Relative Dating

You are an expert in relative dating techniques. You need to explain, using the chart below, the relative age of the fossils in relationship to the other fossils. Answer each question. Once you have all of your answers recorded, WRITE YOUR PARAGRAPH RESPONSE in your NOTEBOOK.

1) Using the letters printed on the left, what is the order of the rock layers from youngest to oldest?

O - R - G - A - N - I - S - M

2) What is the youngest fossil? How do you know?
The youngest fossil is the Foraminiferan. I know this because it is in Layer O, the youngest layer at the top.

3) What is the oldest fossil? How do you know?
The oldest fossil is the Tribrachidium. I know this because it is in layer M, the oldest layer at the bottom.

4) An index fossil is a fossil that is found only in one layer of earth and can be used to date layers. What fossils would be good index fossils? Explain why.
The Foraminiferan would be a good index fossil because it shows only in layer O at the top.

5) What fossils would be bad index fossils? Explain why.
Some bad index fossils would be the Brachiopod, Diplomytus, Crinoid, and Trilobite fossils because they occur in more than one level. This would not accurately indicate the age of a fossil solely based on its location in the rock strata.
Principles of Geology:

- **Law of Uniformitarianism**: The way things occurred in the past are likely the same way things occur today. (example: rivers flow downhill today so they probably flowed downhill in the past also)
- **Law of Superposition**: The youngest layer of rock is on the top. The oldest layer of rock is on the bottom
- **Law of Original Horizontality**: All sedimentary rocks are deposited flat initially. If you find them at an angle, they have been moved
- **Law of Cross-cutting relationships**: igneous rocks or faults that “cut” into other rocks are the youngest. (the “other rocks” had to be there before they could get cut by anything)

1. Which of these layers is the youngest? **Sand** How can you tell? **It's the youngest because it is on the top layer of the strata**
   What principle of geology does this relate to? **The Law of Superposition**

2. When did layer “4” occur? **After 1, 2, & 3, before 5** How can you tell? **Because layer 5 is on the top, however 4 cuts through 1, 2, and 3.**
   What principle of geology teaches that concept? **Law of Cross-Cutting Relationships**

3. What happened to these layers of rock (if anything)? **They've been moved**
   Which principle of geology did you use to determine what happened? **Law of Original Horizontality**

4. Which layer was there first? **The bottom layer** Write down **everything** that happened to these layers of rock after ALL of the layers were deposited. (Don’t forget erosion by the river) **The rocks were originally deposited flat, however they've been moved. Erosion has taken off the top layers of the rocks and valleys/hills have been created.**

5. What happened first in this picture (the igneous pluton D or the earthquake fault line E)? **D**
   Which rock layer was put down last (A, B, C, or D) **D**
   Why do you think rock D is sticking out above the ground (like a hill)? **There was enough force to break through the top layer.**
   Which way did the rocks on the right move? (upward or downward)? **Downward**
6. This is a picture of a fault line that is a result of an earthquake causing the land to break and slip. The one on the right side, slipped downward. Which happened first? (The lighter layer outlined by dashes or the fault line)? Lighter layer formed. Which principle of geology helps you figure that out? The Law of Horizonality.

7. Which happened first (the Coal layer, the Banana Sandstone, or the erosion of Deadman’s canyon)? The Coal layer. What happened to the top of the curvy rocks beneath the Banana Sandstone? Erosion, plate movement, etc. Why are the rocks on the bottom folded but the top ones are not? What do you think could have caused this? There was likely erosion and plate movement that caused the plates to shift. The layers were then deposited flat again.

8. What do you think caused the layers on the bottom to tilt upward? Tectonic plate movement at a convergent boundary - or upward shift. Why are the layers on top not tilted? They’ve been deposited after the event occurred. Which law states that rocks are always deposited flat first? Law of Horizonality.

9. This rock has a vein of lava rock that squeezed its way in through the crack. Which principle of geology would help you to know that the vein of lava rock is the youngest? The Law of Cross-cutting relationships.

10. Which “blob of lava” (pluton) was in this area first (A, B, or C)? A. What is your evidence? The continual formation of land built up, creating the volcano. Also, the older rock is lighter.