Name(s)	Project Number
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Project Title

Killer Backpacks on the Loose

Abstract

Objectives/Goals
The objective of this experiment was to determine if a middle school student#s percentage of backpack weight affects their angle of posture. My hypothesis was that if a person#s percentage of backpack weight is over 10% of their body weight, then the average difference will be greater because the weight of the backpack will be on the person#s shoulder and back, which will cause them to be off balance, so they lean forward to center the weight, while if the percentage of backpack weight is 10% or less, then the average difference will be less and the person will stand straighter, since the weight in already centered.

Methods/Materials
A subject#s and their backpack#s weight were found. Then, the percentage of backpack weight was found. A picture of the individual was taken with and without their backpack on, standing sideways. Based on the pictures, the posture was analyzed by placing dots at the ear and shoulder and connecting them and going straight up from the shoulder. After the angles were formed for both pictures, they were measured using a protractor. The final angle of the subject with their backpack on was subtracted from the initial angle of the subject without their backpack on for both pictures. Data was then analyzed and grouped based on percentage of backpack weight.

Results
On average, the average differences in each category were 4.5°, 3.5°, 4°, 19°, and 7°. In the 1-10% category (first category), the average difference was greater than the difference in the next two categories. Also, in the 25.1-30% category (last category), the average difference was less than the previous category. However, the majority of the results depicted that the average difference in the arch of the back increased as the percentage of backpack weight increased.

Conclusions/Discussion
My hypothesis that the if the percentage of backpack weight is over 10%, the average difference will be greater, and if the percentage of backpack weight is less than 10%, the average difference will be less was supported by the resulting data. As the percentage of backpack weight increased, the average difference in the arch of the back increased. Therefore, students should decrease the amount of items they have in their backpacks and use only what is necessary.

Summary Statement

The greater the percentage of backpack weight, the greater the average difference in the arch of the back, so students should take unnecessary items out of their backpacks.

Help Received

Mother helped glue papers on my board and took me to places to get supplies; Science teacher helped correct work and answer questions; language teacher helped correct work; librarians at the Corona Public Library helped find books.