

Clash of Ideas, Episode 4

A Lost Ocean and Plate Tectonics



Engage

- When fossils are found high in the mountains, a lot of people think that the Flood must have deposited them up there. But we find actual ocean floor in the mountains. How is this different? What does it say about the fossils that are found in the mountains?
- It took more than 40 years to unravel the mystery of ophiolites. This is typical in science. What does this tell us about a scenario in which someone discovers what they believe to be undisputable proof that the Bible isn't true? How should we respond?

Discover

- Exercise on superposition:

Make two batches of cornmeal, water, and food coloring (wheat flour can be added to help the mixture stick together a little bit, but the experiment won't work if the material is too sticky or cohesive).

Make a low mound of the color that represents oceanic crust.

Make two taller cakes of continental crust on either side. Push the two continental crusts together, sliding them over top of the oceanic crust and pushing down just enough so that the continental crust picks up pieces of the oceanic crust.

Finally, cut the cornmeal mountain in half and slide one half out of the way so that you can see a cross section of the mountain.



For more information, see: https://www.youtube.com/watch?v=-gCH_CwoGso

Explain

- Continental crust and oceanic crust are very different. The oceanic crust is thinner and denser, while the continental crust is thicker and less dense. These differences make the two types of crust float at different levels over the mantle of the earth.
- Finding the same series of rock layers, or the same types of rock together in different areas, is good evidence that similar processes were at work in both places. Imagine a series of robberies that happen across your country where the thief breaks in and steals only laundry detergent, three plates, and a square foot of carpet from the living room. If this happens over and over again, even though it happens in different cities, people will suspect the robberies are related. This is similar to finding chert, layered limestone, and ophiolites together in the mountains and also seeing the same types of rocks together on the ocean floor.

Extend

- The Bible lists two times in Earth's history when the surface of Earth was dramatically altered. The first was creation, and the second was the Flood. Since ophiolites are associated with the part of the geologic column that contains fossils, which of the two times must they correlate with?

Assess/Reflect

- Look at this map of the world, which includes detail of the ocean floor. Locate the Alps, the Himalayas, the Andes, the Rockies, and the Appalachians on the map. Also locate the areas where there has been growth, or spreading zones in the oceans. Can you see how the motion happened that pushed up the mountains?



Map produced by Marie Tharp, Bruce Heezen and Heinrich Berann, 1977

Teacher's Resource

Possible Answers to Questions

- Fossils, ocean floor, and rocks from deep in the earth are usually found in the mountains as a result of tectonic activity pushing them up.
- Spreading zones in the ocean are roughly marked on this map:



Vocabulary

Tectonic plates: the earth's crust is divided into plates which float on the earth's mantle

Ophiolites: pieces of oceanic plates that have been pushed up on to continental plates

Chert: a sedimentary rock composed of silica

Video for exercise available at:
<https://www.grisda.org/audio-visual-media?album=5469010&video=206448792>