CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J0122

Project Title
Oh Chute! Does Parachute Internal Volume Affect Rate of Fall, Assuming Constant Leading Surface Area?

Abstract

Objectives/Goals
This experiment tested the hypothesis:
If rigid pyramidal parachutes of different volumes, but with identical cross-sectional areas of their openings, are dropped from a given height, then
the larger the internal volume of the parachute, the slower it will fall.

Methods/Materials
I constructed six rigid pyramidal parachutes from poster board.
Each parachute had the same square opening of 10cm x 10cm, but they differed in the height of the apex, therefore their volumes differed.
Each parachute was dropped five times from the same test height. Discarding the highest and lowest times, the average time for each was calculated. The results were graphed as "drop time vs. parachute volume".

Results
All the parachutes had the same drop times. The internal volume had no effect.
However, from my observations during the experiment, I saw that the size (therefore volume) of the parachute does affect its stability - the smaller ones were more likely to spin and topple.
I also built an extra parachute with a 15cm x 15cm opening - this fell significantly slower than the 10cm x 10cm parachutes.

Conclusions/Discussion
With parachutes having the same cross-sectional area of their open side (the "lead side" as they fall); varying the internal volume has no effect on the drop time of the parachutes.
However, from my observations during the experiment, I saw that the size of the parachute does affect its stability - the smaller ones were more likely to spin and topple. This was due to turbulence as air 'spilled' around the edges.
The parachute with a 15cm x 15cm opening fell significantly slower than the 10cm x 10cm parachutes. This indicates that the cross-sectional area is a main factor in the descent speed of a parachute, rather than the volume.
In the future I would like to investigate the effect of different openings (area and shape), materials, and parachute shapes.

Summary Statement
This project investigates how parachute internal volume affects rate of fall - assuming a constant cross-sectional area of the opening.

Help Received
Minimal help - father dropped parachutes while I did the timing.