Stage 4 STEM – Olympiad

## Challenge 4: Paper parachute

In this challenge you are required to convert a paper bag into a parachute with the slowest rate of fall using only the specified materials. This challenge is inspired by aviation parachutes that slow cargo supply drops to prevent damage.

### Outcomes

* **SC4-8WS** selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems

[Science Years 7-10 Syllabus (2018)](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/science/science-7-10-2018) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2018

* **TE4-1DP** designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities

[Technology Mandatory Years 7-8 Syllabus (2017)](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/technologies/technology-mandatory-7-8-new-syllabus) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2017

### Resources required

* A sandwich sizes paper bag
* String
* A mass that can be tied to string, like a metal washer
* A device for timing the fall
* A ruler

### Directions to students

1. Complete the glossary definitions task to help with your understanding.
2. Construct a parachute using the paper bag as a canopy, string as the suspension lines and mass as the cargo.
3. Test the parachute by dropping it from your outstretched arm as high as you can reach. Adjust the design until the parachutes arrests the falls as much as possible.
4. Use the ruler to measure 1.5m from the ground. Practise dropping your cargo from 1.5m high. Time how long it takes for fall 1.5m. Repeat the drop test ten times. Calculate the average fall time by adding the ten results and divide by ten.
5. Capture evidence of the design either a digital photo or pencil sketch.
6. Record the average fall time.
7. Complete the recount and learning reflection activity.
8. Submit evidence of completion to your teacher for feedback.

### Success criteria

A student is successful if their parachute and cargo survives ten falls and calculates an average result.

### Glossary

To assist with your understanding of the task, define the following terms in the table below.

|  |  |
| --- | --- |
| Term | Definition |
| Parachute |  |
| Canopy |  |
| Suspension |  |
| Average |  |
| Arrest |  |

### Evidence of completion

In the space provided below, provide evidence of your completed parachute. This could be a digital photograph or a pencil sketch.

|  |
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Record the average cargo fall time from 1.5m:

|  |
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### Procedure recount

In the space provided below, provide a procedure recount of how you made your parachute. Remember to include the correct names of materials, equipment and techniques used. Seek advice from your teacher if you need help.

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### Challenge reflection

Consider the process of designing, making and testing your parachute (the design process). What worked well for you? What did you have difficulty with? What would you differently next time? Are there other materials you could have used and why?

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