Journeys into Earth's Past

In this lesson, students will use evidence at four different stations to form an explanation for different fossil and rock features and how they indicate past environments.

Students may believe that fossils are pieces of dead animals and plants, when most are in fact a cast or impression of the original living thing. They may also assume that fossils of tropical plants, for example, cannot be found in cold or dry environments. This lesson should help to show them that environments change over time.

Materials needed

- Glass beakers
  1 per pair of students
- Different coloured sand
  Enough to fill the beakers
- Fossils of scallop, trilobites, ammonite, ferns or neptunea, or modern specimens that resemble them

Engage

1. Ask students to tell you what they know about sedimentary rocks. Show students slide 2–5 of the *Journey into Earth's Past* presentation, pausing on the questions on slides 2 and 5 to see whether the students can answer them.
2. In pairs, ask students to make their own sedimentary layers, using beakers and different coloured sand. Can they identify which is the oldest and which is the youngest layer? Do they have any ideas of how layers of sand could become rock? Show slides 6 and 7 to reinforce what they've learned.

Explore

1. Show students slides 8–10 to introduce the idea that rock layers can provide information about events in the Earth's past. Then ask students what they know about fossils. This is a good point to address any misconceptions they might have. Show students slides 13–18 to clarify their knowledge.
2. Set up four different stations using the station cards provided. If possible, place relevant fossil examples, or similar modern specimens, at each station.
3. Students should move around the stations writing down their answers to each question. Give students 5–10 minutes at each station. Be on hand to steer them in the right direction or give additional clues. For example, if students are a bit stuck at station 3 tell them that water was found at the bottom of the dip.

Explain

1. Ask students to give their answers to the question at station 1 – what information can we gather from these layers of rock, about the changing nature of the environment? You could use slide 19 as a prompt. Ask students to give specific evidence for their conclusions. Discuss what might have caused this change. They may suggest a change in weather or water levels or movement of rock.
2. Move onto talking about station 2. Ask students to share their answers – what is the relative order of the layers and what do they think caused the rock layers to bend? Show students slides 20–23.
3. When discussing station 3, point out that the fault line does not go through the top layer. Ask students what this shows about when the earthquake occurred. Show students slide 11.
4. Finish by discussing station 4. Ask students to elaborate on why they think it was a river that caused the change. How did it remove the rock? Use slide 12 as a prompt. You could mention that the river may now deposit new sediment, building up new sedimentary rock within the gap.

Elaborate

1. Show students slides 24–29 to introduce the fossil record.
2. Ask students to research the fossil record of an animal of their choice and to produce a timeline to show how the animal has evolved over time, using the timeline on slide 26 as an example.
3. Use slides 30–33 to explain how radioactive dating can be used to determine the age of rocks and fossils.

Evaluate

Formative Monitoring (Questioning / Discussion):

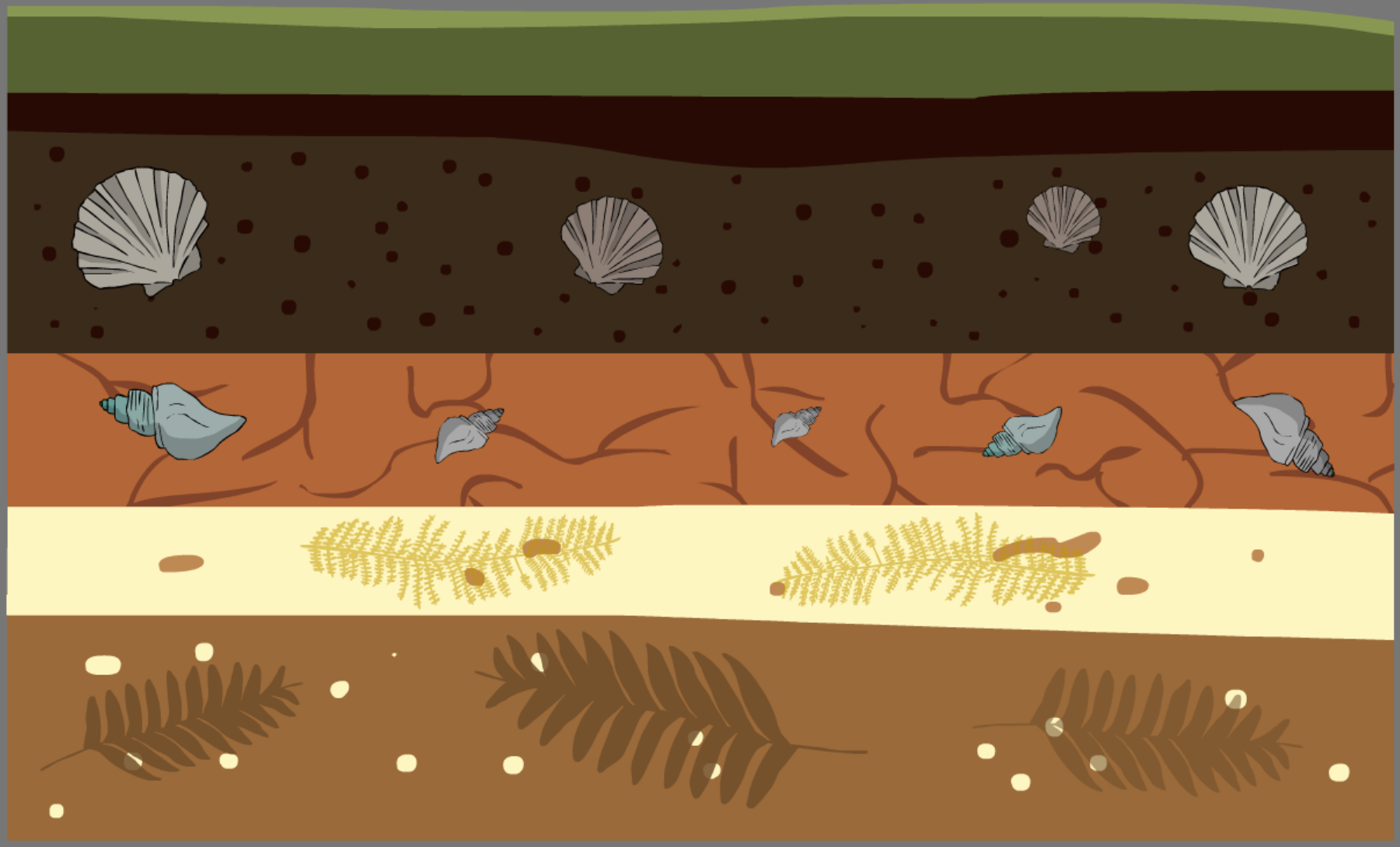
- Can the student use the information that they are given to identify appropriate evidence?
- Do they make clear, concise notes of their thoughts at each station?

Summative Assessment (Quiz / Project / Report):

Students should be assessed on the timeline they produce based on their research into the fossil record of an animal.

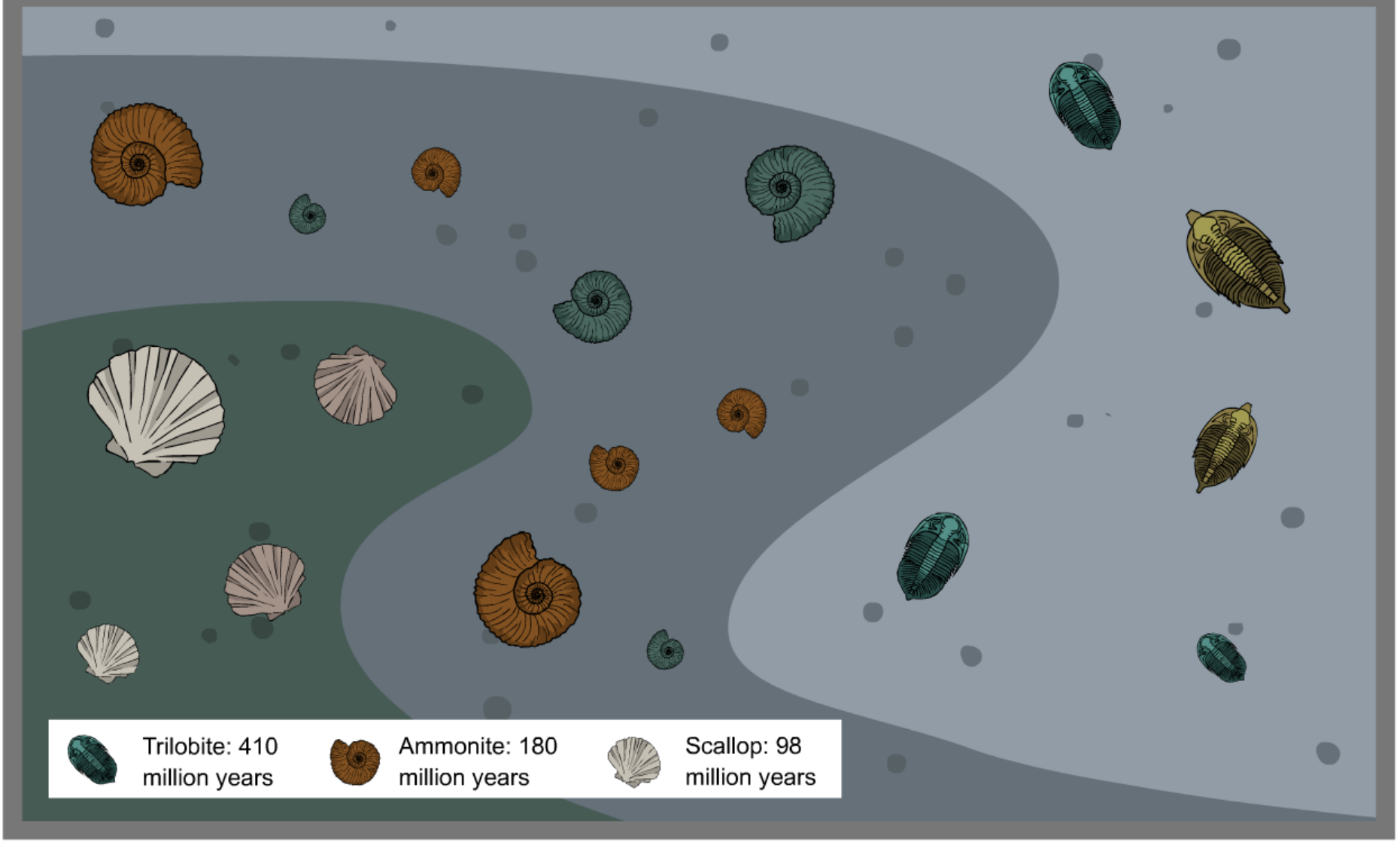
Station 1

What information can we gather from these layers of rocks about the changing nature of the environment?



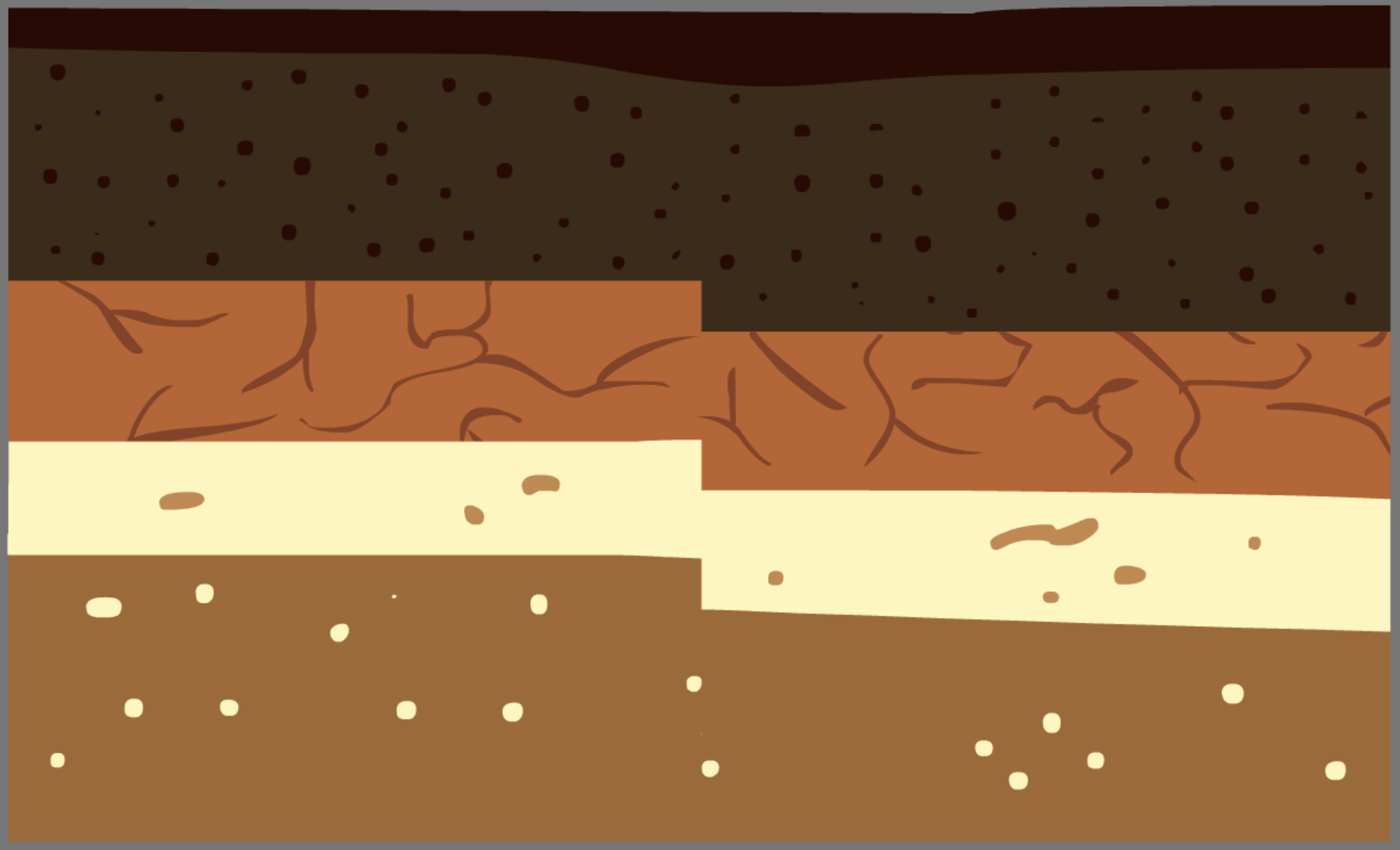
Station 2

What can you work out from this image about the relative age of the rock layers of sedimentary rock? What might have caused the layers to bend?



Station 3

What do you think has caused the rock layers to become misaligned?



Station 4

What do you think has caused this change to the rock formation? And how?