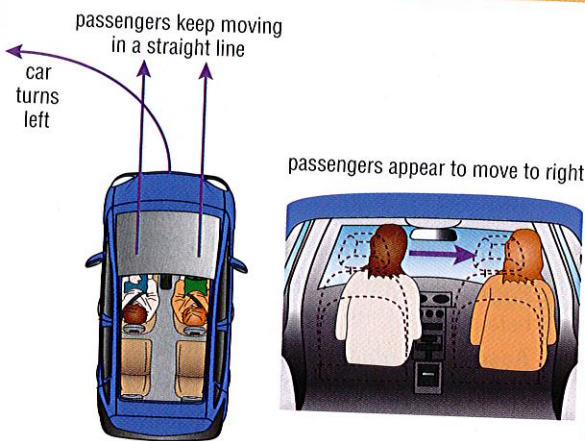


Inertia explains why you sometimes 'feel' lighter or heavier when in a lift as it first moves off or slows to a stop. It also tells why you 'move sideways' when a car corners: you keep trying to travel in a straight line.



We keep travelling in a straight line unless a force changes our direction.

Fig 5.3.4



Worksheet 5.3 All over in 200 milliseconds!

Science Focus

Inflatable seatbelts

Most modern cars have airbags, but aircraft generally don't. Apart from mid-air explosions, most aircraft accidents are survivable and one company is producing an inflatable seatbelt for aircraft to make them even more so. The Aviation Inflatable Restraint Belt inflates in 0.070 s to form a large pillow into which the passenger collapses as the aircraft comes to a halt in an accident. Some airlines have already installed them in their Boeing 777 and Airbus 340-600 aircraft.



Fig 5.3.5

The inflatable seatbelt promises to slow passengers in an aircraft accident.

5.3

Questions

Checkpoint

What is a force?

- 1 Define 'force'.
- 2 List four possible outcomes when a force is applied to an object.
- 3 Classify the following forces as either *contact* or *non-contact* forces:
electrostatic, lift, thrust, weight, friction, buoyancy, air resistance, magnetic, drag

Newton's First Law

- 4 Recall the two parts of Newton's First Law.
- 5 Define 'inertia'.

Think

- 6 Assess whether the following statements are true or false.
 - a An object needs a force to start moving.
 - b Passengers are thrown forward in a head-on collision.

- c A typical accident takes 1 to 2 seconds.
- d You have enough time in a collision to brace yourself to avoid injury.
- e To keep something moving on Earth, you need to keep pushing.

- 7 Explain what happens to the occupants of a car when it:
 - a turns left
 - b suddenly accelerates
 - c goes fast over a speed hump
 - d goes over a deep dip in the road
 - e collides head-on with a wall
 - f is parked, but is hit from behind by another car
 - g is parked, but is hit from the left by another car
- 8 Outline the features of a car that are designed to comfortably stop our forward inertia.
- 9 Propose why it is preferable to have the stopping force in a car applied to the chest and waist instead of the head.

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