

Folding and Faulting

Background

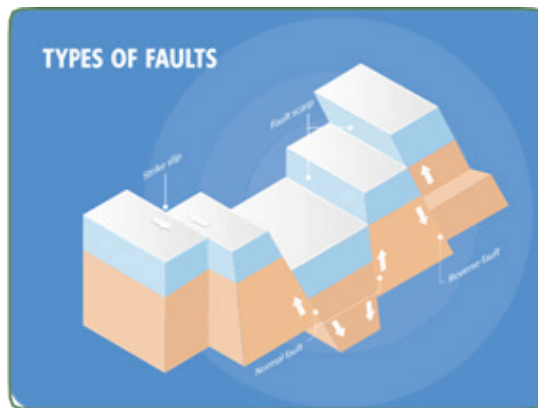
A fold is a bend in rock that occurs as a result of compressional or squishing forces. Folds are most visible in layered rocks. An anticline is an arch-shaped fold. A syncline is a bowl-shaped downfold. A fault forms in rocks when stresses overcome the internal strength of the rock, resulting in a fracture. A normal fault is a fault where the hanging wall moves downward, relative to the footwall.

A reverse fault is a fault along which the hanging wall has been raised relative to the footwall. A strike-slip fault is where blocks of rock slip sideways past each other. A hanging wall is the overlying side of a fault and the footwall is the mass or rock beneath a fault. Folding and faulting provide evidence for plate tectonics, the theory that the Earth's crust and upper mantle are made of more than a dozen major and minor plates that move relative to one another. (Reference: The Dictionary of Earth, Dorling Kindersley, 1994, p. 191)



Purpose:

To understand the processes of folding and faulting on the Earth.



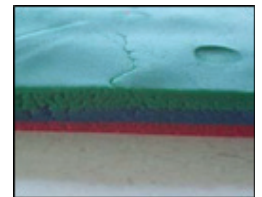
Materials:

- 3 – 6 different colours of Play-Doh®
- Coloured pencils similar to the colours of the Play-Doh®
- A cutting device to trim your Play-Doh® block (an icing spatula, fishing line, a ruler)
- A few Popsicle® sticks

Directions:

Play-Doh® Folds

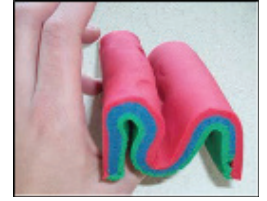
1. Show the pictures of the folds and faults to your family and discuss their definitions.
2. Create a series of similarly sized, flattened pancakes, one for each colour of Play-Doh® (each about 15 cm in diameter and one cm thick). The greater the diameter, the thinner the layers and the more easily the model can be folded.
3. Stack the different coloured layers on top of each other, in any order, to make a block model.



Block Model



4. Use coloured pencils that closely match the colours of your Play-Doh® layers to sketch the side view of your model in the Chart below (Diagram A).
5. To simulate compression (squeezing), place your hands, one on either end of the Play-Doh® block. Gently push your hands together, so that you squeeze the block along its longer axis. This causes the Play-Doh® block to fold and buckle.
6. Try to create at least one upward fold (anticline) and one downward fold (syncline).
7. Use coloured pencils that closely match your Play-Doh®, to sketch the side view of your folded model in the space labelled (Diagram B).
8. To simulate surface erosion, use your cutting device and remove a layer from the top of your folded model.
9. Use coloured pencils that closely match the Play-Doh®, to sketch the side view of your folded and eroded model in the space labelled (Diagram C).
10. Ask your family what they think your model demonstrates. When an Earth scientist sees repeating bands of sedimentary layers, like the ones in your model, they understand that they have found eroded folds.

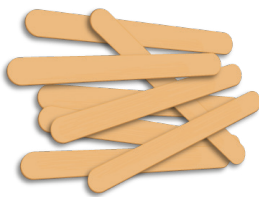


Two anticlines and a syncline

Diagram A	Diagram B	Diagram C	Diagram D
Normal Fault	Reverse Fault	Strike-Slip Fault	

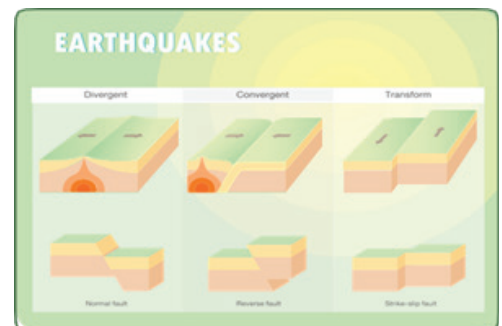
Popsicle® Stick Faults

Place a Popsicle® stick between your hands. Carefully bend it. What happens? Instead of folding, the Popsicle® stick breaks. That's because it is brittle. This is how faults are produced in rocks.



Play-Doh® Faults

Cut your Play-Doh® block model in a vertical direction – add a little bit of an angle if you like. Use this new model to demonstrate a 1) normal fault, a 2) reverse fault, and 3) a strike-slip fault. Use coloured pencils that closely match your Play-Doh®, sketch the side view of this model in the space labelled (Diagram D).



If you are interested in learning more about Earth science and volcanoes visit the Mining Matters website to download [Core Concepts – Structure of the Earth](#) or the Bozeman Science YouTube Channel and watch the [Geology Video](#)