

Key concepts:

- Forces have strength and direction.
- The forces acting on an object can be balanced or unbalanced.
- Forces are balanced when they are equal in strength but opposite in direction.
- Balanced forces don't change the motion of objects.
- Unbalanced forces cause objects to accelerate.

Part 1

Answer questions 1-4 and draw labelled arrows on the diagrams to show forces acting on the object (gravity, normal force, applied force and friction). The length of the arrows should indicate the relative strength of the force.

1. A car is parked on a level driveway. Are the forces on it balanced or unbalanced?

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2. A rock is dropped from the top of a cliff. Are the forces on it balanced or unbalanced?

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3. A skydiver is descending on a parachute at constant speed. Are the forces on him balanced or unbalanced?

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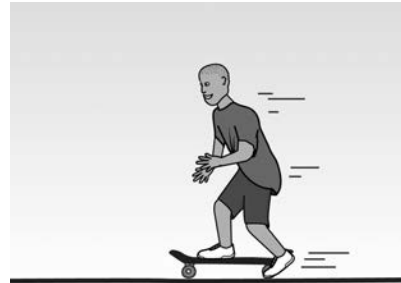
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Part 2

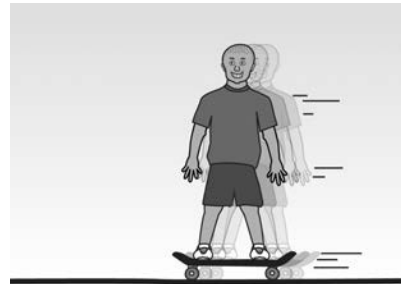
4. Why does the boy have to push against the ground to start the skateboard moving?

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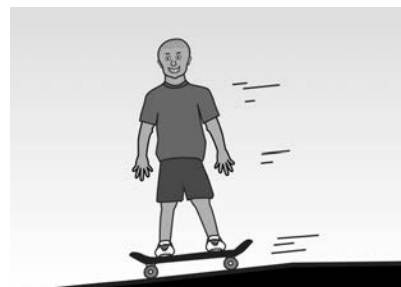
5. This skateboard is moving at constant speed. What does this tell us about the vertical and horizontal forces acting on it?

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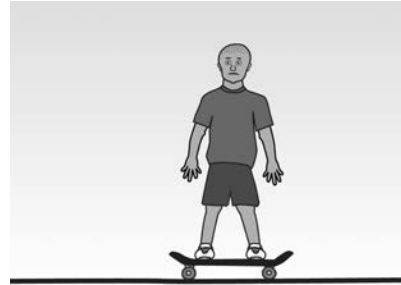
6. What happens to the skateboard when it starts rolling down the slope? What forces make this happen?

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7. On a level path, the skateboard eventually slows down and stops. What makes it stop?

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8. Complete the following statements:

a) Forces are balanced when they are equal in _____ but opposite in _____.

b) _____ is a force that acts on all objects on Earth.

c) When *balanced* forces act on a stationary object, the object will

_____.

d) When *balanced* forces act on a moving object, the object will

_____.

e) When an *unbalanced* force acts on a stationary object, the object will _____

_____.

f) When an *unbalanced* force acts on a moving object, the object will _____

_____.