

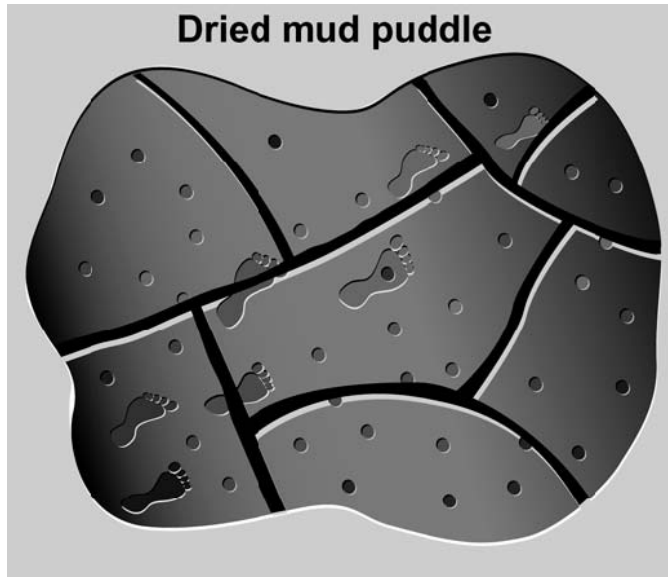
Relative Dating Activity

How can you determine the sequence of past events?

Earth is very old and many of its features were formed before people came along to study them. For that reason, studying Earth now is like detective work—using clues to uncover fascinating stories. The work of geologists and paleontologists is very much like the work of forensic scientists at a crime scene. In all three fields, the ability to put events in their proper order is the key to unraveling the hidden story.

Sequencing events after a thunderstorm

Carefully examine this illustration.



It contains evidence of following events:

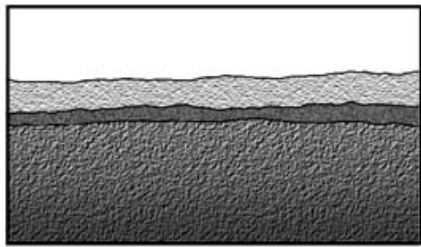
1. _____ The baking heat of the sun caused cracks to form in the dried mud puddle.
2. _____ A thunderstorm began.
3. _____ The mud puddle dried.
4. _____ A child ran through the mud puddle.
5. _____ Hailstones fell during the thunderstorm.

From the clues in the illustration, sequence the events listed above in the order in which they happened.

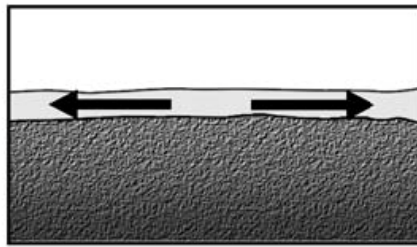
6. Write a brief story that explains the appearance of the dried mud puddle and includes all the events. In your story, justify the order of the events. (4 points)

Determining the relative ages of rock formations

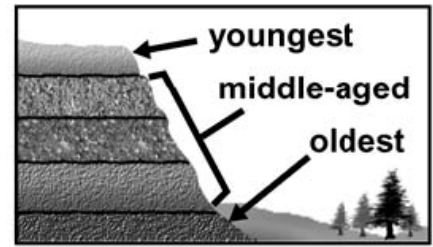
Relative dating is an Earth science term that describes the set of principles and techniques used to sequence geologic events and determine the relative age of rock formations. Below are graphics that illustrate some of these basic principles used by geologists. You will find that these concepts are easy to understand.



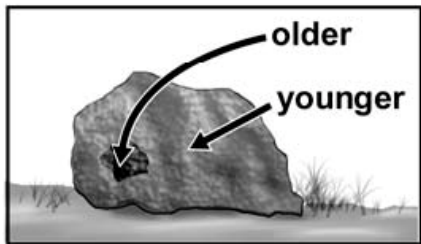
_____ 7. **Original Horizontality**



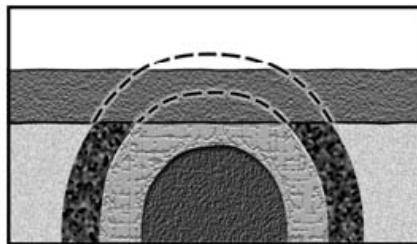
_____ 8. **Lateral Continuity**



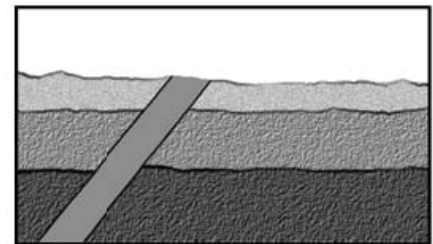
_____ 9. **Superposition**



_____ 10. **Inclusions**



_____ 11. **Unconformities**



_____ 12. **Cross-Cutting Relationships**

Match each principle to its explanation. Write the letter of the explanation in the space provided under each graphic.

Explanations:

- In undisturbed rock layers, the oldest layer is at the bottom and the youngest layer is at the top.
- In some rock formations, layers or parts of layers may be missing. This is often due to erosion. Erosion by water or wind removes sediment from exposed surfaces. Erosion often leaves a new flat surface with some of the original material missing.
- Sediments are originally deposited in horizontal layers.
- Any feature that cuts across rock layers is younger than the layers.
- Sedimentary layers or lava flows extend sideways in all directions until they thin out or reach a barrier.
- Any part of a previous rock layer, like a piece of stone, is older than the layer containing it.

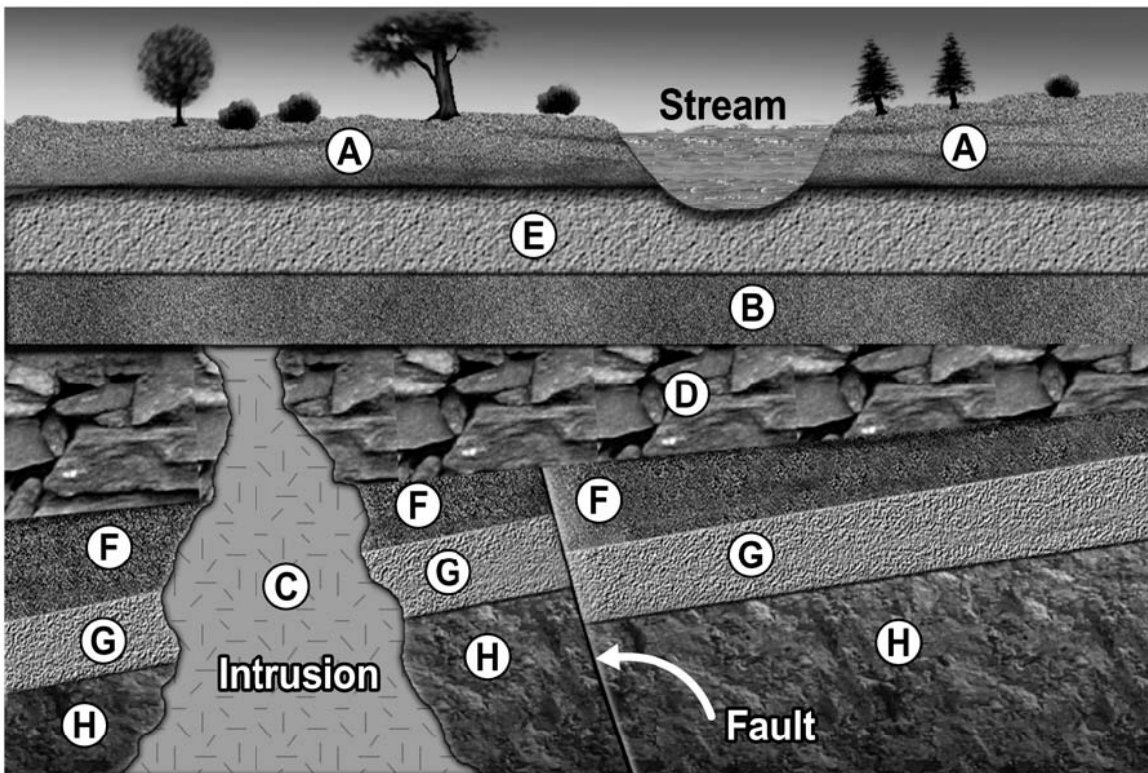
Sequencing events in a geologic cross-section

Understanding how a land formation was created with its many layers of soil begins with the same time-ordering process you used in the first part of the activity. Geologists use logical thinking and geology principles like the ones described in the second part of the activity to determine the order of events for a geologic formation. Cross-sections of Earth, like the one shown on the next page, are our best records of what has happened in the past.

Rock bodies in this cross-section are labeled A through H. One of these rock bodies is an intrusion. Intrusions occur when molten rock called magma penetrates into layers from below. The magma is always younger than the layers that it penetrates. Likewise, a fault is always younger than the layers that have faulted. A fault is a crack or break occurs across rock layers, and the term faulting is used to describe the occurrence of a fault. The broken layers may move so that one side of the fault is higher than the other. Faulted layers may also tilt.

Put the rock bodies illustrated below in order based on when they formed.

- | | |
|-----------|-----------|
| 13. _____ | 16. _____ |
| 14. _____ | 17. _____ |
| 15. _____ | 18. _____ |



19. Relative to the other rock bodies, when did the fault occur? (2 points)

20. Compared with the formation of the rock bodies, when did the stream form? Justify your answer. (2 points)
