



Forces and motion

Forces and their effects

1 These events happened in a football game.

Abu kicks a ball (A). He runs after it and kicks it again before it stops (B). Carlos kicks the ball back (C) to Abu, who traps the ball with his foot (D) and squashes it (E). Fill in the table by matching each action letter in the game with an action of a force.

Action of a force	Action in the game
Changing the direction of a moving object	
Stopping a moving object	
Changing an object's speed	
Changing an object's shape	
Starting an object moving	

Different types of forces – Contact forces

2 What kind of force occurs when a car crashes into a wall? _____

3 What kind of strain force is generated in a rope when you pull on it?

4 a) Which of these statements about friction is true? Tick (✓) one box.

Static friction is stronger than sliding friction.

Static friction is the same strength as sliding friction.

Static friction is weaker than sliding friction.

Static and sliding friction are completely different forces.

b) Which type of friction makes a tractor's wheels spin in the mud?



- 5 a) Oma finds a sledge with rusty runners and pulls it through the snow. He scrapes the runners with sandpaper then pulls again. He scrapes some more with a finer sandpaper and pulls once more. Finally, Oma rubs wax on the runners and pulls the sledge for one last time.

Oma has recorded the strength of each pull but has written them down in the wrong order. The strengths are 25 N, 20 N, 40 N and 30 N. Place these results in the correct order in the table.

Condition of runners	Pulling force in N
Rusty	
Roughly sanded	
Smoothly sanded	
Waxed	

- b) How has the surface of the runners been changed?
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- c) Why is there a change in the pulling force?
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- 6 The depth of the tread on the tyres of Shazia's bicycle is 6 mm. The depth of tread of Su Lin's bicycle tyres is 0.5 mm.
- a) When they race along a wet road with puddles, who is more likely to slip?
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- b) Explain your answer.
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Different types of forces – Non-contact forces

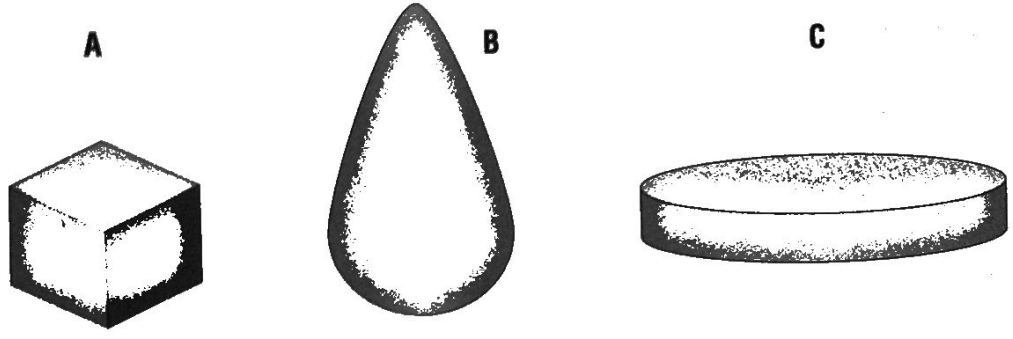
7 When a skydiver pulls on the ripcord of her backpack a small pilot parachute is released. It is connected to the main parachute by a cord and a moment later the main parachute is released.

- a) What force acts on both parachutes? _____
- b) What happens to the main parachute when this force acts on the pilot parachute?

- c) What happens to the skydiver when this force acts on the main parachute?

- d) What is the force pulling down the skydiver?

8



Clay objects made in the shapes shown in the picture were each dropped down a long tube of water to see how fast they fell.

- a) How do you think this test was made fair? _____

- b) Which shape fell fastest and why? _____

- c) Which shape fell the slowest and why? _____

- 9 An astronaut had a weight of 600 N on Earth but when he arrived on the Moon his weight had changed to 100 N. Explain the change.

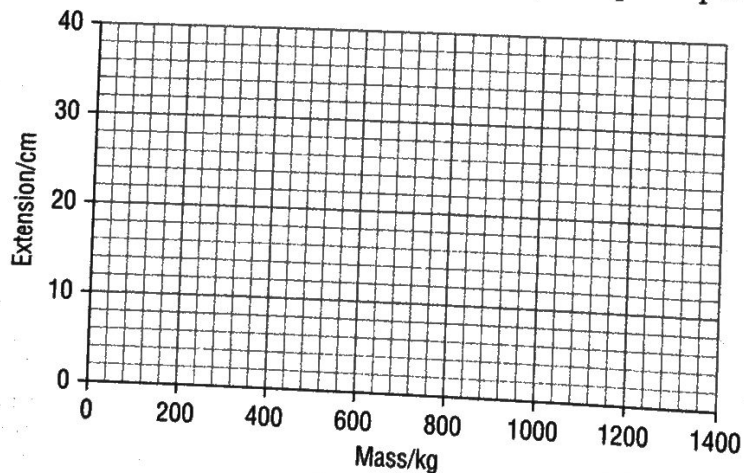
How springs stretch



- 10 George hangs masses on a spring and records the extension of the spring. Here is the data he recorded.

Mass/kg	Extension/cm
0	0
200	4
400	8
600	12
800	16
1000	20
1200	26
1400	40

- a) Plot this data on the grid below and join up the points.



- b) Which of these statements describes the extension of the spring up to 20 cm?
Tick (✓) one box.

The spring only extends a few millimeters as the mass increases.

The extension of the spring decreases as the mass is increased.

The extension increases in proportion to the increase in mass.

The spring extends in a random way as the mass is increased.

- c) Between which two masses does the spring go beyond its elastic limit?

- d) George has a similar spring. How could he use it to find the elastic limit of the spring more accurately?

Teacher comments