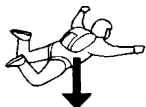


# Air resistance

- If the forces on an object are **balanced**, there is no resultant force. The object stays still, or carries on at a constant velocity.
- If there is a resultant force, then the object will accelerate or decelerate.
- Air resistance (or friction) always opposes movement.

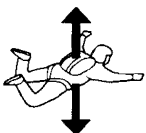
A sky-diver jumps out of a helicopter. He uses air resistance to land safely.

1. Fill in the missing words:



At the start there is only one force on the sky-diver. This is his **w**\_\_\_\_\_.

This unbalanced or **r**\_\_\_\_\_ force makes him **a**\_\_\_\_\_.



As he travels faster, the friction (called **a**\_\_\_\_\_ **r**\_\_\_\_\_ or drag) increases. Eventually the 2 forces are equal and **b**\_\_\_\_\_, with no **r**\_\_\_\_\_ force, so he stops **a**\_\_\_\_\_ and travels at a constant **s**\_\_\_\_\_. This speed is called his **terminal velocity**.



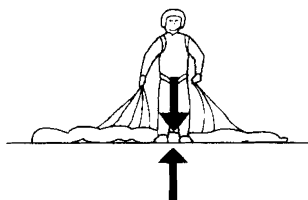
When his parachute opens, the air resistance **i**\_\_\_\_\_. There is now a **r**\_\_\_\_\_ force upwards. This makes him slow down, until . . .

2. The sky-diver weighs 700 N. Label each of the forces in all of the diagrams with one of these labels:  
**700 N**  
**less than 700 N**  
**more than 700 N**



. . . the 2 forces are **e**\_\_\_\_\_ again. Because the 2 forces are **b**\_\_\_\_\_ (with no **r**\_\_\_\_\_ force) he now travels at a constant **s**\_\_\_\_\_. This is his new **t**\_\_\_\_\_ velocity.

3. In your own words, explain carefully what happens when his parachute opens.
4. Explain why a falling raindrop does not go faster and faster.



When he hits the ground, it pushes up to make him **d**\_\_\_\_\_ quickly. When he stands on the ground, the ground **p**\_\_\_\_\_ up on his feet. The upward **f**\_\_\_\_\_ is equal to his **w**\_\_\_\_\_ (so there is no **r**\_\_\_\_\_).