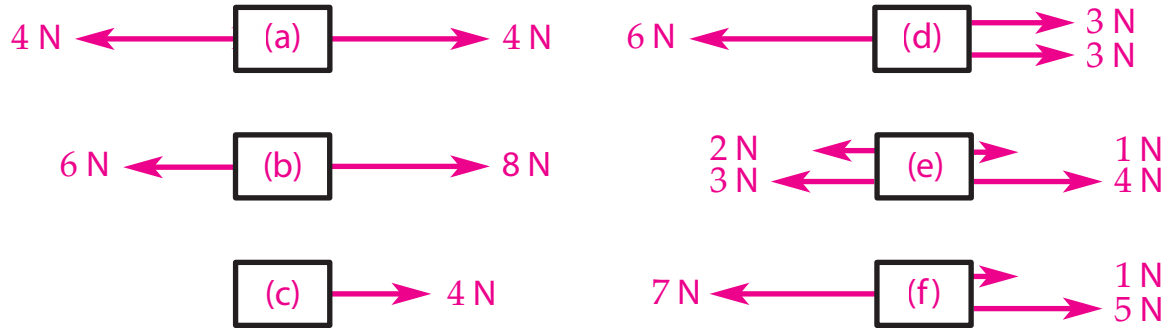
Force and Motion Practice

1 For each block, decide if the forces are balanced.



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2 Describe what is meant by

(a) balanced forces

(b) unbalanced forces

(c) resultant force

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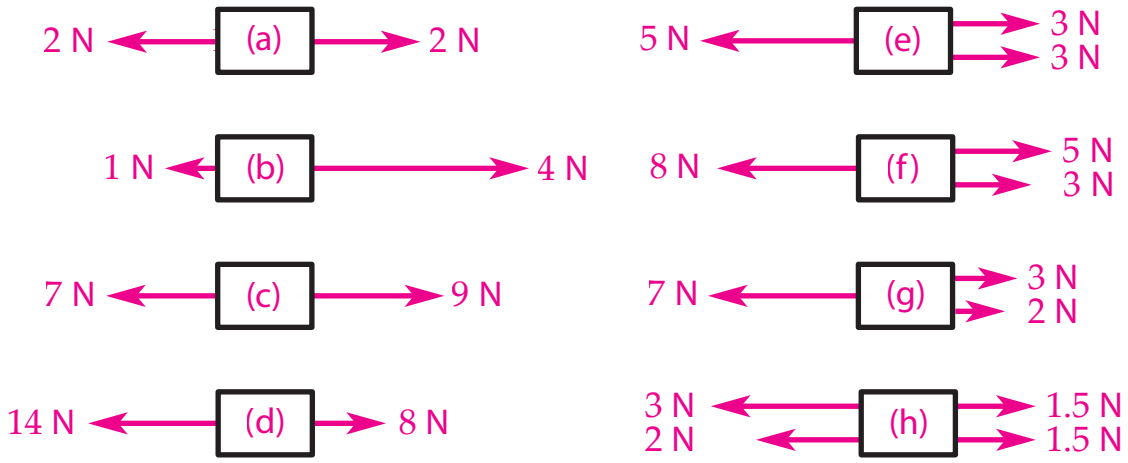
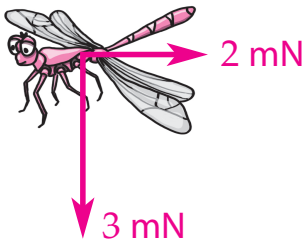
3 What is the resultant force on each block below? For each one give the strength and direction of the resultant force.



4 Add one extra force to each block above so that the forces on every block are balanced.

5 Explain what you did to work out the resultant force on each block in Q3.

6 Two of the four forces on the dragonfly are shown in the diagram. The resultant force is 1 mN upwards. Draw the extra forces and label their strengths.



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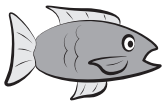
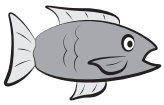
7 A fish is swimming to the right. Draw the direction of the force needed

(a) to speed up the fish,



(b) to turn the fish to swim downwards.



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8 Match the forces with their directions.

What the force is doing		Direction
A shopper turns their trolley to the left.		Upwards
An anchor speeds up as it falls to the sea bed.		Sideways (right)
An anchor stops when it hits the sea bed.		Sideways (left)
An aeroplane's banked wings turn it to the right.		Downwards

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9 For each part, choose the correct direction from the options below. The options can be used once, more than once or not at all.

Upwards **Downwards** **Zero resultant force**

A bungee jumper steps off a bridge. Give the direction of the resultant force when

(a) the bungee has just gone taut (it begins to stretch),

(b) the jumper is at the bottom of their motion,

(c) the bungee goes slack on the way up.

10 For each part, choose a description from the options below. The options can be used once, more than once or not at all.

Speed up **Slow down** **Stay still** **Steady speed** **Turn**

What will happen to

(a) a stationary suitcase with balanced forces,

(b) a moving trolley with balanced forces,

(c) a moving trolley with a resultant force pushing forwards (in its direction of motion),

(d) a moving trolley with a resultant force pushing backwards (against its motion),

(e) a moving trolley with a resultant force pushing it sideways.

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11 Fill in the table to say what will happen to each object. Choose your answers from **speeds up**, **slows down**, **stays still**, **steady speed**, **turns**.

Object and motion	**Relevant force(s)**	**What happens**
Truck driver 'puts foot down*'	engine force $>$ friction	
Planet moving away from star	gravity force	
Cow sleeping in a field	weight $=$ support force	
Moving express train	engine force $=$ friction	

$\star$ this means they press the accelerator pedal as far as it will go.

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12 Add normal reaction (contact), weight and drag forces (where needed) on a basketball thrown vertically upwards

(a) as it is being thrown, (b) just after letting go, (c) at the top of its motion.