**Sample Abstract Reports**

**[ACID RAIN ON GERMINATING GRAIN](https://apps2.societyforscience.org/abstracts/project.cfm?PID=PS310&Year=2012)**

Farmers depend on rain for the growth of their crops. If the rain the crops are receiving is too acidic, the crops may suffer. When pollutants in the air mix with the water in the atmosphere and come down as precipitation, acid rain occurs. One major air pollutant is sulfur dioxide, which is emitted by industrial processes. Acid rain can negatively affect the environment. The growth of plants can be stifled, for example, which is a problem for farmers. Acid rain was simulated with sulfuric acid to determine the effects of acid rain on germinating wheat. Seeds were soaked in solutions made to pH levels of 3.0, 4.3, 5.0, and 6.5 (6.5 was used as the control). Then, the wheat seeds were allowed to germinate for six days. The percent of seeds germinated for the different pH solutions they were soaked in was as follows: 10.75% for 3.0 pH, 12.25% for 4.3 pH, 22.00% for 5.0 pH, and 10.00% for 6.5 pH. After a 95% confidence two-sample t-test was conducted on the results of the germinated seeds, it was concluded that the pH 5.0 seeds had a significantly higher germination percentage compared to the rest of the pH seeds tested. The results did not support the hypothesis because although lower pH levels hindered the germination of the wheat, so did the 6.5 pH. The seeds soaked in the 5.0 pH solution germinated at a significantly higher percentage.

[**LIAR LIAR FACE ON FIRE: THE EFFECTS OF NOT TELLING THE TRUTH ON NUCHAL TEMPERATURE**](https://apps2.societyforscience.org/abstracts/project.cfm?PID=BE311&Year=2012)

Lie detection, a controversial practice in the scientific community, has been dominated by use of the polygraph. Thermal imaging technology, a non-invasive method, has been the subject of recent studies worldwide in detecting dishonesty. Recent data shows that thermal imagers can surpass a polygraph in lie detection. This project’s purpose was to determine whether variations in nuchal temperature could be used as a predictor of lying. The experimenters developed ten questions, selected ten subjects, and constructed lie cards. Each subject entered the controlled testing room and received a randomly selected card. Using a thermal imager, the subjects’ nuchal temperatures were recorded before, during, and after responding to each question in the three trials. Data showed a slight rise in nuchal temperatures over seventy percent of the time as the subjects answered the untruthful questions. Conversely, nuchal temperatures remained constant through eighty percent of the truthfully answered questions. A bell-shaped curve was created to support data reliability, and 83.3% of the temperature values fell within one standard deviation of the mean. In conclusion, the hypothesis that nuchal temperature would be affected by lying was supported. To extend the project, additional readings in the facial area would be obtained, and a larger sample size would be tested; thus, a greater understanding and conclusion to the effect of lying on body temperature as a whole could be achieved. Furthermore, with its sustained reliability in detecting lies and non-invasive process, thermal imaging devices are more practical than polygraphs and have a desired capability for use in highly crowded areas such as airports.

[**AMATEUR LASER PHYSICS: ENGINEERING AFFORDABLE GAS LASERS TO DISCOVER WHAT AFFECTS OUTPUT POWER**](https://apps2.societyforscience.org/abstracts/project.cfm?PID=PH060&Year=2012)

This Project resulted from an observation that gas lasers are extremely expensive. The primary goals of this project were to design an affordable, useful gas laser and use it to find out what affects output power as well as the advantage of gas lasers that makes them marketable despite their cost. It was known from research that the resonator gas was the most significant factor to output power, but beyond this my hypothesis was that length of the laser and input power were the biggest factors to output power. The first half of this project was designing the lasers of two different lengths with a variable input power. Once the lasers were working a solar cell was used to measure the output power and the results were compared to test my hypothesis. The results showed that length and input power affected output power the most. The engineering goals were met and the hypothesis was proven correct. It was learned that the reason gas lasers are marketable with other laser types is that their output characteristics make them suited for some applications where no other laser can substitute. The benefits of this project are two: first, the information learned from this project could be used as a base for further research and second, the lasers built are very practical. The lasers are useful as pump lights, micro-cutting, micro-engraving, further research, detecting improvised explosives, or any other application that requires short, intense pulses in the ultraviolet.