# CALIFORNIA STATE SCIENCE FAIR
# 2013 PROJECT SUMMARY

**Name(s)**

Hayato S. Kato

**Project Number**

**J0911**

**Project Title**

## The Relationships Between Gauss Levels and the Weight Held by an Electromagnet

**Abstract**

**Objectives/Goals**

My project's objective was to determine the relationships between the gauss levels, the unit for magnetic flux density, and the weight an electromagnet is capable of pulling: whether these two types of units are the same measurements which can be used to find the other.

**Methods/Materials**

I conducted experiments by comparing the levels of gauss units using a hall sensor and digitally displaying the weight by attracting a metal plate which is connected to a sensitive digital load cell. Then, the electromagnet will be pulled down until the plate releases, and I will record the highest weight recorded. I compared the unit's graphs with both their slope of the graph and the efficiency per gram in order to determine whether gauss units and weight pulled are same measurements.

**Results**

Each different variable that was tested showed different relationships between the gauss levels and the weight pulled. When the gauss units increase as the weight increases for one electromagnet, it didn't mean that the others also had the same relationships.

**Conclusions/Discussion**

My conclusion is that the relationship between gauss levels and weight capable of being pulled can be altered by the different variables such as different length coils, different thicknesses of the core, and different numbers of layers wrapped. Since there are no set relation with gauss units and weight being pulled, I conclude that these two units represent different types of measurements which can not be used to find the other.

**Summary Statement**

My project is about finding out whether gauss units and the weight that an electromagnet can pull are the same or different measurements.

**Help Received**

Father helped cut iron core and lend me tools for experiments; Mother helped assemble and print the binder