



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Helen C. Jackson	Project Number S0310
Project Title The Backpack Pack: A Study of the Weight of Students Compared to the Weight of Their Backpacks	
Objectives/Goals Each year millions of students walk around school carrying backpacks full of textbooks. This weight on their backs can cause acute and chronic aches and pains, which can eventually trigger serious back problems. This project is to determine what percentage of students from grades 3-12 carry backpacks that are too heavy for their body weight, according to the doctor recommended weight of 10-15% of their body mass. Is there a relationship between the gender and age of students compared to their backpack weight? Have students with heavy backpacks experienced back pain? Does the style of backpack, length of strap, or mode of transport to school affect the students back problems?	
Abstract Methods/Materials 213 students from grades 3-12 were tested. Students and their backpacks from local elementary, middle, and high school were weighed using scales. The gender, age, style of backpack, transportation to school, and previous back problems were recorded, along with the straps on their backpack being measured. The testing took place at different times of day on students from various classes over a period of 3 weeks	
Results The data show that there were more students in grades 6-9 whose backpack weight was over 10-15% of their body weight than in elementary and high school. The percentage tended to be low in grades 3-5, increasing in grades 6-9, and then decreasing again when students reached the 10th grade. There did not appear to be any correlation between the heaviness of female verses male backpacks, with the average female backpack percentage being 9.9% of their body weight and males being just a little less at 9.4%. No obvious relationship was noticeable between the mode of transport taken to school or length of backpack straps verses back pain problems experienced by students.	
Conclusions/Discussion The data did not entirely support what was originally predicted. From the 213 students tested, the overall average backpack verses body weight percentage did not exceed the doctor recommended weight. There were many students with heavy backpacks, but because of their individual body weight the ratio of backpack to body weight was not very high. Although there was no apparent correlation between backpack weight/strap length/mode of transport and previous back pain problems at school level, scientific testing and research has revealed that the pressure students put on their backs now may have serious effects in the future	
Summary Statement Comparing students backpack weight verses their body weight.	
Help Received None	