



CALIFORNIA STATE SCIENCE FAIR 2008 PROJECT SUMMARY

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| Name(s) Hunter A. Young | Project Number J1940 |
| Project Title My Achy Breaky Back: A Better Backpack Design | |
| Abstract Objectives/Goals My objective was to determine what causes back pain when wearing a backpack and to improve the design of backpacks to decrease pain and increase comfort. Methods/Materials Three designs of backpacks were purchased. Participants were weighed and given a calculated load to simulate weight in their backpack. Each design was worn by a test subject for approximately 2 minutes to simulate walking between classes. The participant rated each backpack on a scale of 1 to 10 and shaded areas that were uncomfortable. Each backpack style's rating was totaled giving a ranking for each backpack. The lower number indicated a more comfortable fit and a higher number was less comfortable. The materials used are listed below. Evaluation forms, shoulder strap backpack (green backpack), shoulder and waist strap backpack (blue backpack), front and back backpack (red backpack), scale, calculator, books for using as load, pencils, and clipboards. Results The majority of subjects (60%) preferred the Front and Back Backpack. The second favored (23%) was the Shoulder Strap Backpack and last was Shoulder and Waist Strap Backpack (17%). Conclusions/Discussion The majority of subjects preferred the Front and Back Backpack. Even though they thought this was the most comfortable, some found the design strange commenting; it feels funny, I feel like I'm pregnant, and who would wear this kind of backpack. This new design seems to be the most comfortable style allowing the weight or load to be more evenly distributed between the front and the back. The problem with the back loaded style of backpacks is that the weight is all on the back. This can make the wearer lean too far forward or backward and puts their spine out of balance which causes pain on the lower back. Putting the weight on the front and the back keeps the spine in a more aligned position over the hips creating a straight line from the head to the bottom of the spine. The other styles of backpacks were preferred by some people but this may have been because they are more used to these styles. Overall, the Front and Back Backpack is a better design for balancing load on the structure of the spine. | |
| Summary Statement This project was conducted to find causes of backpack pain and design a backpack which alleviates or decreases the pain or discomfort. | |
| Help Received My chiropractor, Dr. Claudette Satnick-Nasoor, educated me on the importance of structural balance and weight distribution over the back. My dad and mom hauled materials needed for testing to many places. My mom helped type and proof my paper. My sister obtained some of the participants for testing. | |