“WHO DUNIT?” Activity

With your Table Partner, quietly read the case and the list of suspects, examine the evidence, and on your note page....

1. Name the person who took the last cookie.

2. Explain, IN A COMPLETE SENTENCE, how you know they are the thief.
The Nephew and his seeing-eye dog!
Unit 9

- Relative Dating
- Original Horizontality
- Law of Superposition
- Index Fossils
- Law of Crosscutting Relationships
In the same way a history book shows an order of events, layers of rock (called *strata*) show the sequence of events that took place in the past. Using a few basic principles, scientists can determine the order in which rock layers formed. Once they know the correct order, a *relative age* can be determined for each rock layer.
Relative Age/Dating indicates that one layer is older or younger than another layer based on surroundings, but does not indicate the rock’s actual age in years. Think about my age compared to the other teachers on our team....

No rude comments please! : )

Absolute Age is the age known in years, not relative to the surroundings. This would be your age in Years or Months...days...hours, etc. just as specific as you wanted to be.
Principle of Original Horizontality

Scientists know that *sedimentary rock* (rock formed from sediments) generally form in horizontal *layers* due to gravity.

The **Principle of Original Horizontality** states that *sedimentary rocks, left undisturbed, will remain in horizontal layers*. Therefore...
....scientists can assume that sedimentary rock layers that are NOT horizontal have been tilted or deformed by crustal movements that happened AFTER those layers formed.

What events could cause movement or distortion to horizontal layers of rock?
Law of Superposition

Examine this diagram.

According to the **Law of Superposition**, layer 1 was the first layer deposited, and thus the oldest layer. The last layer deposited was layer 12, and thus it is the youngest layer.

*What can this tell us about what we find in these layers?*
Law of Superposition

Scientists use a basic principle called the Law of Superposition to determine the relative age of a layer of sedimentary rock.

*The Law of Superposition states that an un-deformed sedimentary rock layer is older than the layers above it and younger than the layers below it.*
Movements of Earth’s crust can lift up rock layers that were buried and expose them to erosion. Then, if sediments are deposited, new rock layers form in place of those eroded layers. The missing rock layers create a break in the geologic record in the same way that pages missing from a history book create a break in a story.
When rock layers have been disturbed by *faults* or *intrusions*, determining relative age can be a challenge.
Unconformities

A break in the geologic record is called an **Unconformity**. An *unconformity* shows that deposition stopped for a period of time and rock may have been removed by erosion before deposition started again.
Unconformities

There are three types of unconformities.

1. An unconformity in which stratified (layers) of rock rests upon unstratified rock is called a **nonconformity**.

2. The boundary between a set of tilted layers and a set of horizontal layers is called an **angular unconformity**.

3. The boundary between horizontal layers of old sedimentary rock and younger, overlying layers that are deposited on an eroded surface is called a **disconformity**.

According to the Law of Superposition, all rocks beneath an unconformity are older than the rocks above the unconformity.
In such cases, scientists may apply the Law of Crosscutting Relationships.

*The Law of Crosscutting Relationships states that a fault or intrusion is always younger than all the rocks it cuts through, above and below the unconformity.
Sequence Practice

Based on what you now know about the *Law of Superposition*, the *Principle of Original Horizontality*, *unconformities*, and the *Law of Crosscutting Relationships* place the layers indicated in the diagram in the correct order, starting from the oldest layer.
The Sequence Answer:
The oldest layer is Q, followed by O, then N, then M, then L. P cuts across layers L-Q, so it is the next event since it does not cut into layer H. Above the unconformity we then have layer H, followed by I, then J, with K being the youngest layer.
Bozeman Science - Law of Superposition
Index Fossils

Paleontologists can use fossils to determine the relative ages of the rock layers in which the fossils are located. **Index fossils** are fossils that occur only in rock layers of a particular geologic age.
Index Fossil- qualifications:

To be an *index fossil*, a fossil must meet certain requirements:

1. It must be present in rocks scattered over a large *area*.
2. It must have features that clearly *distinguish* it from other fossils.
3. Organisms from which the fossil formed must have lived during a short span of geologic *time*.
4. The fossil must occur in fairly *large numbers* within the rock layers.
Additional Practice

On the back of your note page,
Put the geologic layers/events in order
1 – 9. (1 oldest – 9 most recent)

Check your work with the answer keys around on the counters.

Need more practice or want a challenge? Ask for “the packet”
and check your work with the “Key” on my website!
Answer Key to the back page practice:

3 – earthquake
8 – deposit D
4 – deposit B
2 – deposit G
9 – Intrusive Lava
1 – rocky deposit R
5 – river cuts through
6 – deposit E
7 – deposit A