



Rolls-Royce

Force and Air Resistance

For pupils aged 7-11

Teachers' notes



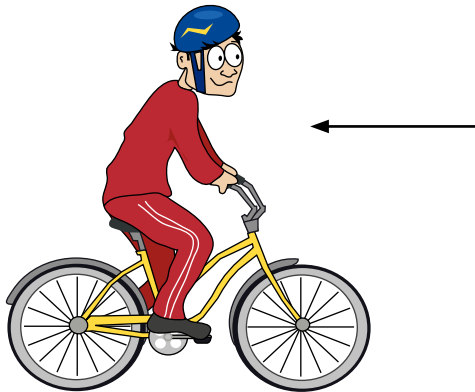
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Forces and Air Resistance

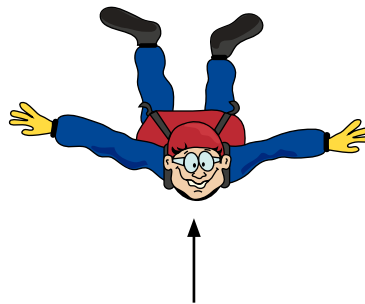
Forces and Air Resistance

For each pair of the following pictures use arrows to show the direction and size of the air resistance. Under each pair write a sentence to say what the air resistance does. Say whether you think the air resistance is useful or is a problem.

Bike with high handle bars



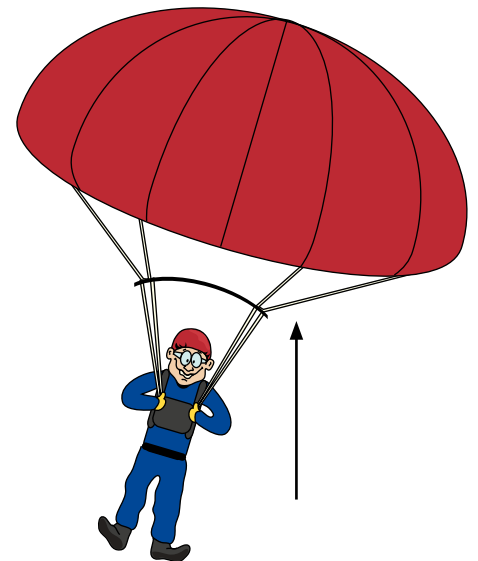
Parachutist. Chute is NOT open



Bike with low handle bars



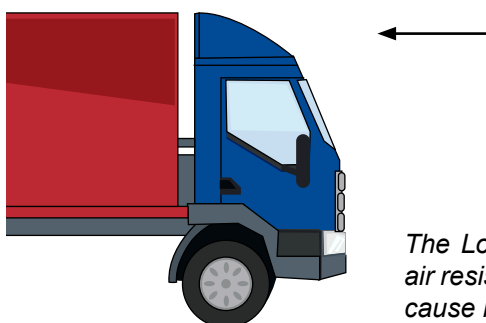
Parachutist after chute opens



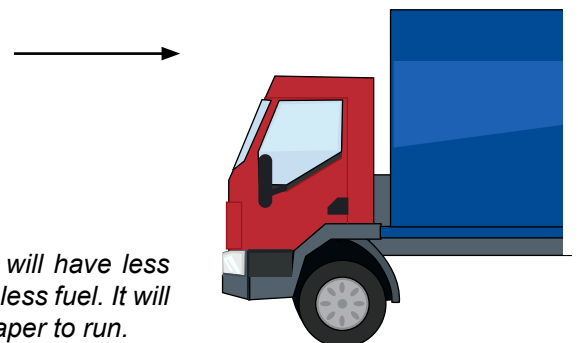
On the bicycle with the high handlebars the person will have more air resistance. This will slow them down and make it more difficult for them to pedal.

When the parachutist opens their parachute the air resistance increases. This slows the parachutist down and lets them land safely.

Lorry with shaped cab



Lorry with square cab



The Lorry with the shaped cab will have less air resistance. This lorry will use less fuel. It will cause less pollution and be cheaper to run.

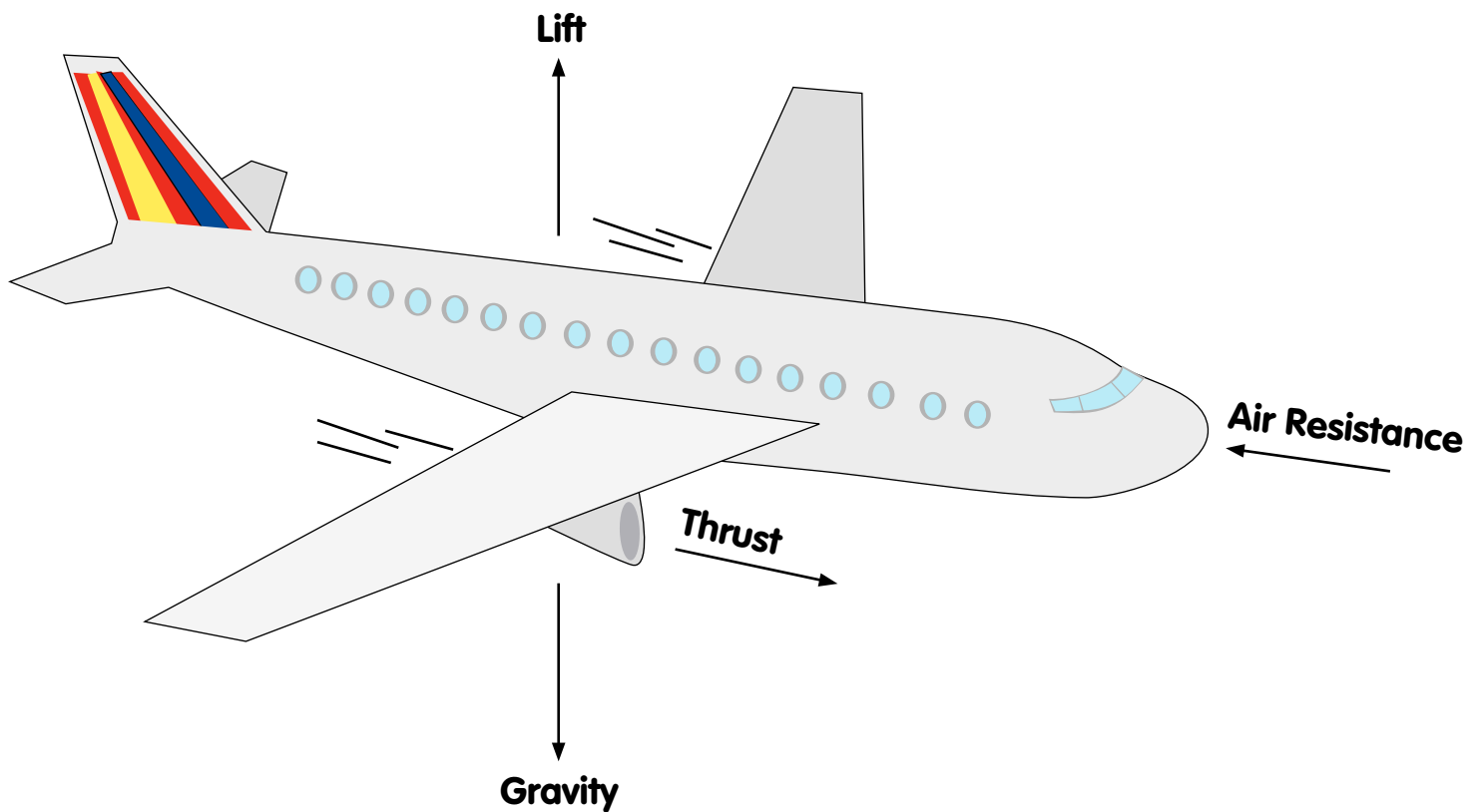
Forces and Air Resistance

Forces and Air Resistance

The picture below shows an aeroplane flying level. The force acting upwards is called lift. This force happens because of the special shape of the aeroplane wings.

On the picture below use arrows to show the direction of three other forces:

- The thrust from the engines
- The air resistance
- The force of gravity.



Forces and Air Resistance

Practical tips

On these activity sheets arrows are used to show both the direction and size of forces. The longer the arrow the bigger the force.

The first sheet illustrates how gravity acts to pull an object, in this case a football, towards the Earth. As the ball accelerates downwards it has to move through the air which resists it with an upward force, air resistance. This is a difficult concept for children to understand, but it is really just a particular example of friction. The ball rubs against the air particles which have to be pushed aside to let the ball pass as it falls.

The next section gives examples of how the shape of an object affects air resistance, the more streamlined the object is the less air resistance it has, the air pushed to one side can flow smoothly over the surface causing less air resistance.

The pupils are then asked, mark in the direction of three other forces acting on an aeroplane. Balanced forces are not a specific teaching point at KS2 but for an aeroplane in level flight the forces of lift and gravity will be balanced and thrust and air resistance will be balanced.

National Curriculum Links

This investigation links to attainment target Sc 4, Physical processes. At KS2:

Pupils should be taught:

Sc4 2b Pupils should be taught that objects are pulled downwards because of the gravitational attraction between them and the Earth.

Sc4 2c Pupils should be taught about friction including air resistance, as a force that slows moving objects and may prevent objects from starting to move.