

Balanced and unbalanced

What are balanced forces?

When the forces acting on an object are the same size but in opposite directions we say that they are **balanced**. You can think of balanced forces like two teams in a tug of war. If each team pulls with the same force the rope doesn't move. The forces cancel out. The object is in **equilibrium**. All stationary objects are in equilibrium. There must be a support force acting on them to balance out their weight.

Quick question

State what equilibrium means.

What are unbalanced forces?

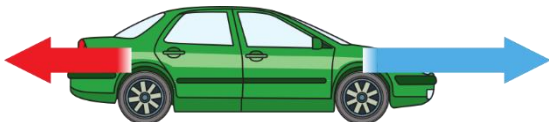
The forces acting on this rocket-powered car are **unbalanced**. They are not the same size so they do not cancel out. The **driving force** from the engine is much, much bigger than the **resistive forces** from air resistance and friction.

Quick question

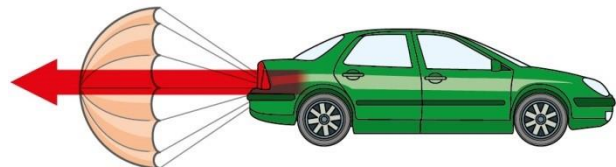
State the difference between balanced forces and unbalanced forces.

How do unbalanced forces change speed and direction?

When the car's rocket-powered engine starts up the driving force will become very big very quickly. When the driver wants to stop he will fire a parachute to slow the car down. In both cases the forces on the car are unbalanced.



The driving force is bigger than the resistive forces acting on the car. The speed of the car increases.



The only forces acting on the car are resistive forces. The speed of the car decreases.

Every time you go around a corner in a car the friction between the tyres and the road changes the direction of the car.