

# Index Fossil + Relative Dating Lab

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## Objectives

- Investigate the law of superposition and determine the relative age of rock layers.
- Understand what index fossils are and how they are used to date rock layers.

**PART ONE:** Each card represents a different layer of rock. The letters (such as "T" and "C") represent fossils in a rock layer. You will be matching up the cards that have the same letters (same fossils) until all the cards are connected.

- 1) Start with the card that says "THIS IS THE OLDEST ROCK LAYER" and put it on the bottom. (The "T" and the "C" represent two different types of fossils formed in this rock layer.)
- 2) Now look for a different card that has either a "T" or "C" written on it. There is only one card with a "C" in the deck. This "C" fossil lived at a later time than the original "C" fossil, but it must be found in a layer next to the original layer. This is because fossils can't become extinct and then reappear at a later time. They must live in adjacent layers. The fossils represented by the letters on this card (C,G,A) are "younger" than the original "T" or "C" so they go on top. This is a younger layer of rock.
- 3) Sequence the remaining cards using the same process.
- 4) Write the sequence of letters below.

1. **Youngest** (\_\_\_\_) (\_\_\_\_) (\_\_\_\_) (\_\_\_\_) (\_\_\_\_) (\_\_\_\_) (\_\_\_\_) (\_\_\_\_) **Oldest** (8pts)

2. How do you know that "X" is older than "M"? Describe the law or principle that you used.

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3. Explain why "D" in the rock layer represented by DM is the same age as "M"?

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4. Explain why the "D" in the rock layer represented by OXD is older than "D" in the rock layer represented by DM.

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5. What is the law of superposition?

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**PART TWO:**

- 1) Look at the second set of cards which have drawings of fossils on them.
- 2) Each card represents a particular rock layer with a collection of fossils that are found in that particular rock layer.
- 3) Figure 2A gives information about each of the different fossils.
- 4) The oldest rock layer is marked with the letter "E" in the lower left-hand corner.
- 5) Find a rock layer that has at least one of the fossils you found in the oldest rock layer.
- 6) Remember, once an organism **disappears** from the sequence of layers it is **extinct and cannot reappear later.** For this reason, same fossils must appear in layers next to each other.
- 7) Arrange the cards from oldest to youngest with the oldest layers on the bottom and the youngest on top.

**Interpretation Questions:**

6. Write the letters of the layers from **youngest** to **oldest** below. (8pts)

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7. What is a fossil?

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8. In what category of rocks would you find the fossils from this activity?

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**PART THREE:** Now you will learn how scientists use index fossils. An index fossil is one that existed during limited periods of geologic time and thus are used to date the rock layer in which it is found. If an organism existed across many time periods, the rock it is found in could be many different ages. These long-lived fossils are therefore not good index fossils. A good index fossil existed during a short period of time. So, all scientists have to do is date the original fossil using the half-life technique, then every time they see that fossil again they know the age of the rock it is in.

9. What is an index fossil?

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10. Name three organisms that probably could be used as index fossils. (3pts)

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_

11. Why would they be good to use?

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12. Name three organisms that would probably NOT be used as index fossils. (3pts)

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_

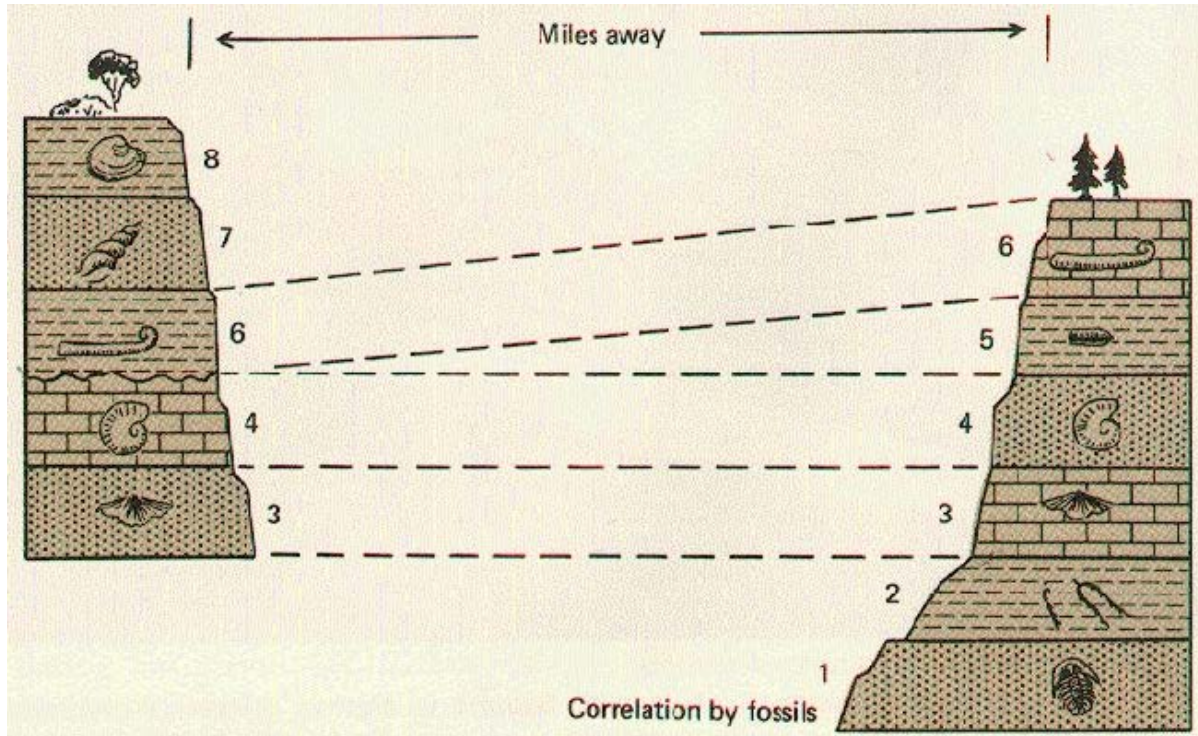
13. How can scientists use index fossils to determine the absolute age of an object?

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Use the diagram to answer the questions below:



14. Which is older the trilobite or the ammonite?

15. Why are the ammonites in layer 4 in different types of rock?

16. Why is there no layer 5 in the left outcrop?

17. What is this called? (a rock layer that is missing)

18. If the brachiopods (index fossils) from the Paleozoic Era dated at 500 million years old, what can be said about the rock they are found in?

19. If a mysterious invertebrate is found right next to the brachiopod, how old is the mystery fossil?

20. Why is there no layer 7 in the right outcrop?