

Who Dunit? and the Law of Superposition

2-5

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Key Points:

The Law of Superposition is the basis for the understanding of the sequence of past geological events. In this exercise, students will determine the order of a sequence of events and then to apply this skill to a geological exercise in order to determine a sequence of hypothetical geological events and their relative age.

Overview:

Rocks are generally deposited horizontally. After one rock layer has been deposited, another is laid down on top of it. Thus, the rocks on the bottom of the stack are the oldest, and the rocks on the top are the youngest. Once the rocks have been deposited they sometimes get moved around. They can be broken by faults, tilted into mountains, intruded by magma, or cut through by rivers and streams. By looking at the rock layers and seeing in which order these processes occurred, we can determine how old the rocks are in relation to the rocks around them, as well as the general timing for things like fault ruptures and magmatic intrusion. This law, proposed by Nicolaus Steno in 1669, is called the Law of Superposition.

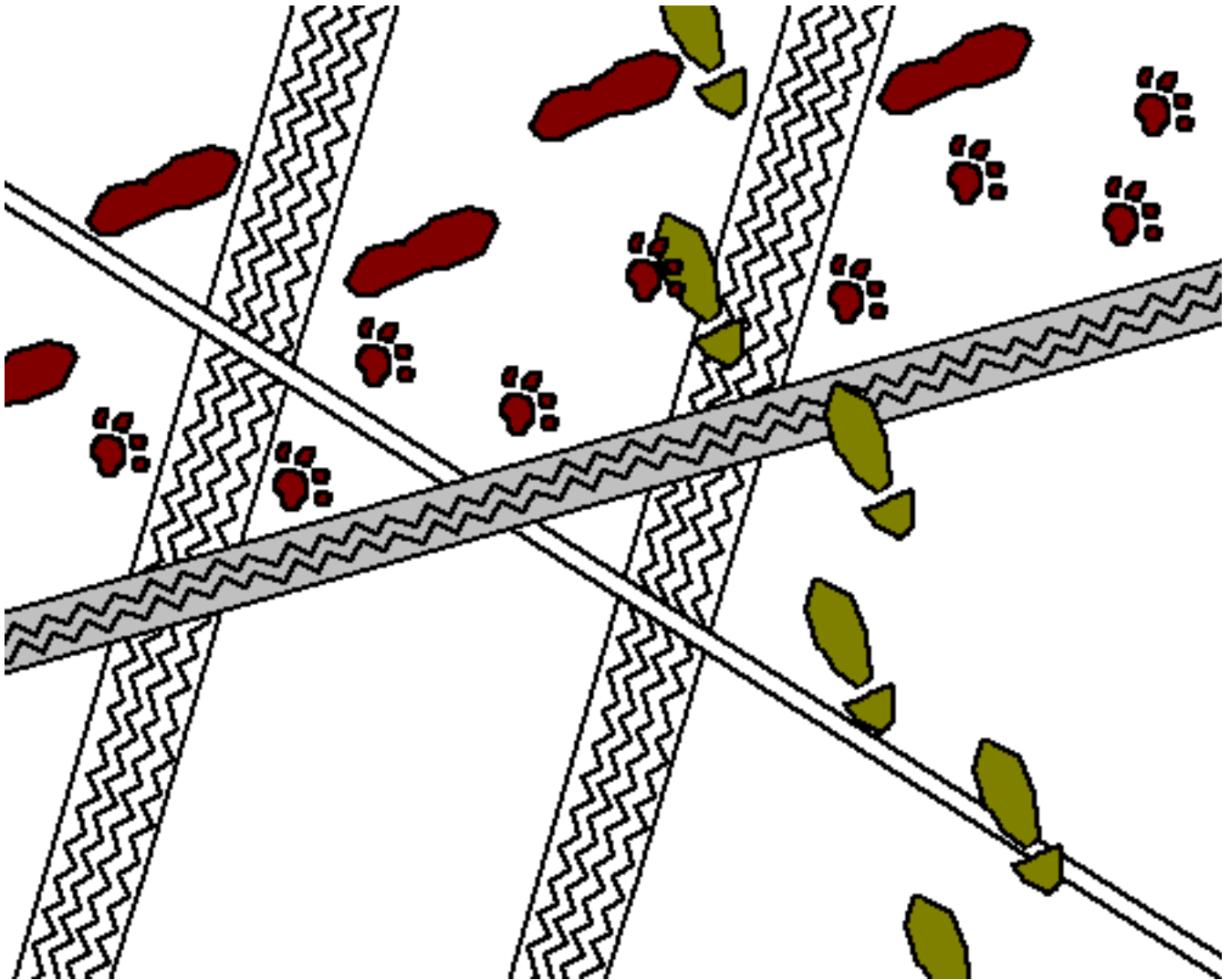
Procedure:

1. Give the students the Whodunit? page and let them look at the clues.
2. Start a discussion about who would have been in this spot last (no other marks over their marks) Who would have been first?, etc. Place numbers in front of each person that left tracks at the "scene of the crime" in the order of their appearance from first to last.
3. Discuss the Law of Superposition and how it works just like these tracks.
4. Hand out the Superposition worksheet.
5. See if they can determine the order of events.
6. Helpful hints: Were the yellow and green layers moved by the fault? Did the magma intruded before or after the fault moved? What was the first thing that happened? (the bottom layer of rocks were deposited) Is there more than one interpretation?

Questions:

1. What could scientists learn by using the Law of Superposition?
2. How could this help people learn about earthquakes?
3. Is there any way to determine when the magma actually intruded with these clues only?
4. Could we use fossils to help determine the age of rocks (and thus the age of magmatic intrusion)?
5. What other methods could scientists use to date rocks?

Who Dunit?



(used with permission from Steve Dutch, Univ. of Wisconsin, Green Bay)

Someone took the last cookie in the cookie jar last night.
The last person to leave the scene is the culprit. Who was it?

Clues:

The Butler walks to work

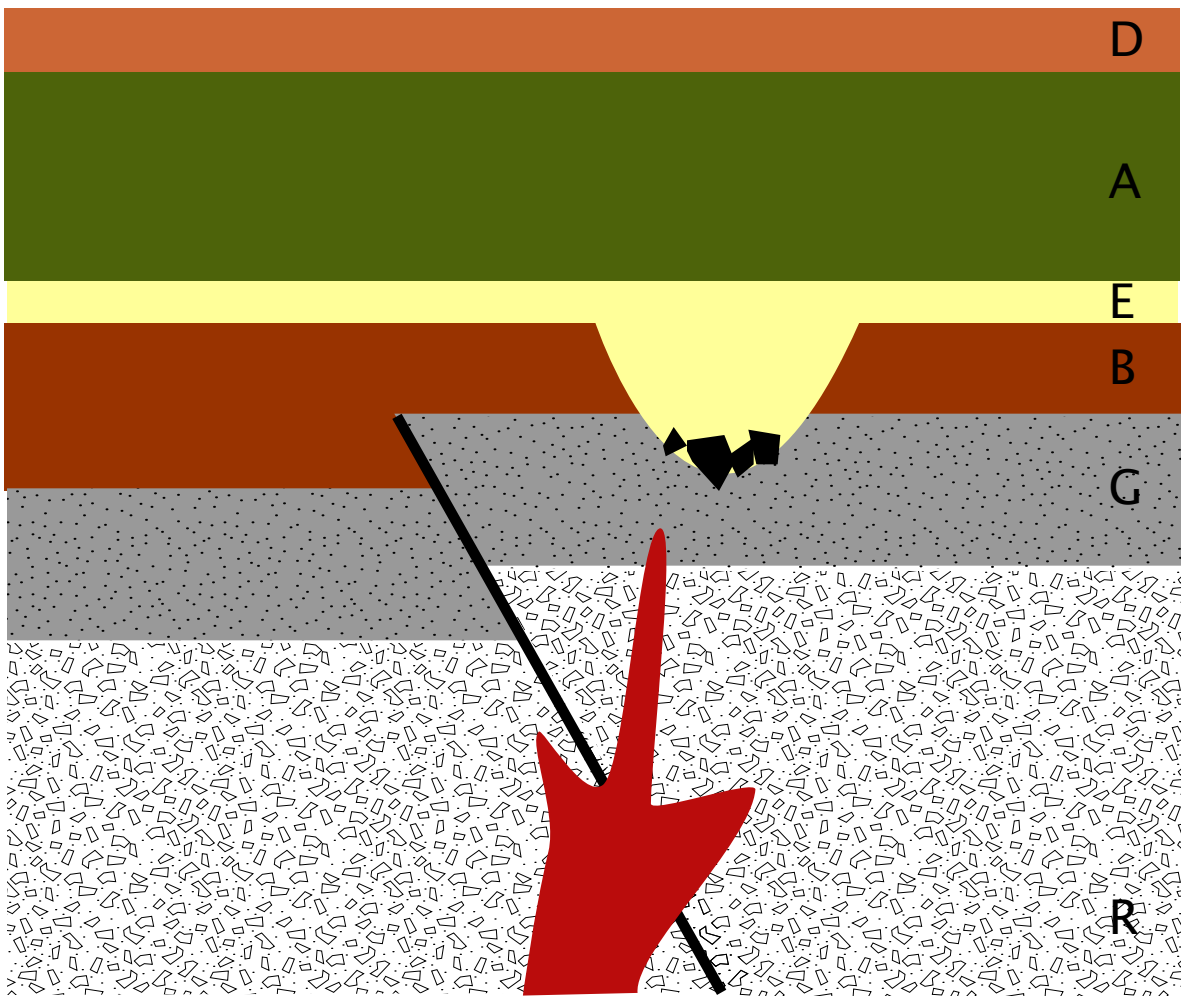
The Handyman rides a bike

The Cook rides a motorcycle

The Maid drives a car

The Nephew has a seeing-eye dog

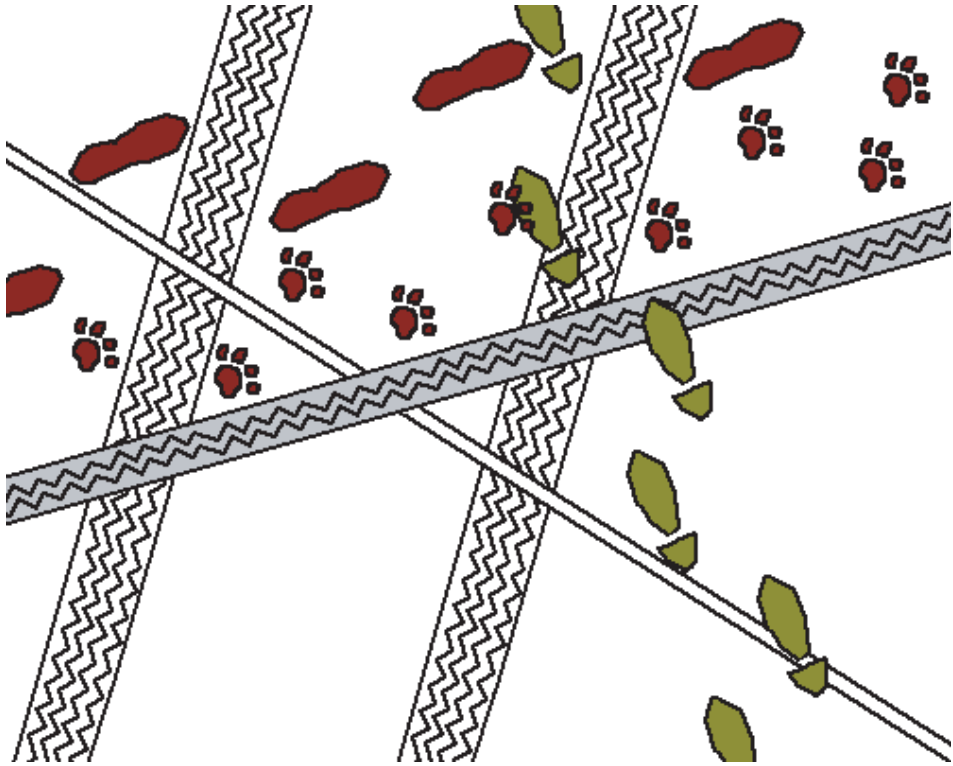
Principle of Superposition



Number the events below in the order they occurred in time, 1-9.

- _____ earthquake
- _____ deposit D
- _____ deposit B
- _____ deposit G
- _____ intrusive lava
- _____ rocky deposit R
- _____ river cuts through
- _____ deposit E
- _____ deposit A

Who Dunit?



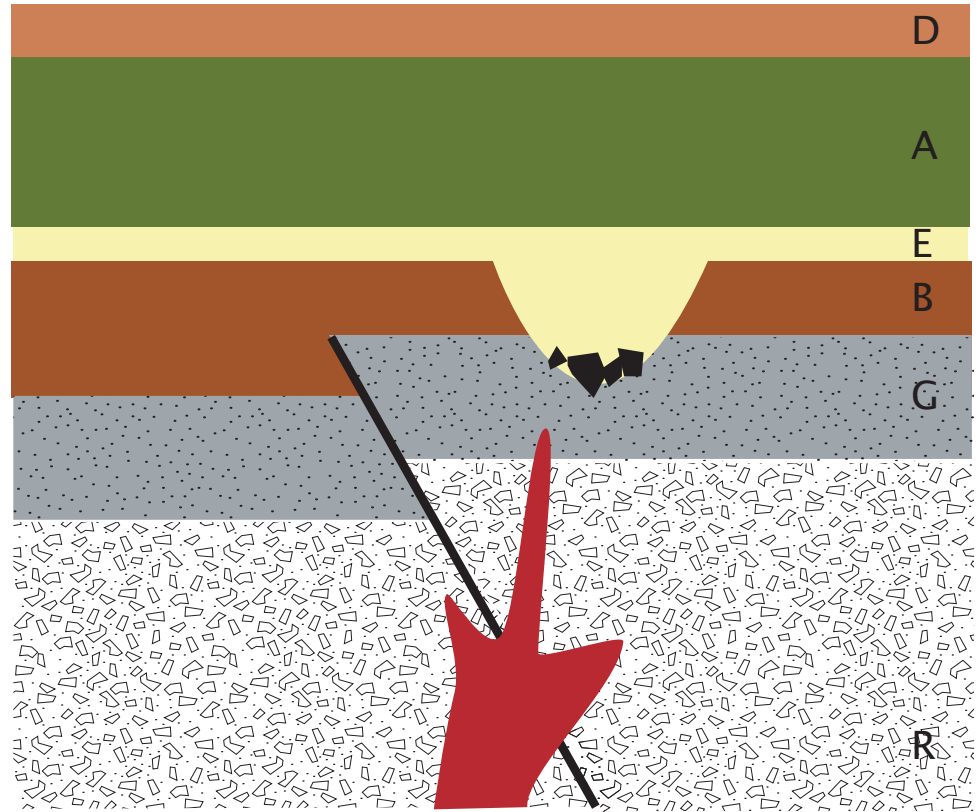
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Someone took the last cookie in the cookie jar last night.
The last person to leave the scene is the culprit. Who was it?

Clues:

- 4 The Butler walks to work
- 2 The Handyman rides a bike
- 3 The Cook rides a motorcycle
- 1 The Maid drives a car
- 5 The Nephew has a seeing-eye dog

Principle of Superposition



Number the events below in the order they occurred in time, 1–9.

- 3 earthquake
- 8 deposit D
- 4 deposit B
- 2 deposit G
- intrusive lava – anytime after the earthquake #3
- 1 rocky deposit R
- 5 river cuts through
- 6 deposit E
- 7 deposit A

Answer Key