

## PHYSICS

### RANGER DANGER DAN THE PARACHUTE MAN

#### Brief summary of activity:

In this puzzle the user has to successfully land a parachutist onto a target area. The user controls the size of the parachute and the size of the hole in the centre of the parachute. In doing so the user needs to take account of factors such as wind speed and landing surface, and they must apply their knowledge of 'terminal velocity'.

#### Specific Curriculum Area:

**Year 9** — Unit 9K: Speeding up, Section 9: How do parachutes work?

#### Assessment method:

After completing this puzzle, the pupil could write an explanation about what they have discovered. This could take the form of a lab report' and the pupil could make hypotheses based upon their findings.

#### Differentiation:

Various levels within the task make the task progressively more complex. After completing a level, whether successful or not, pupils have a more difficult problem to solve involving more factors such as wind speed and landing surface.

#### Learning objectives:

Children should learn: that when the upward force of air resistance balances the downward force of weight, the speed remains constant; to interpret distance-time graphs and relate them to the situation from which data was obtained; to translate data presented in one form into another

#### Use of Activity in a lesson:

This task could be set as a homework activity, assuming Internet access is possible. Alternatively, the teacher could demonstrate the task to the class (via an Interactive Whiteboard) and the pupils could then repeat the first level as shown by the teacher, thereafter trying levels on their own.

#### Hints and tips for teachers:

1. Tell pupils not to get frustrated if they do not succeed until having had many attempts—encourage trial and error.
2. If pupils are having problems tell them to vary only ONE of the parachute variables in order to see what difference that makes before tackling BOTH variables.
3. Remember the surface is not always SOFT!

URL:

**Design Your Parachute** Level: 1

You have to land your parachutist on a marsh surface.  
The windspeed is 1 m/s

Canopy Size

Large

Small

The wind speed

Slide this up and down to change the size of the parachute

The current dimensions of the parachute are given here

Canopy Radius: 3.05 m  
Canopy Area: 29.22 m<sup>2</sup>

Next >

< Instructions

The parachute is shown here—gets bigger and smaller as the 'canopy size' is changed

**Design Your Parachute** Level: 1

Windspeed: 1 m/s

Hole Size

Large

Small

Slide this up and down to change the size of the hole in the middle of the parachute

The current dimensions of the hole in the middle of the parachute are given here

Hole Radius: 0.665 m  
Hole Area: 1.39 m<sup>2</sup>  
Total Area: 27.83 m<sup>2</sup>

Test

< Back

The hole appears here depending on the selection made on the 'hole size' slider

**Testing Parachute**

Terminal Velocity: 4.22 m/s

A parachute being tested

Note the GREY, HARD surface

Dark patch indicates target landing area.

**Testing Parachute**

Terminal Velocity: 4.25 m/s

Well done! You have successfully landed in the target zone. You get to play the next level! Click on 'Play Again' to try another one.

Play Again

A successful landing onto a SOFT surface

### Troubleshooting:

If some parachutes do not appear to work successfully, remember that the SURFACE changes too! Not all landings are SOFT.

### Other links:

[http://www.standards.dfes.gov.uk/schemes2/secondary\\_science/sci09k/09kq5](http://www.standards.dfes.gov.uk/schemes2/secondary_science/sci09k/09kq5)