

Asperities on a Strike-Slip Fault (Spaghetti in a Vise)

There are many asperities, or rough stuck areas, along the interface of the adjacent walls of a fault. When one asperity slips, there is an added load on the adjoining asperities. In a large earthquake there is a cascading effect as each zone that slips loads the next zone, which then slips, and so forth. This demonstration shows how asperities (stuck patches) on a fault rupture at different times.

Learning Objective:

- Students will be able to explain how asperities along a fault can create foreshocks, the mainshock, and aftershocks.

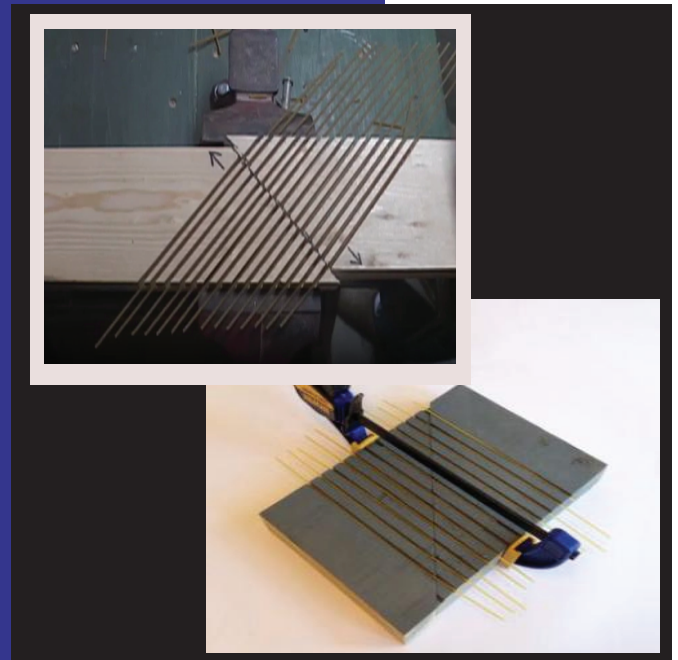
Steps

Step 1: **Ask the question:** “Do faults break all at once, or in segments?”

Step 2: **Demonstrate:** Compress uncooked spaghetti in the asperities template slowly and show how breaks occur at different points (a model for multiple asperities).

Step 3: **Connect:** Discuss forces, friction (static vs sliding), and energy transformation. “When one asperity fails, stress can transfer—potentially triggering nearby failure. -- Why?”

Step 4: **Synthesize:** “How does this help explain what happens in a real earthquake?”



- Have students narrate the process using cause/effect language: “When ___ happens, then ___.”
- Try using different thicknesses of spaghetti for a variable.
- NGSS: MS-ESS2-2, MS-PS2-2, Developing and Using Models, Stability and Change



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