



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Andrew J. Chaffee	Project Number J0309
Project Title Energy of a Rubber Band	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project analyzed how temperature affects the distance a rubber band travels as a projectile as well as verifying its potential energy by finding the spring constant utilizing Hooke's Law. My project's hypothesis is that the cooler the rubber band, the more it will retain energy due to its molecules being more relaxed and distributed and will have greater resistance to force, therefore, travel farther.</p> <p>Methods/Materials The rubber bands were subject to three distinct temperatures:-20F, room temperature and 220F. There was 30 projectile launches for each of the three temperature conditions. Potential energy was determined by measuring the displacement of the rubber band against force, then calculating the spring constant. With the spring constant (k) and (x)-the distance the band was stretched, potential energy can be measured.</p> <p>Results The data and results supported my hypothesis. The cooler the rubber band, the farther it flew and its spring constant was greater. The variance of length traveled and displacement was much closer between room temp and heated bands than room temp and cooled rubber bands. I believe this showed the significant energy stored in the cooler bands and that the molecules were more widely distributed to create a better allocation of energy for a longer trajectory of the rubber band in flight.</p> <p>Conclusions/Discussion Most surprising observation was the how the surface of the rubber band literally absorbed the temperature changes until the band was stretched for release. It would be interesting to analyze whether products with rubber should be manufactured at cooler temperatures to make them more resistance to breakage. If i were to extend this project, i would test varying sizes of rubber bands to observe whether there is a correlation between size and potential energy.</p>	
Summary Statement How does temperature affect the flight of a rubber band and its potential energy	
Help Received Parents assisted with design of the board and calculating the slope constant using Excel	