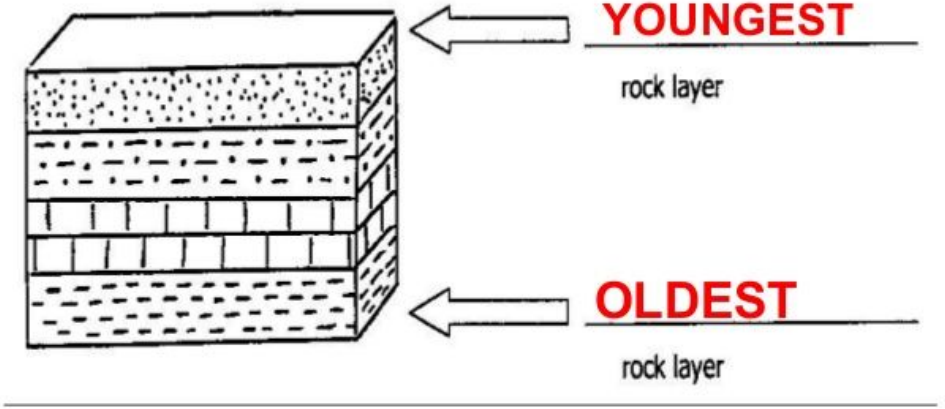
The Laws of Stratigraphy

How do the rock layers help scientists understand earth's history?

Stratigraphy

- The study of rock layers

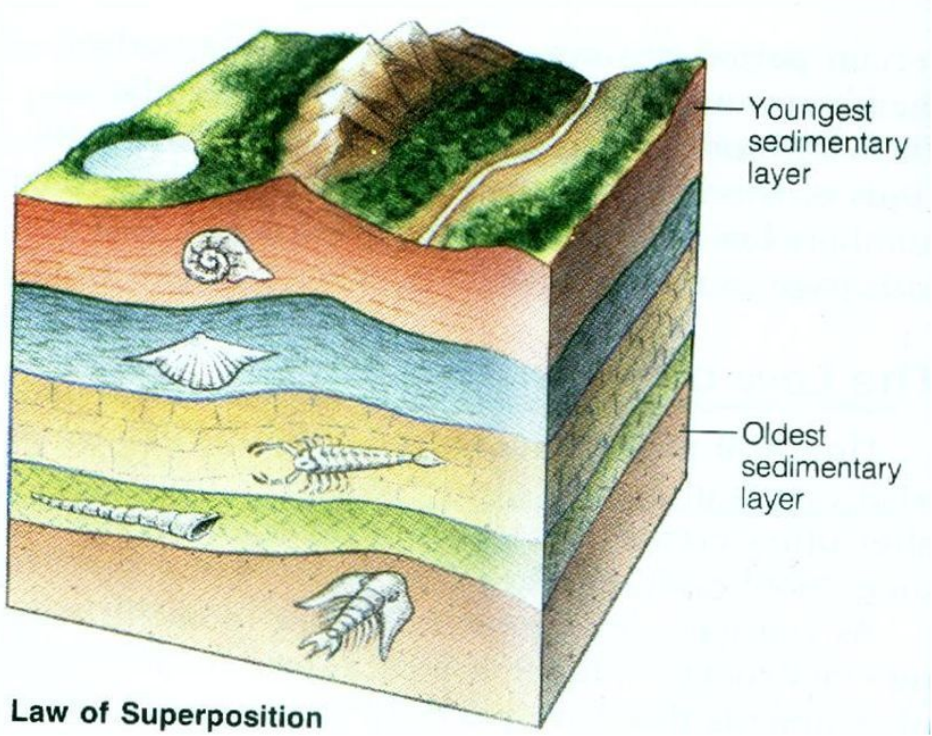
- Rock layers are formed from the bottom up
  - **Youngest** rock on **top**
  - **Oldest** rock on **bottom**

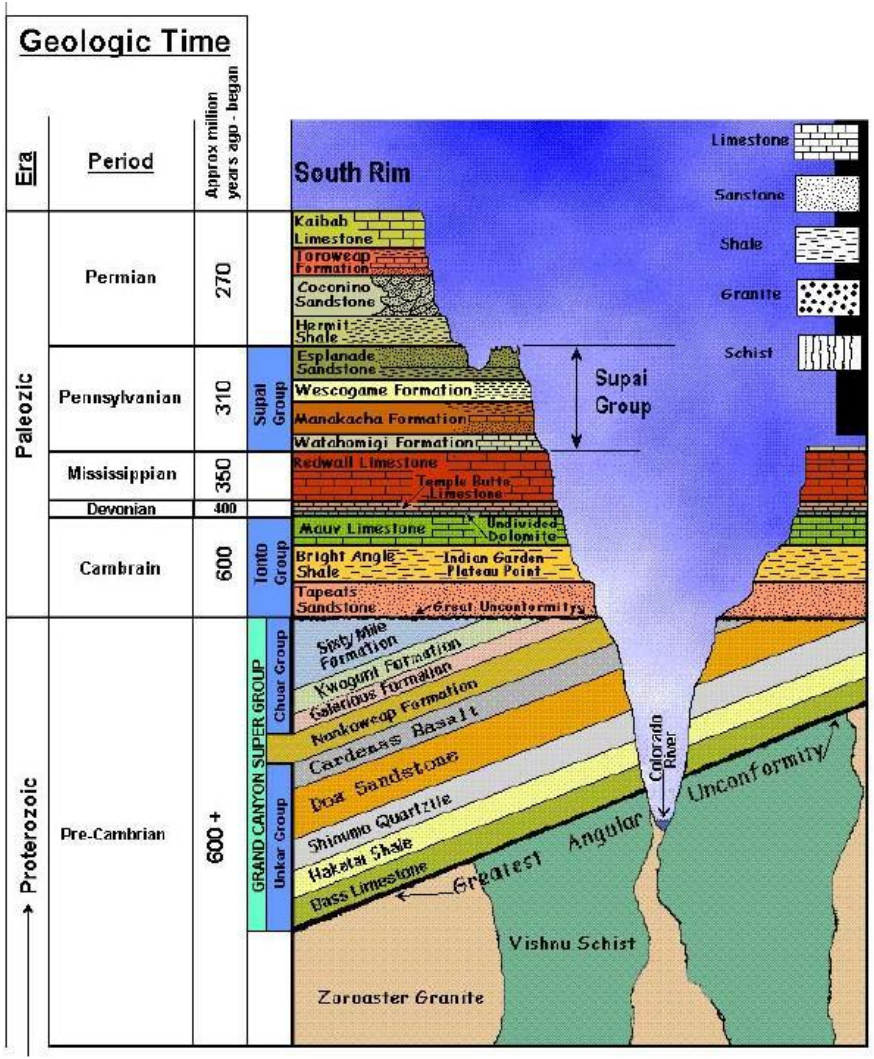


Law of Superposition

- Superposition refers to the position of rock layers and their relative ages.

- **Relative age** means age in comparison with other rocks, either younger or older.



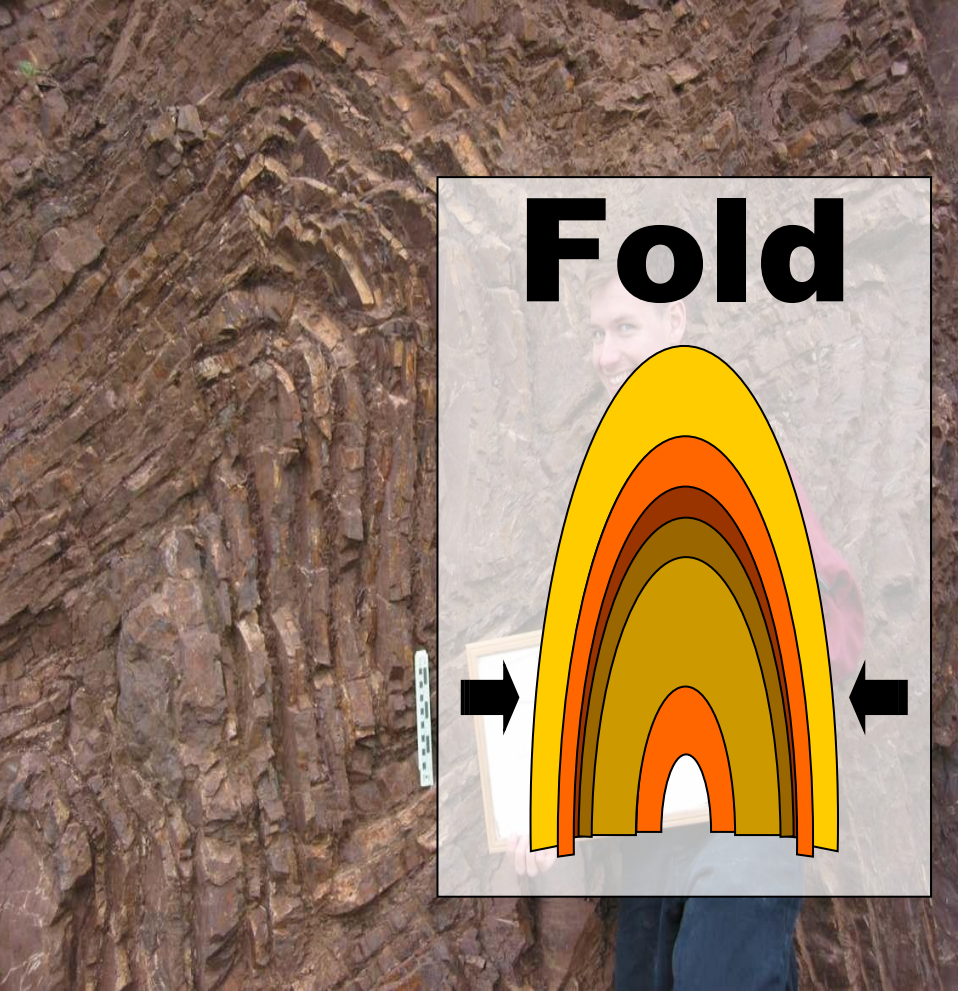


270 Million Years Old

YOUNGER

OLDER

600+ Million Years Old

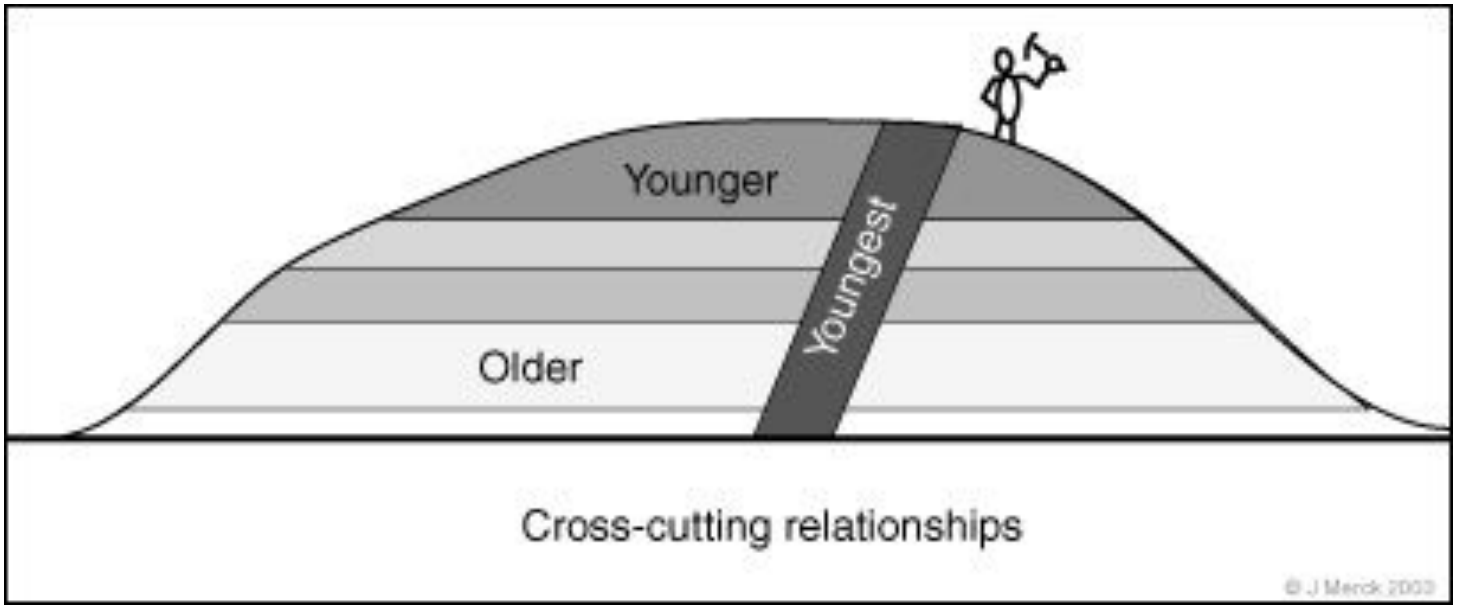


Law of Original Horizontality

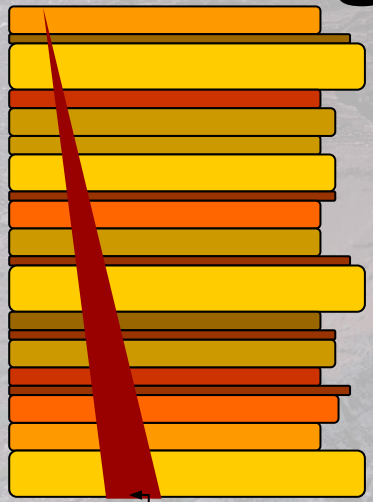
- Sediments were deposited in ancient seas in horizontal, or flat, layers. If sedimentary rock layers are tilted, they must have moved after they were deposited.

Law of Cross-Cutting Relationships

- Rock layers may have another rock cutting across them, like igneous rock or a fault line.



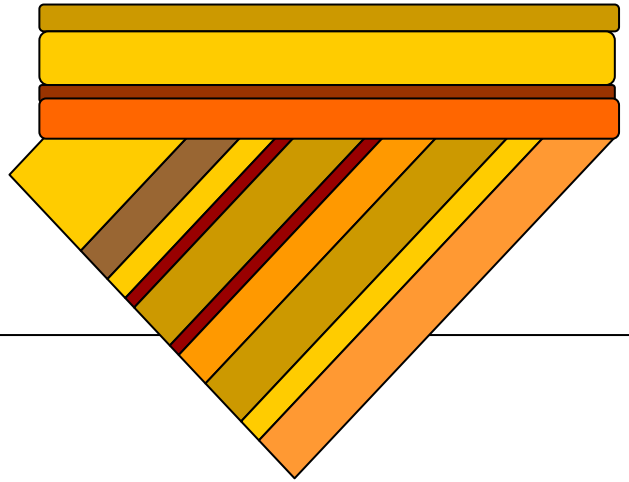
Cross Cutting



MOST RECENT

Unconformity

Sometimes, layers give an indication of many different events. First, there was a set of layers laid down flat. Then, they got tilted, like the flatirons in a previous photo. Over time, the tips of the layers got eroded down into a new, flat surface. Then, another set of flat layers got deposited on top.



Index Fossils

- Index fossils are commonly used to match rock layers in different places. You can see how this works in Figure 1.7.
- If two rock layers have the same index fossils, then they're probably about the same age.

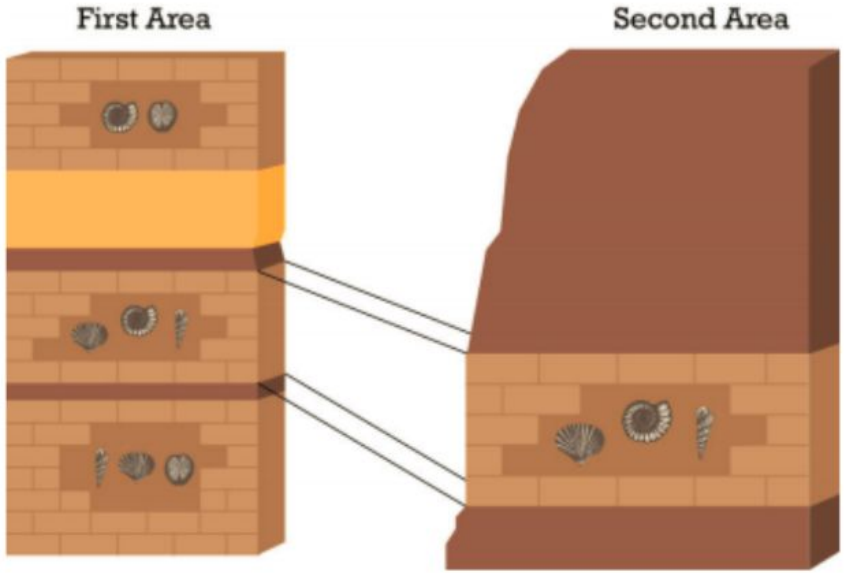
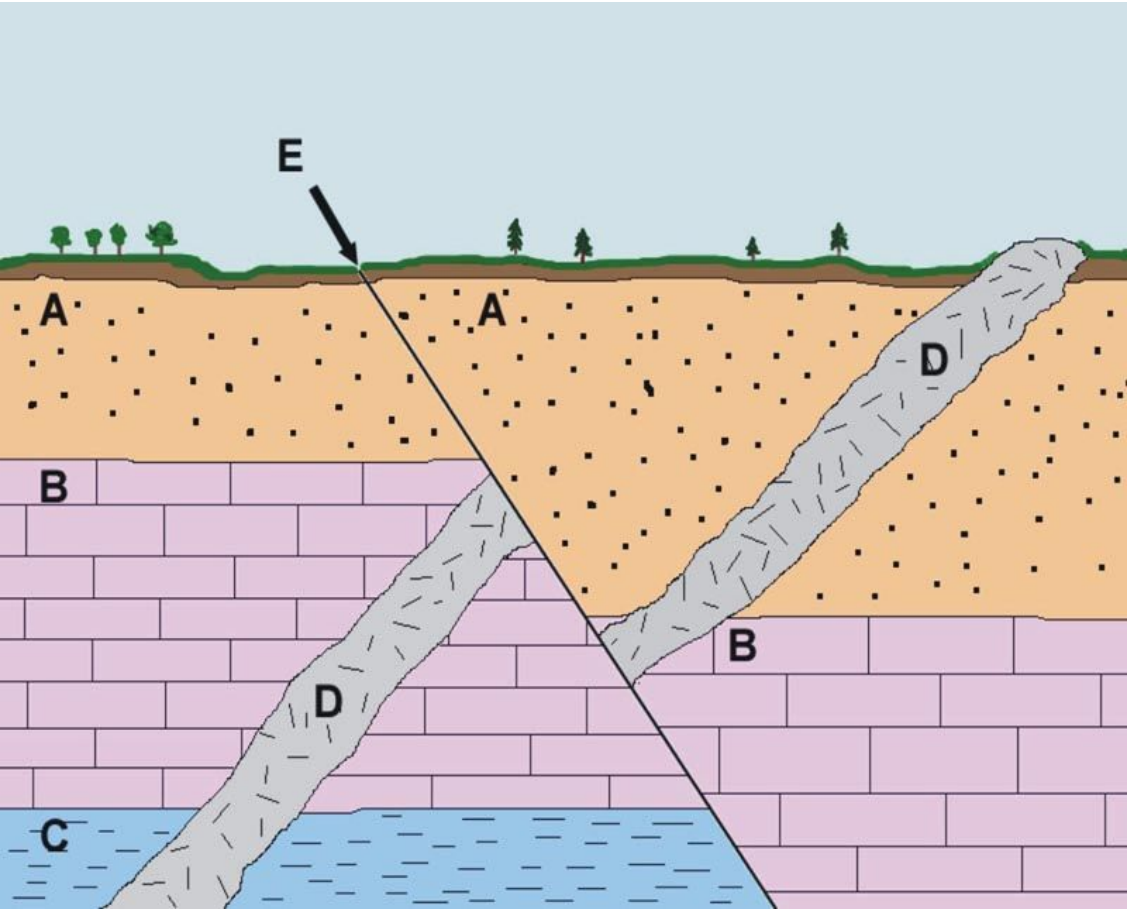


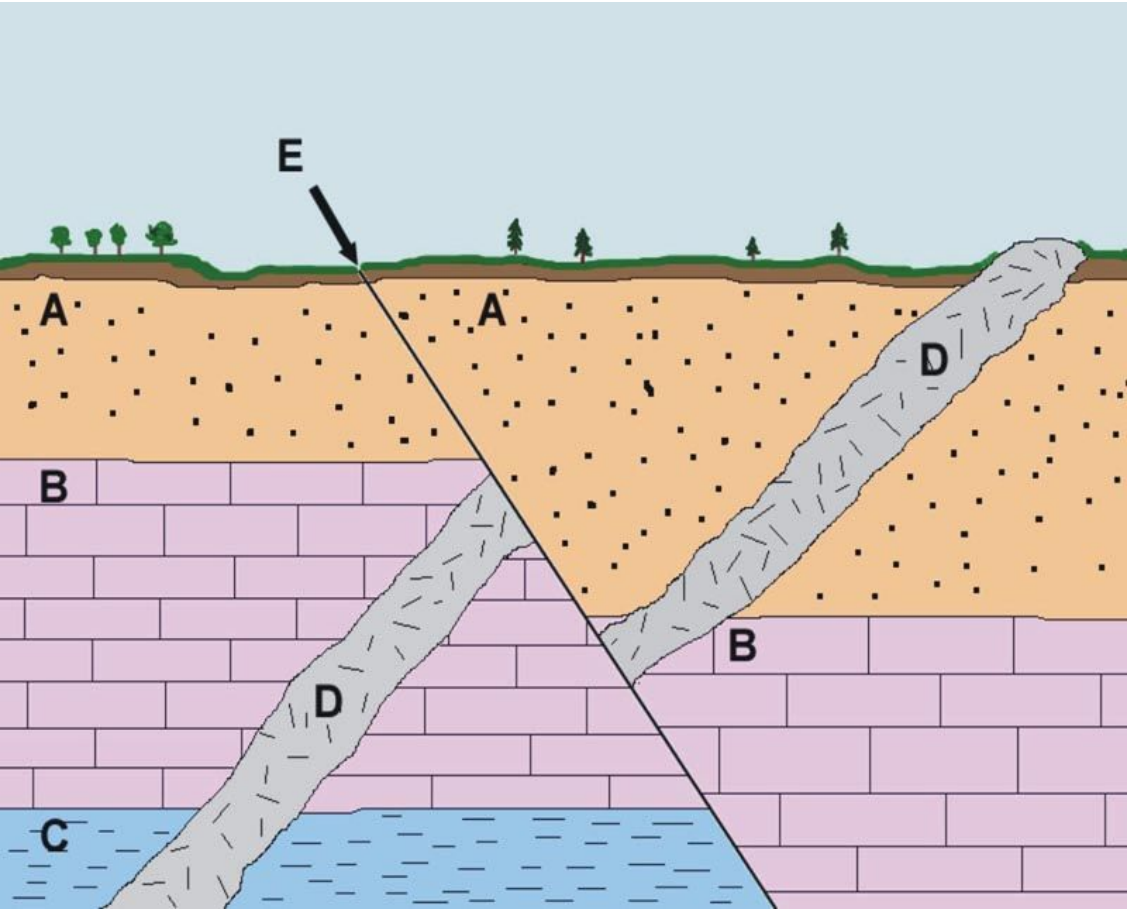
FIGURE 1.7

Using Index Fossils to Match Rock Layers. Rock layers with the same index fossils must have formed at about the same time. The presence of more than one type of index fossil provides stronger evidence that rock layers are the same age.

Which rock layer is the oldest?



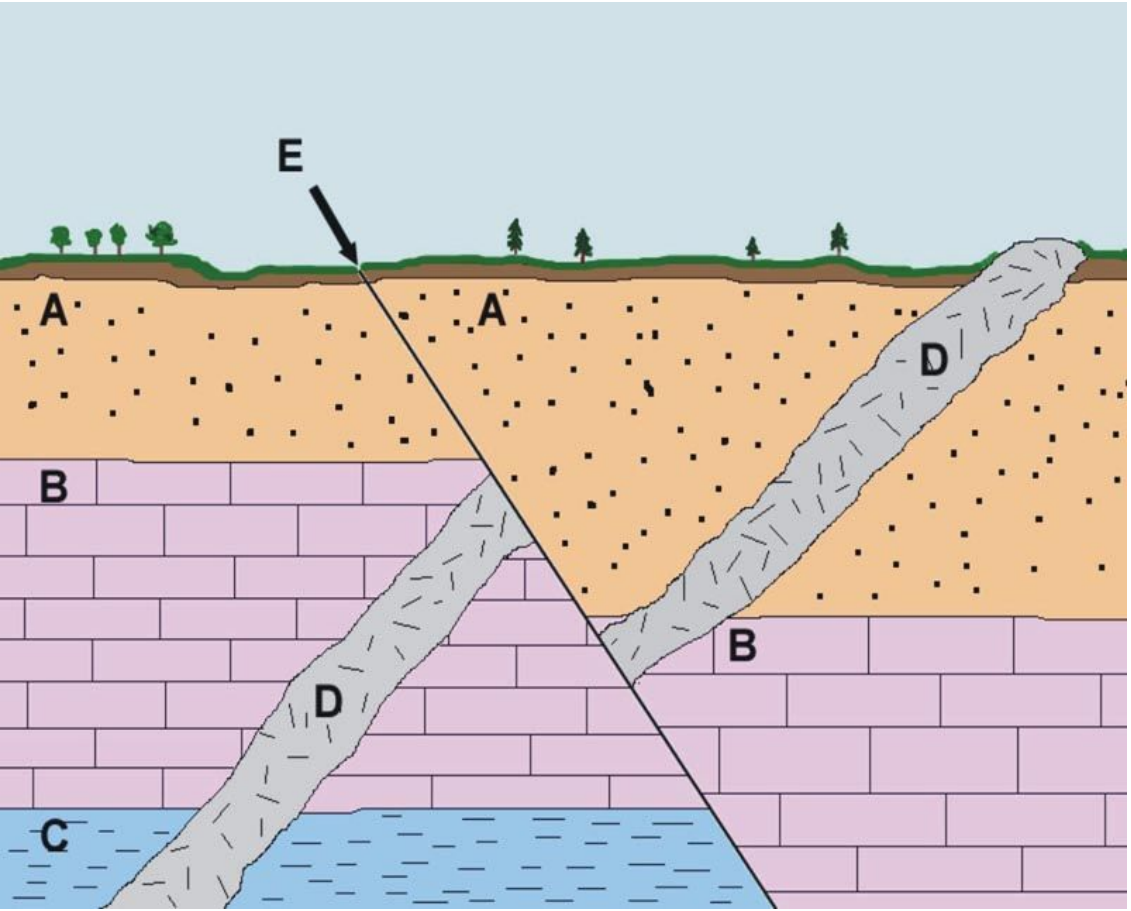
Which rock layer is the oldest?



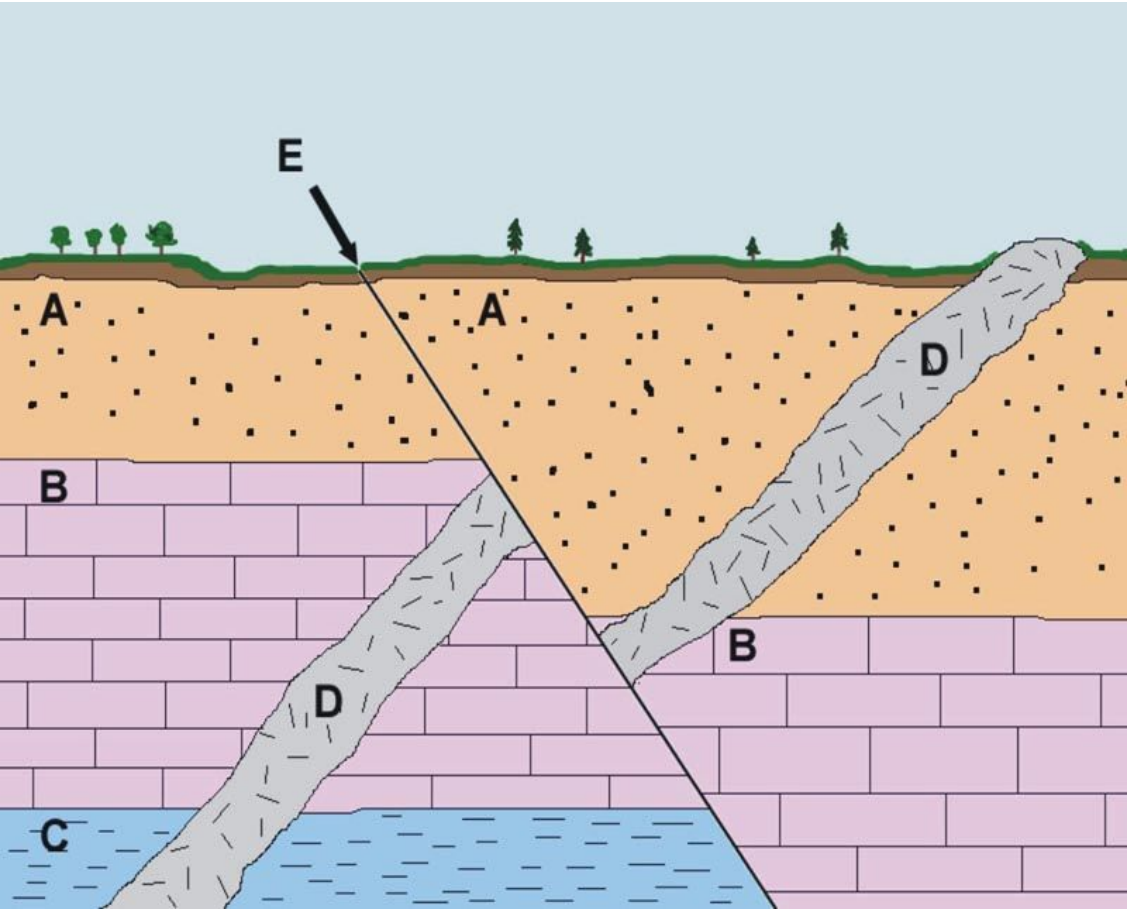
Answer: Rock Layer C

Because layer C is the lowest layer

Which rock layer is the
next oldest layer after C

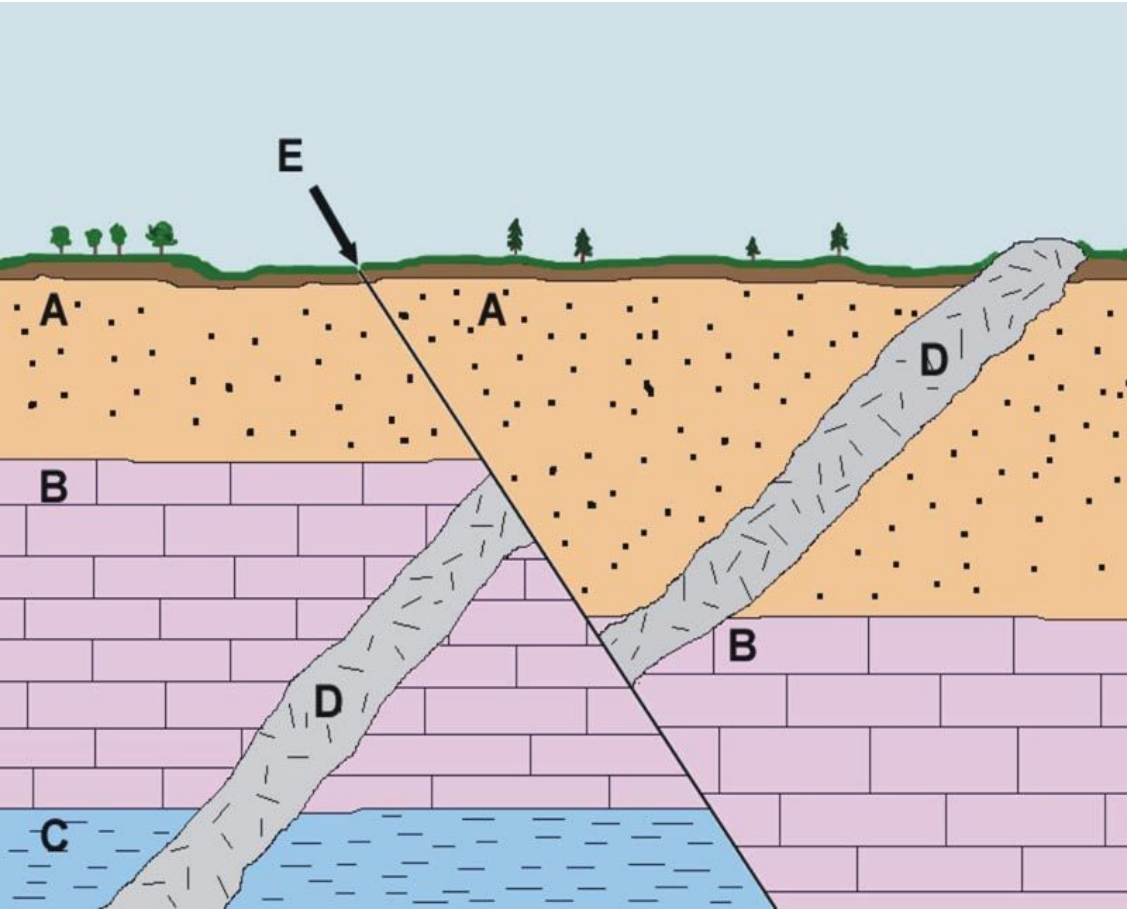


Which rock layer is the next oldest layer after C

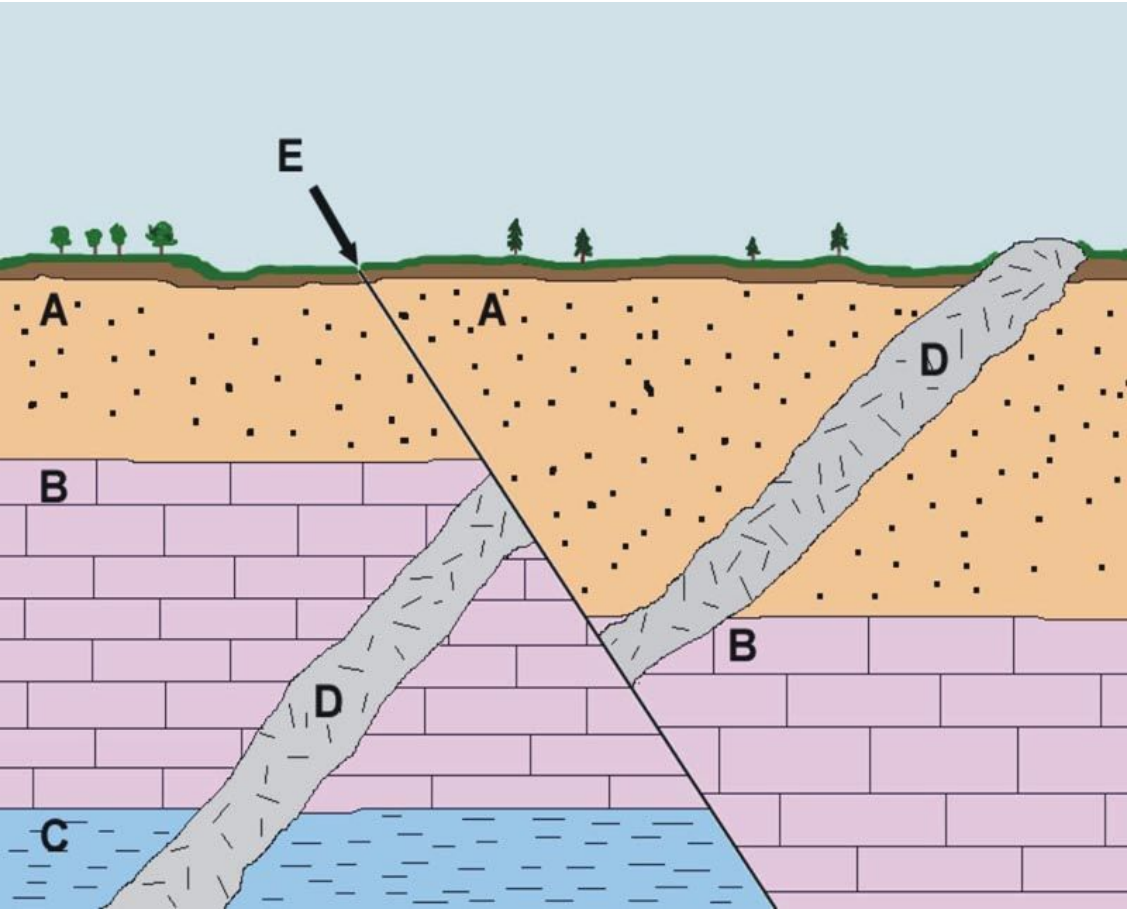


Answer: Layer B

Because the rock layer is on top of layer C which means it had to come after.



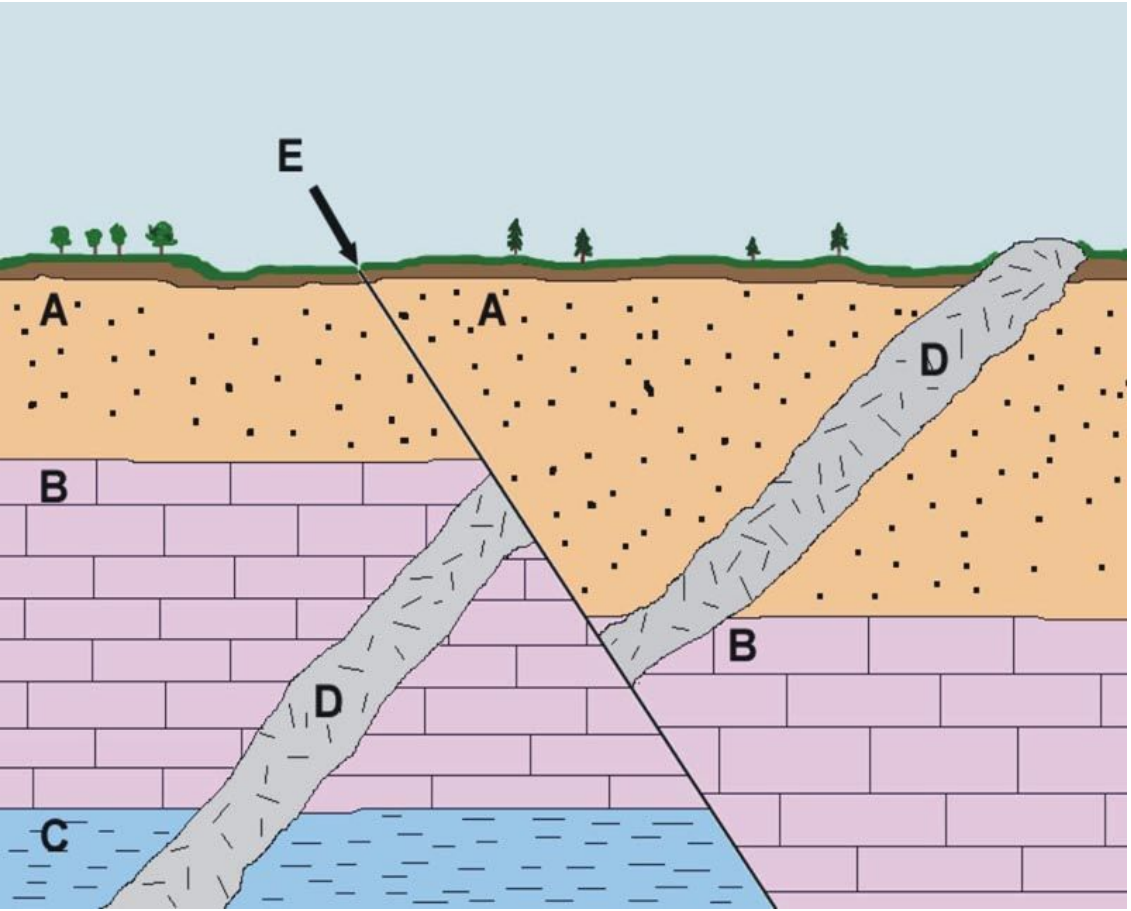
Which rock layer is the next oldest layer after B?



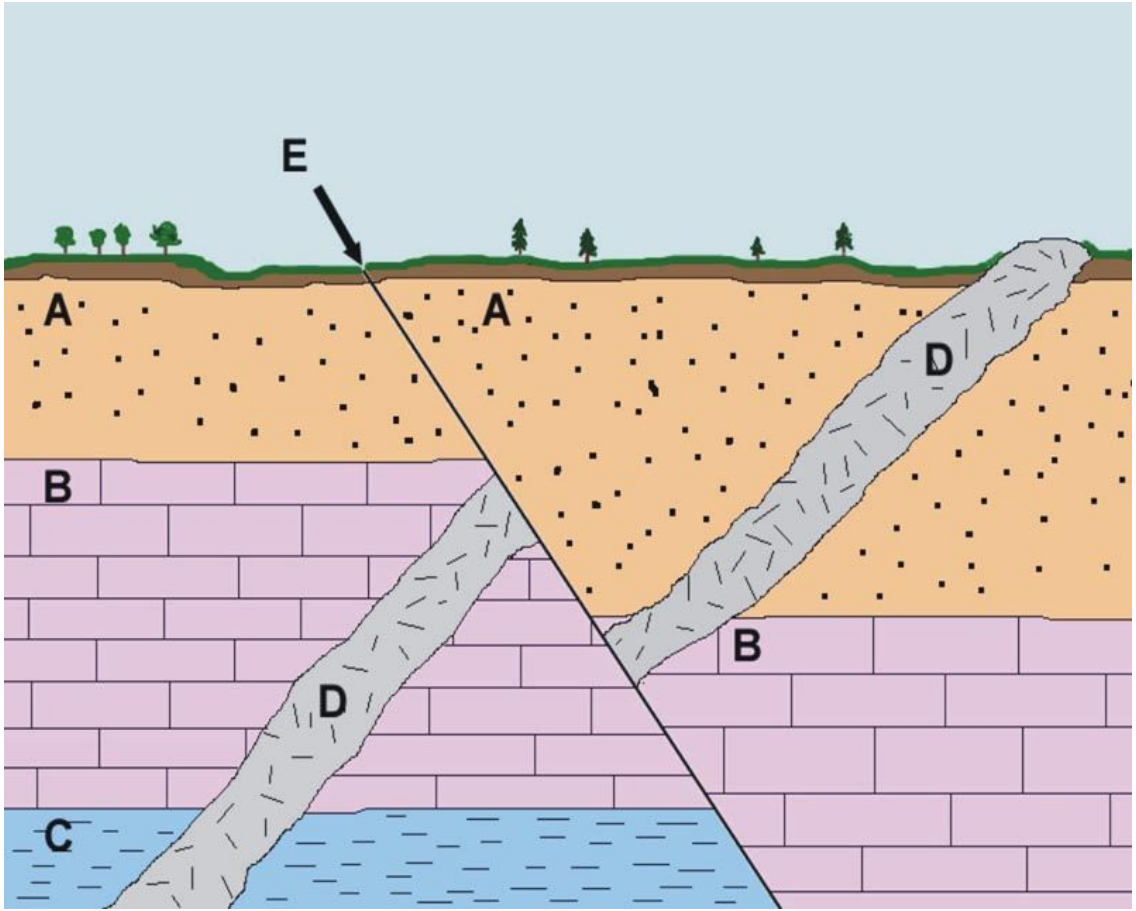
Which rock layer is the next oldest layer after B?

Answer: Layer A

Because it is on top of layer B which means it had to come after.



Which rock layer is the next oldest layer after A?



Which rock layer is the next oldest layer after A?

Answer: Intrusion D

Because it cuts through the older layers A-B. The fault (E) cuts through the intrusion (D) which means it had to come after the intrusion (D)