters on them, put the letters in order from oldest to youngest, like we did with the two examples above.

Add words for erosion events, folding events, intrusions, faults, tilting, etc. If the fault (or whatever) is labeled with a letter, you will want to refer to it as "Fault A" (or whatever it is called). If there are several faults and they are not labeled, you can say "the fault on the left" or the "fault on the right".

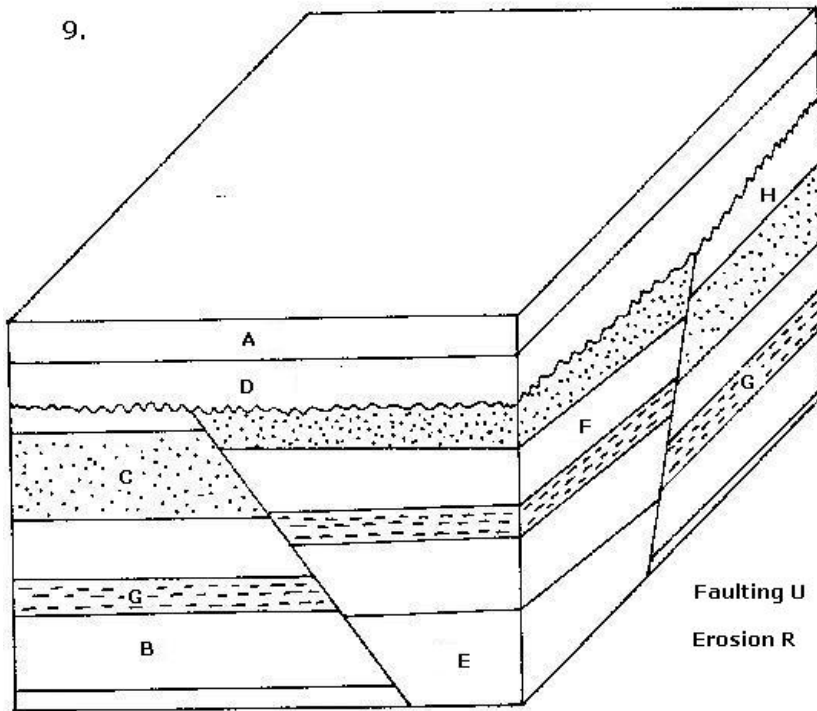
If the block IS NOT LABELED AT ALL (blocks 7 and 8), you are to describe the units. X's, V's, o's, dashes, black unit, white unit, bricks, dots, etc. You can also look at the lithologic unit symbols on the blocks and use the words for the rock type in place of the description of the symbol. For example, instead of dots, you would say "sandstone". Instead of the dashes, you would say "shale". And instead of the bricks, you would say "limestone". V's are volcanic rock, X's are plutonic rocks, etc. Just put your words in order from oldest to youngest, like you did with the other diagrams.

**Solve the relative dating problems in the ten blocks below. Write the answers beside the blocks, with the oldest units at the bottom and the youngest units on top. Include all events (folding, faulting, etc.) in their proper sequence.**



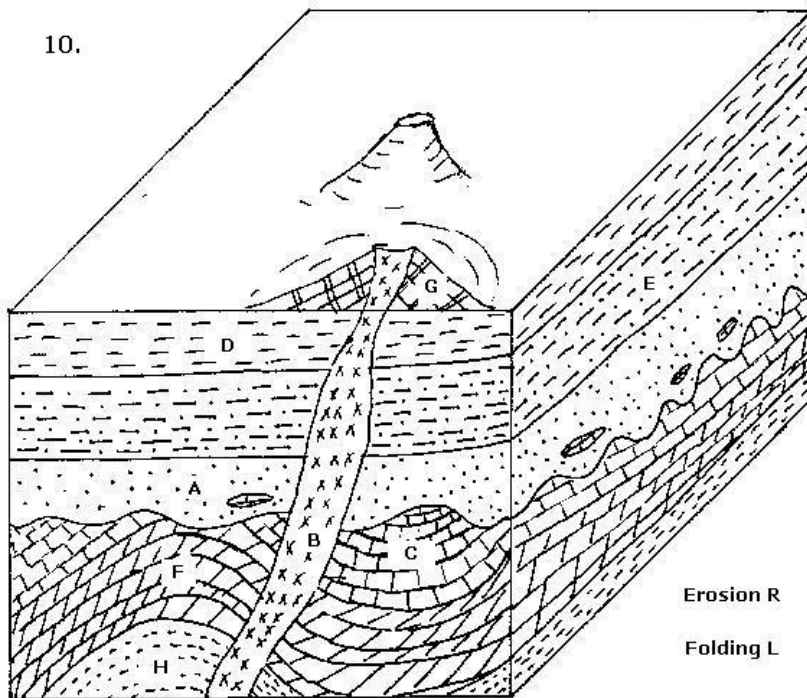


9. Youngest



Oldest

10. Youngest



Oldest

Questions to answer after determining the sequence of events in the ten diagrams above:

1. What type of unconformity is represented by Erosion A in block 1?

\_\_\_\_\_

2. What type of unconformity is represented by Erosion N in block 2?

\_\_\_\_\_

3. What type of igneous intrusion is shown in block 3?

\_\_\_\_\_

4. What type of fault is Fault A in block 4?

\_\_\_\_\_

5. What type of fault is Fault S in block 5?

\_\_\_\_\_

6. What type of fold is present in block 6?

\_\_\_\_\_

7. In block 6, is the igneous rock a pluton or a lava flow? Or both? Explain?

\_\_\_\_\_

Explain:

8. In block 7, are the inclusions with X's on them clasts or are they xenoliths?

\_\_\_\_\_

9. In block 7, are the inclusions with V's on them clasts or are they xenoliths? Are all clasts with V's on them of that type, or are there other types as well? Explain.

\_\_\_\_\_

Explain:

10. What type of fault is present in block 7?

\_\_\_\_\_

11. What types of faults are present in block 8? Identify each.

Fault on left = \_\_\_\_\_

Fault on right = \_\_\_\_\_

12. Are there two faults in block 9, or is there only one fault? Explain?

\_\_\_\_\_

Explain:

13. What type of fault (or faults) is (or are) present in block 9? Normal or reverse?

\_\_\_\_\_

\_\_\_\_\_

14. What type of unconformity is found below unit A in block 10?

\_\_\_\_\_

15. What type of fold is the fold on the left in block 10? Anticline or syncline?

\_\_\_\_\_

16. What type of fold is the fold on the right in block 10? Anticline or syncline?

\_\_\_\_\_