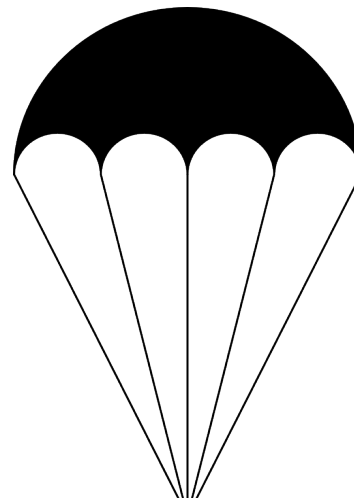


Topic	Gravity, weight and air resistance	Level	GCSE (or any course for students aged 11-16)
Outcomes	<ol style="list-style-type: none">1. To explain why free falling objects hit the ground at the same time2. To calculate the acceleration of a free falling object3. To describe how and why air resistance affects falling objects by drawing free body diagrams		

What I think...



1kg

1kg

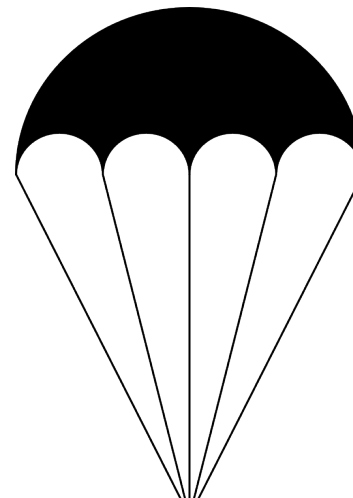
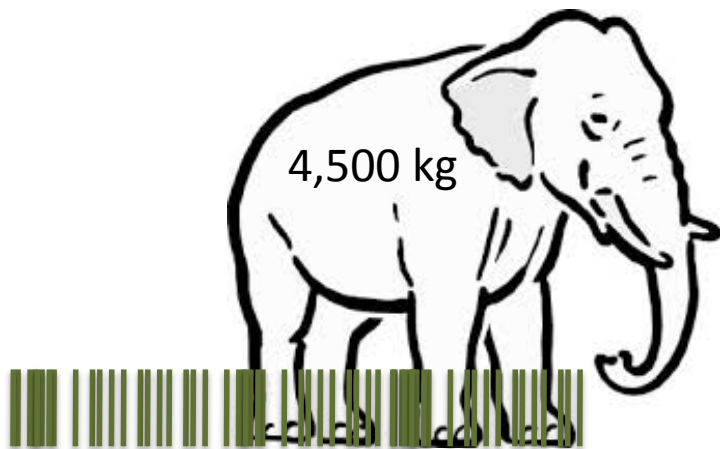
5kg

9kg

The four boxes above are dropped from an aeroplane. At the same time and height, an elephant runs off the cliff.

1. Which box(es) will hit the ground first? Explain.
2. Which box(es) will hit the ground last? Explain.
3. The elephant has a greater air resistance than the parachute. So why does the elephant hit the ground before the black box?

What I now think...



1kg

1kg

5kg

9kg

The gravitational field strength on Earth is 10 N/kg. Using the equation: $\text{acceleration} = F_{\text{net}}/m$ calculate the acceleration due to gravity (g) for each **colored** box. **Now review your answer to question 1.**

As the parachute falls, it collides with air particles creating an upward force called air resistance. What effect will drag have on the acceleration of the black box? Refer to the equation above in your answer. **Now review your answer to question 2.**

Calculate the downward force (weight) for both the elephant and the black box. Assuming both objects experience equal amounts of air resistance, draw free body diagrams of both objects as they fall. **Now review your answer to question 3.**