



STEM clubs

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SOAPY STRESS

Focus: Engineering

Geotechnical engineers study the properties of earth materials. Their understanding of how rock behaves under stress is important for safety in our modern world. Engineers investigate rock and soil to determine its characteristics, and then design foundations for human-made structures, such as bridges or stadiums.



For students to experience three types of material stress related to rocks by breaking bars of soap using only their hands



Equipment:

- Several bars of cheap soap

Instructions:

1. Explain 3 types of stress that affect rock:
Tensional stress: Rocks are pulled apart and become longer, or separate.
Compressional stress: Rocks are pressed together and become shorter.
Shear stress: Rocks are pulled one way on one side, and the opposite way on the other side, making them slip past each other.
2. Split students into groups of 3. Give each group one bar of soap.
3. One person in each group should demonstrate 'tensional stress' by pulling (not twisting or bending) the bar of soap apart with their hands. Two students may need to pull against each other!
4. The second person in each group should demonstrate 'compressional stress' by pressing or squeezing one of the smaller pieces of left-over soap.
5. The third person in each group should demonstrate 'shear stress' by pushing a piece of the soap one way with their left hand and the other way with their right hand.
6. Groups could explore how sedimentary rocks are formed, by smashing some of the remaining small flakes of their soap together to make a bigger piece of soap.
7. Groups could illustrate the effects of weathering on rock by holding a sharp corner of their soap under running water.

Discuss:

1. How would some of these stresses occur on a bigger scale in the natural world?
2. Why do geotechnical engineers need to understand stress in rocks?

Useful Links:

Teach Engineering website – provides a full outline of this activity plus supporting resources:

http://www.teachengineering.org/view_activity.php?url=collection/cub/_activities/cub_rock/cub_rock_lesson01_activity1.xml



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