

NAME: \_\_\_\_\_

## Parachute Design

Drawing of Your Parachute:

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Trial #1	
Time to Descend:	Description of Descent:
Trial #2	
Time to Descend:	Description of Descent:

What can you improve? Why will you improve this? How will you improve this?

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MODIFY DESIGN AND TEST AGAIN

Trial #1	
Time to Descend:	Description of Descent:
Trial #2	
Time to Descend:	Description of Descent:

Include a summary of your final design. What are the most important features of your parachute? How did you make it, describe how it flies, what changes/improvements did you make, and also explain the SCIENCE behind why your parachute works.

## DESIGN CHALLENGE – A PARACHUTE

### Introduction

What is the purpose of a parachute? What is the role of a parachute in skydiving?

Imagine you are jumping out of a plane 10,000 feet in the air. What type of material would you want your parachute to be made of and what size would you want it to be?

The design of a parachute is very important, especially in an extreme sport such as skydiving because someone's life is dependent on the parachute functioning correctly. Engineers thoroughly test the materials and designs of parachutes to ensure that they open as intended and reliably, and are strong enough to withstand the air resistance needed to slow skydivers to safe landing speeds.

**The problem:** Your task is to design a parachute that can land a weight most gently.

### Background

A parachute is an umbrella-shaped device of light fabric used especially for making a safe jump from aircraft. Due to the resistance of air, a drag force acts on a falling body (parachute) to slow down its motion. Without air resistance, or drag, objects would continue to increase speed until they hit the ground. The larger the object, the greater its air resistance. Parachutes use a large canopy to increase air resistance. This gives a slow fall and a soft landing.

#### Recommended resources:

A history of parachutes, plus good pictures: <http://www.parachutehistory.com/>

Explanation of free fall and air resistance with diagrams (Newton's second law): <https://www.physicsclassroom.com/Class/newtlaws/u2l3e.cfm>

Explanation of forces on a falling object with air resistance: <http://www.grc.nasa.gov/WWW/K-12/airplane/falling.html>

### Build Your Design

Try different materials!

- tissue paper
- newspaper
- tape
- napkins
- paper towels
- weights
- construction paper
- string

### Tips

Remember to test one thing at a time. For example, you might want to determine which paper **material** works the best, before testing the parachute **size**.

Try parachutes with and without holes in the top, and different-sized holes.

Make parachutes using different materials, such as plastics, cotton and nylon.

### Discussion

- How does the area of the parachute affects its flight.
- What type of paper is the best material to make a parachute? Why?
- What materials did not work well? Why?
- What changes could you make to improve your design?