



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Kyle D. Lowery	Project Number J0908
Project Title Does Fracking Cause Earthquakes?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to build a device that models earthquakes caused by fault slippage and determine the effect of fracking on the number and magnitude of earthquakes.</p> <p>Methods/Materials A brick covered with sandpaper was pulled across a rough surface by an attached elastic cord. The distance the brick moved was measured with a ruler, the force required to move the brick was measured with a force gauge and the maximum volts of the seismograph was recorded with a geophone. To replicate natural conditions, these measurements were made with direct contact between the brick and the rough surface. To mimic the effect of fracking, the measurements were repeated with Nordic Ice, Salty water and Soapy water placed between the brick and the rough surface.</p> <p>Results When the Nordic Ice was tested, the force required to move the bricks a similar distance to the Control decreased by 53%. In contrast, when the Saltwater and the Soapy water was tested, the force required to move the bricks was similar to the Control but the distance the bricks moved increased by at least 63%. In all cases, the average maximum volts observed in the seismographs decreased by at least 50% relative to the Control.</p> <p>Conclusions/Discussion My hypothesis was correct in stating that chemicals introduced into the ground by fracking will cause the frequency of earthquakes to increase since the friction between rock layers will be decreased. The experiments showed that the friction was decreased since either the force required to move the bricks decreased relative to the control or the bricks moved further with the same force relative to the control. In addition, the experiments showed that the damage from the earthquakes would be decreased since the magnitude of the quake was reduced significantly. Overall the experiments could discern a difference between the control condition (no solutions) which mimics the stress a fault is normally under and the three conditions that used a lubricating solution that would decrease the friction between the rock layers along a fault.</p>	
Summary Statement I tested the impact of fracking on earthquakes and showed that the frequency of earthquakes would increase but their magnitude would decrease.	
Help Received I built and performed the experiments myself. My parents taught me how to use the geophone.	