



The
Relative
Age of
Rocks

Lesson 2

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How Old Are Rock Layers?



How Can Rock Layers Change?

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I. How old are rock layers

A. Relative and Absolute Age

Geologists have two ways to express the age of a rock

- * Relative Age- the age of a rock compared to the ages of other rocks
 - does not provide a number
 - older or younger than

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* Absolute Age- the age of a rock is the number of years that have passed since the rock was formed

- number
 - may not get the age exactly
- *Geologists often use both relative and absolute ages

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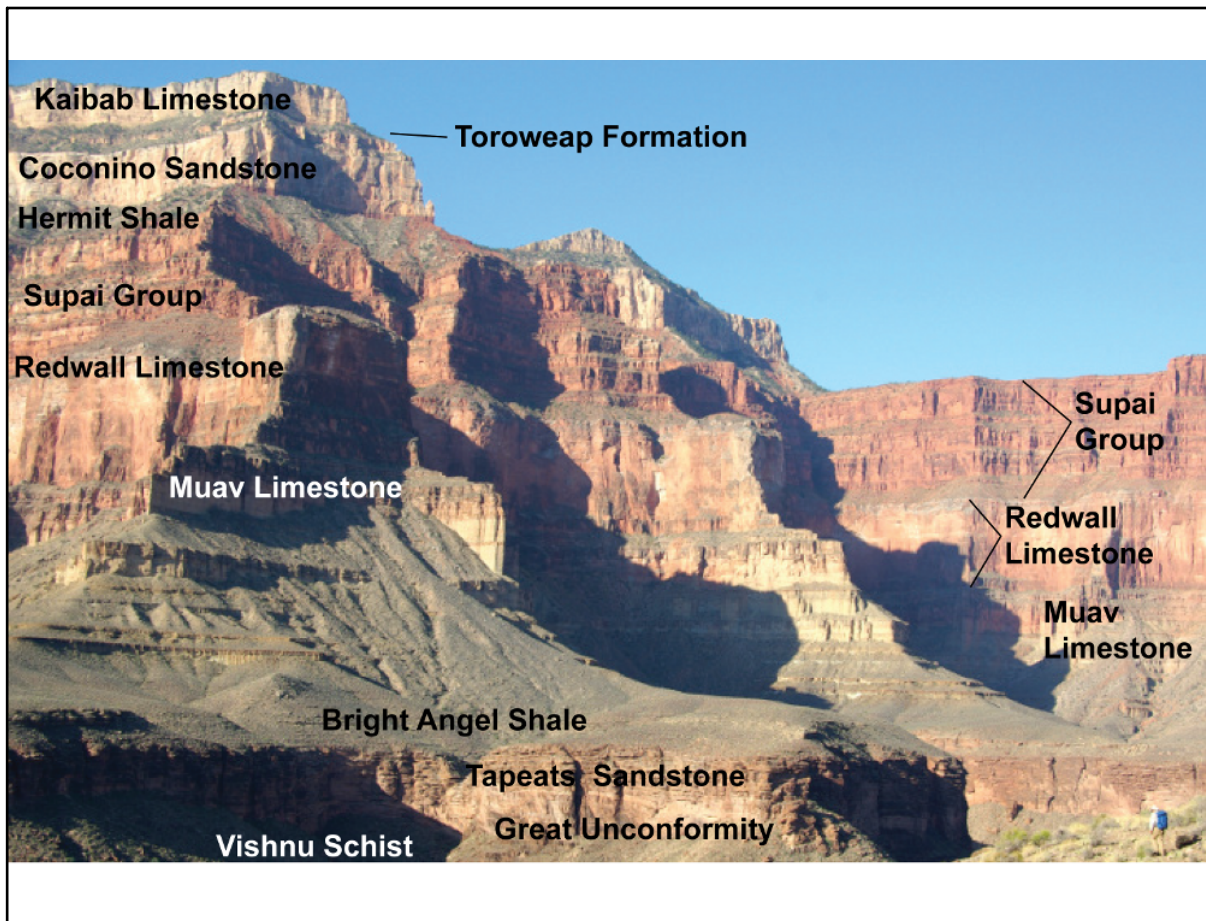
B. Rock Layers

Fossils are most often found in layers of sedimentary rock

*Geologists use the law of superposition to determine the relative age of sedimentary rock layers

* According to the law of superposition, in undisturbed rock layers the oldest layer is at the bottom. Each higher layers is younger than the layers below it

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C. Clues from igneous rock

There are other clues to the relative ages of rocks besides the position of rock layers

- * Geologists study extrusions and intrusions of igneous rocks, faults and index fossils
- * Lava that hardens and forms igneous rock on the surface is called an extrusion
- * Extrusions are always younger than the rocks below

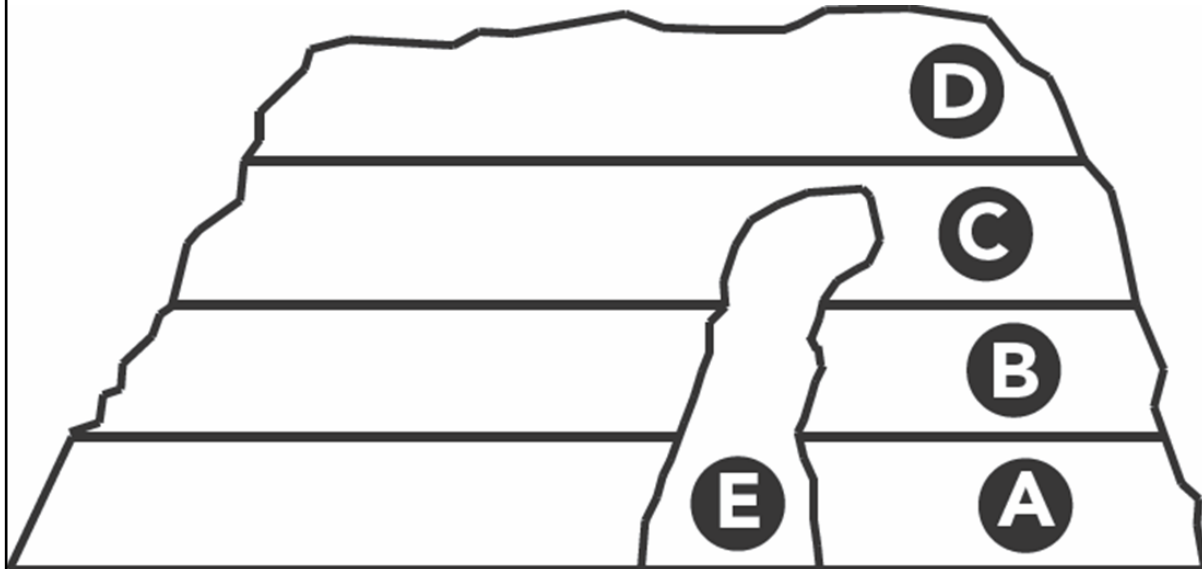
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*Magma that cools and hardens into a mass of igneous rock beneath the surface is called an intrusion

* An intrusion is always younger than the rock layers around and beneath it

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The diagram below shows rock layers found at a site. Identify the area on the diagram that shows an intrusion. What is the oldest layer of rock in the diagram?



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D. Clues from faults

More clues can come from studying faults

- * a fault is a break in the Earth's crust
- * a fault is always younger than the layers of rock it cuts through
- * to find the relative age of a fault, geologists find the relative age of the youngest layer

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E. How do fossils show age?

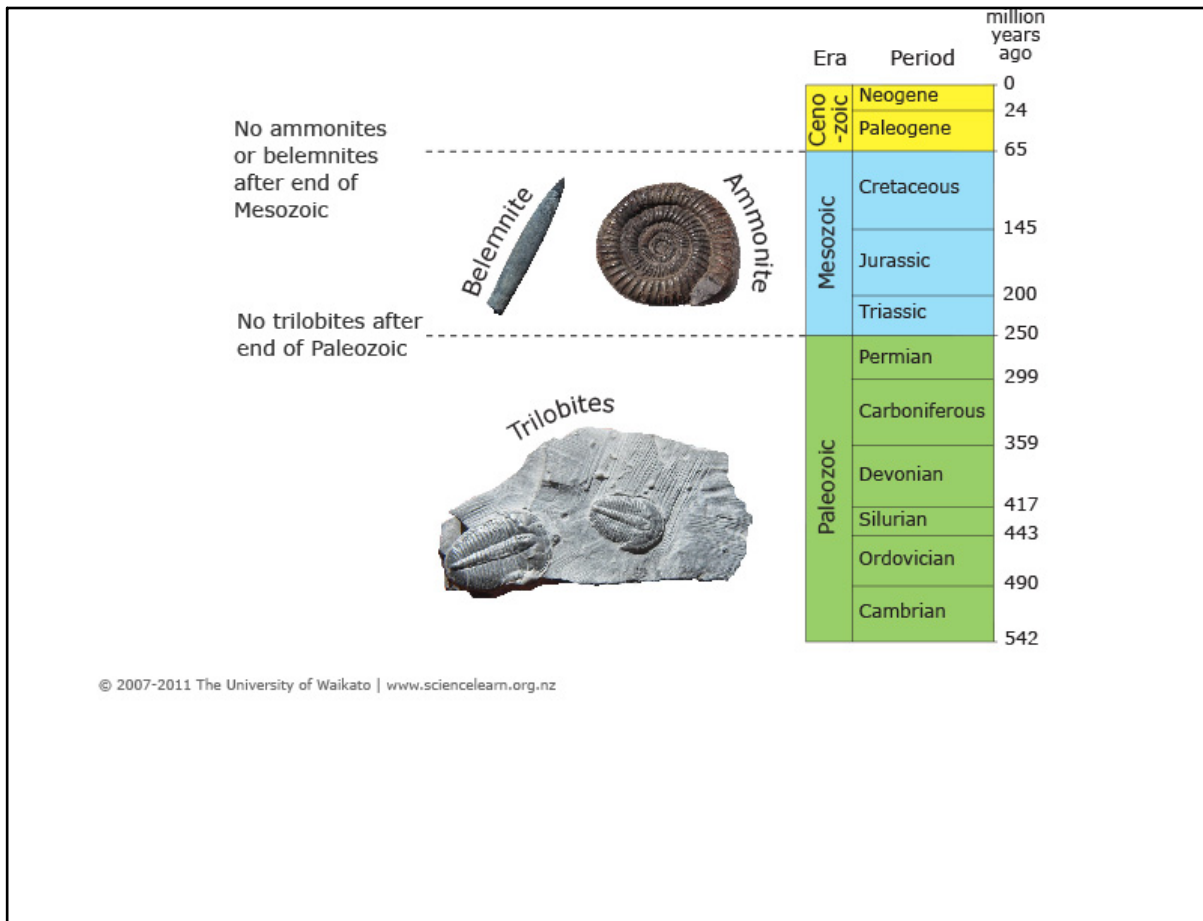
To date rock layers, geologists first find the relative age of a layer of rock at one location

- * They can then match that layer to other location
- * Certain fossils called index fossils help geologists match up rock layers

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- * An index fossil is a fossil that is widely distributed and represent an organism that live for a relatively short time
- * Index fossils are useful because they tell the relative ages of the rock layers in which occur
- * Scientists infer that layers with the same index fossils are the same age

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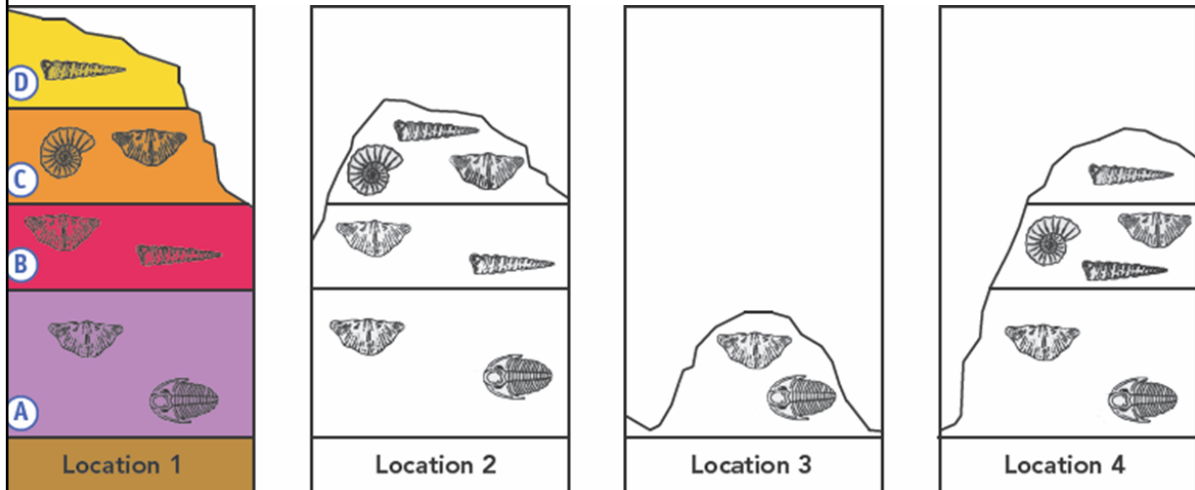


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* Scientists use index fossil to match rock layers

Index Fossils

Scientists use index fossils to match rock layers. Match the rock layers in locations 2, 3, and 4 with first area shown. Which fossils can be used as index fossils?



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II. How can rock layers change

A. The geologic record of sedimentary rock layers is not complete

- * Most has been lost to erosion
- * Gaps in the geologic record and folding can change the position in which rock layers appear
- * Motion along the faults can also change how rocks line up

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B. Gaps in the geologic record

When rock layers erode away, an older rock surface may be exposed

- * Deposition begins again building new rock layers
- * The surface where new rock layers meet much older rock surfaces is called an unconformity
- * An unconformity is a gap in the geologic record where rock layers have been lost due to erosion

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C. Folding

Sometimes forces inside Earth fold rock layers so much that the layers are turned over completely

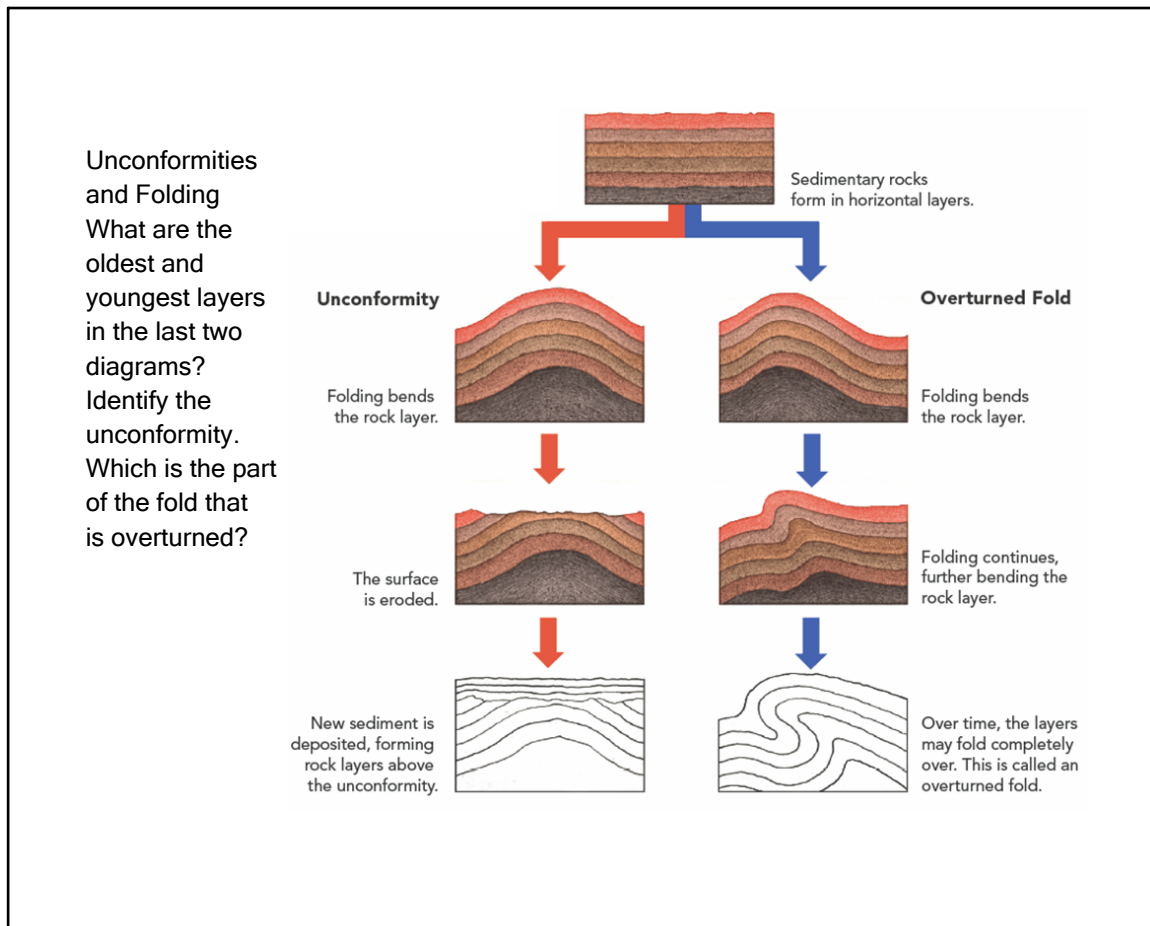
- * in this case, youngest rock is on the bottom

No one place has a complete geologic record
geologists compare rock layers in many places to piece together a complete record

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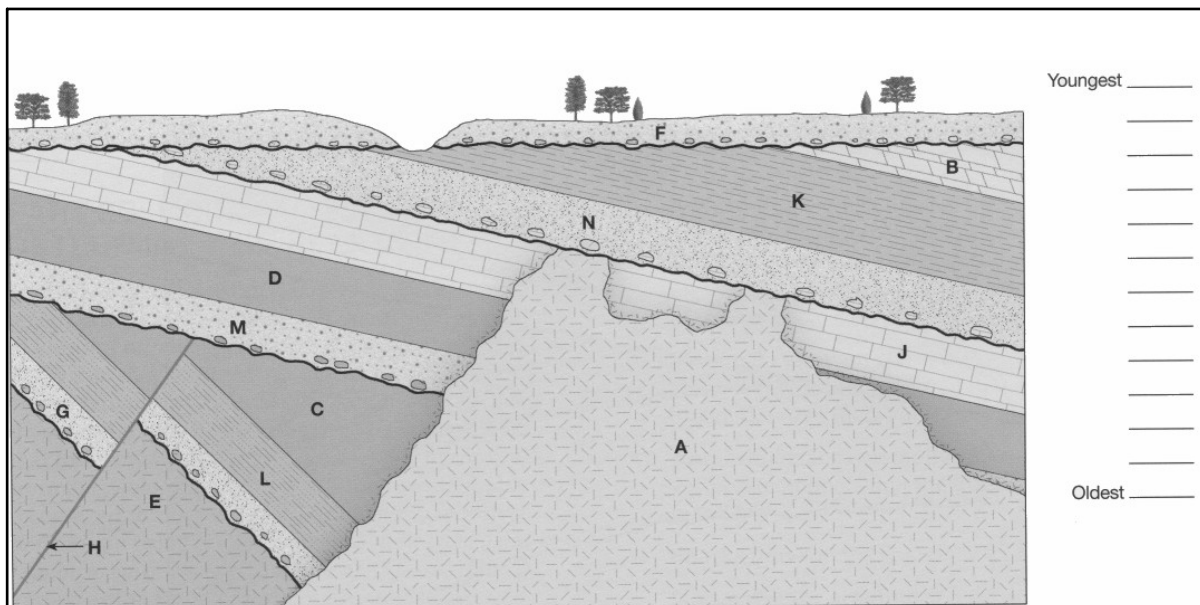
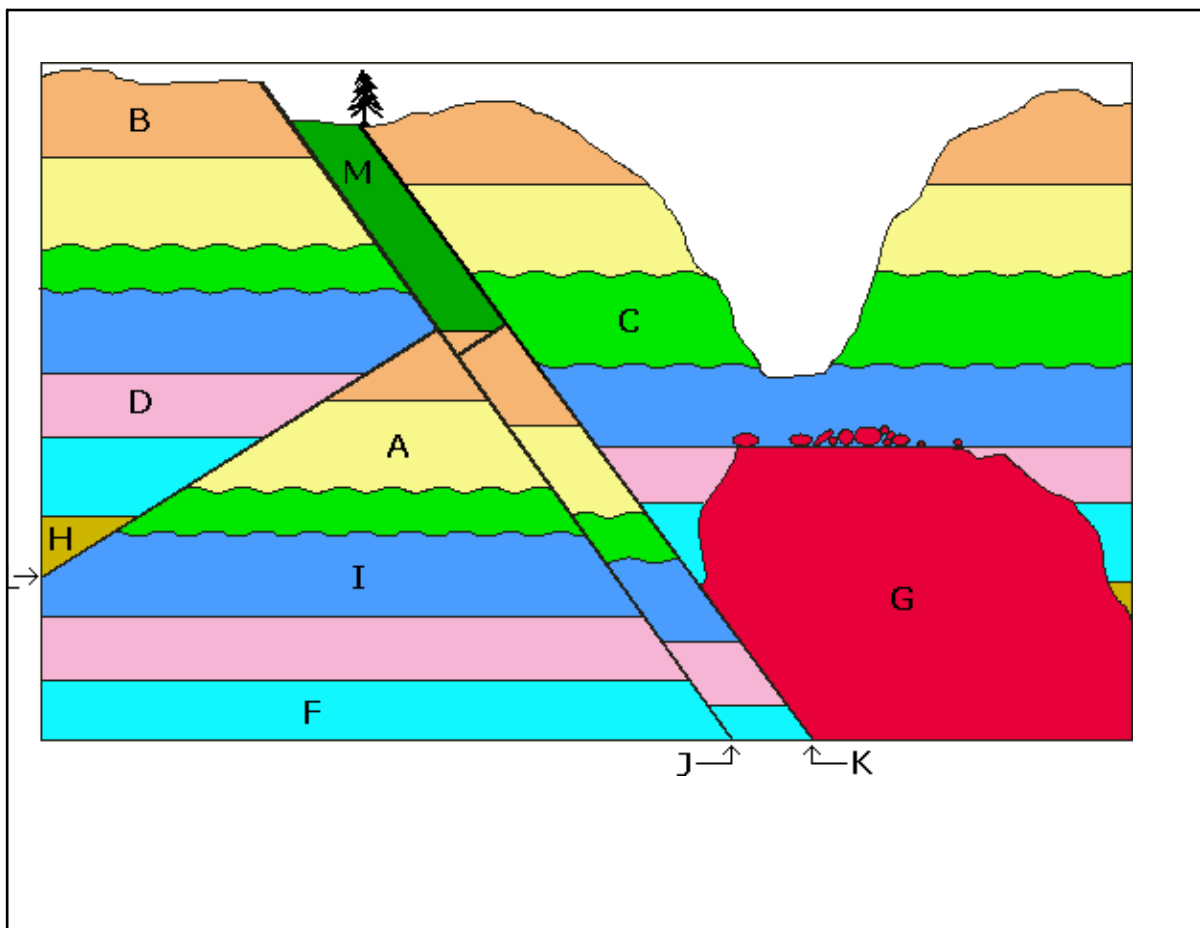


FIGURE 8.9 Geologic cross section for relative age analysis. Place letters on the lines along the right side of the cross section to indicate the relative ages of the rock units, from oldest (first) to youngest (last).

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