

# Earth's Changing Record

Use physical evidence to connect Earth changes to scientific theories.

**SC.7.E.6.4** "Explain and give examples of how physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes."

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## 1 READ AND MARK \_\_\_\_\_ Read it twice

**YOUR JOB** Underline three pieces of physical evidence, then circle the words that tell what each piece of evidence supports.

### Clues in Rock and Fossils

- ① Scientists investigate Earth's long history by studying physical evidence, material that can be observed or measured. In a canyon wall, stacked sedimentary rock layers record repeated changes. Mud, sand, and shells settled in water, then pressure turned the sediments into rock. Lower layers were usually deposited before layers above them. A layer may hold ripple marks, pebbles, or fossil shells. These features support the idea that landscapes and environments have changed many times, rather than remaining the same.
- ② Fossils add another line of evidence. In many rock sequences, simple marine organisms occur in older layers, while more recent layers contain different organisms. This pattern does not mean that every fossil is a direct ancestor of a later one. Instead, it shows that life on Earth has changed over long spans of time. Scientists compare fossils from layers of known order in many places. When the same pattern appears repeatedly, it supports the scientific theory that populations evolved and that some species became extinct.
- ③ Scientists also use radiometric dating to measure the age of certain rocks. Some atoms change into other atoms at steady, known rates. By measuring parent and daughter atoms in a mineral, scientists can calculate when that mineral formed. Dates from volcanic ash layers can place ages around nearby sedimentary layers and fossils. Evidence of erosion, such as a river cutting deeper into rock, also shows ongoing natural change. Together, dated rocks, fossils, and landforms support theories that Earth and its living things have evolved through natural processes over geologic time.

**2 ANSWER WITH EVIDENCE** \_\_\_\_\_ Use the passage

**1** How does the order of sedimentary rock layers help scientists explain that environments have changed?

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**2** What does a repeated pattern of different fossils in older and more recent rock layers support?

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**3** Explain how radiometric dating of a volcanic ash layer can help scientists study nearby fossils.

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**4** How does a river cutting deeper into rock provide evidence of a natural process changing Earth?

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**3 YOUR TURN** \_\_\_\_\_ Your own words

Write exactly three sentences about an imaginary rock outcrop. Include two physical clues, state which clue is lower or upper, and explain how the clues support natural change over geologic time.

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**PART 1 • READ AND MARK**

Underline three pieces of physical evidence, then circle the words that tell what each piece of evidence supports. Accept any marking that follows this job and points at the right text.

**PART 2 • ANSWERS**

| # | QUESTION                                                                                              | ANSWER                                                                                                                                                                  |
|---|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | How does the order of sedimentary rock layers help scientists explain that environments have changed? | <b>Lower layers were deposited first. Different features in layers above and below each other show that environments changed between times of deposition.</b>           |
| 2 | What does a repeated pattern of different fossils in older and more recent rock layers support?       | <b>It supports the theory that populations evolved over long periods of time and that some species became extinct.</b>                                                  |
| 3 | Explain how radiometric dating of a volcanic ash layer can help scientists study nearby fossils.      | <b>Scientists measure parent and daughter atoms to calculate when the ash mineral formed. The ash date can place ages around nearby sedimentary layers and fossils.</b> |
| 4 | How does a river cutting deeper into rock provide evidence of a natural process changing Earth?       | <b>It shows erosion is an ongoing natural process that changes landforms over time.</b>                                                                                 |

**PART 3 • YOUR TURN (SAMPLE ANSWER)**

A lower limestone layer contains marine shell fossils, and an upper sandstone layer contains leaf fossils and a volcanic ash layer. The lower marine evidence and upper land evidence show that the environment at this place changed over time. A date from the ash layer would help scientists estimate when the upper layer formed, supporting natural changes over geologic time.

Accept any accurate physical clues arranged in a sensible lower-to-upper order and a clear explanation that natural processes changed Earth over time. The response should connect evidence to a scientific claim, not simply list objects.