# CALIFORNIA STATE SCIENCE FAIR
## 2007 PROJECT SUMMARY

**Name(s)**
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**Project Number**
**J0813**

**Project Title**
## Suspension via Electromagnetism

**Abstract**

**Objectives/Goals**
Like a metal snake entwining itself around its helpless victim, the coils of an electromagnet engulf its metal core. Suspension via Electromagnetism deals with a wide variety of electromagnetic variables; however, its main purpose is to illustrate the best way to build the strongest, most efficient electromagnet.

**Methods/Materials**
The research necessary for conducting and understanding the many experiments involved branched in several directions. From voltage, current, and wire gage, to the electromagnetic force, even to gravity, Suspension via Electromagnetism required much research. Testing an electromagnet#s strength when influenced by the independent variables, which include wire gauge, core size, core shape, battery type, and the amount of batteries, produced an ample amount of data that shows what materials are ideal to use while building a strong electromagnet.

**Results**
The results revealed several key factors that greatly affect the strength of an electromagnet. Essentially, an efficient wire gage should have an approximate 1:8 ratio to the diameter of the core; also, the amount of batteries used had a significantly greater affect as compared to the batteries# voltage on the electromagnet#s field strength. Also, a horseshoe shaped magnet had more lifting potential, likely because the poles were focused on a particular spot. To conclude, the larger the gage and core are, the greater the magnet#s field (obviously).

**Conclusions/Discussion**
T o conclude, an ideal electromagnet should have a few things. First, the core should be a horseshoe shaped, and roughly the same size as the item that is desired to be lifted. The wire used should be about one eighth as thick as the core, should have as thin coating as possible, and should be neatly rapped. Finally, a large amount of 9 volt batteries (or even car batteries if the magnet#s build desire#s so) should be connect to the wire that is coiled around the core.

**Summary Statement**
"Suspension Via Electromagnetism" focuses on testing several variables that affect an electromagnet's strength, and it also tests the degree of influence each particular variable holds.

**Help Received**
none whatsoever (with the exception of purchasing materials)