

The Sands and Time

2-5

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Key Points:

1. To see a simplified way of how rocks are deposited.
2. To show how the Law of Superposition works.

Materials:

- A clear glass or plastic bowl
- Small rocks or marbles of various colors
- Different colored sand, or colored "goldfish bowl" rocks.

Explanation:

In 1669, Nicholas Steno noted the relationships of different rock units. He described two basic geologic principles. The first, "The Law of Original Horizontality", stated that sedimentary rocks are laid down in a horizontal manner. The second, "The Law of Superposition," stated that in an undeformed sequence of sedimentary rocks, younger rock units were deposited

on top of older rock units. To envision this latter principle think of the layers of paint on a wall. The oldest layer was put on first and is at the bottom, while the newest layer is at the top. Steno's recognition of fossils as traces of ancient life helped him with his discoveries. An additional concept was introduced by James Hutton in 1795, and later emphasized by Charles Lyell in the early 1800s. "The Principle of Uniformitarianism" is the idea that natural geologic processes have been uniform in frequency and magnitude throughout time. The principle is basically stating that "the present is the key to the past." Steno's principles allowed workers in the 1600's and early 1700's to begin to recognize rock successions. However, because rocks were locally described by the color, texture, or even smell, comparisons between rock sequences of different areas were often not possible. It was the use of fossils that provided the opportunity for workers to correlate between geographically distinct areas. This contribution was possible because fossils are widely found in areas of the earth's crust. (<http://www.vgspc.com/superposition.htm>)

Procedure:

1. Pour some sand into the bottom of the bowl. Have the students note which color.
2. Now place some rocks or marbles on top of the sand.
3. Pour in more sand of a different color.
4. Continue this until your bowl has 5 or 6 layers.
5. Look at the bowl from the side.
6. Ask questions.
7. Discuss the Law of Superposition

Questions:

1. What can you see from the side of the bowl?
2. Which layer was laid down first? Where is it in the sequence?
3. Which layer is the youngest? (was laid down last)
4. How can scientists use this to determine the age of real rocks?

Extension:

1. Do this same activity but fill the bowl 3/4 full with water. Now, when you put the sand in it will take a few hours or days to settle, but will settle in the same way (horizontally). Discuss the different ways in which rocks can be deposited.
2. Look at the cross section of a fault (called a trench) or a soil profile. Look at the different layers and see if the students can identify which were deposited first.
3. Do the Whodunit? activity.