

## Motion & Force at Robin Hill

### Describing force and motion at the park!

#### Student Introduction

- ▶ Balanced and unbalanced forces are at work all around you at Robin Hill!
- ▶ Can you identify the forces you experience at the park?

#### TASK

- ✓ You can work alone or in pairs.
- ✓ Enjoy the different activities at Robin Hill.
- ✓ Complete the tasks on the following pages.



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Force diagrams help you to understand the forces acting on an object. The force arrows show the size of the force (the longer the arrow the larger the force) and the direction of the force.  
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This force diagram shows the forces acting on the motorised boat.

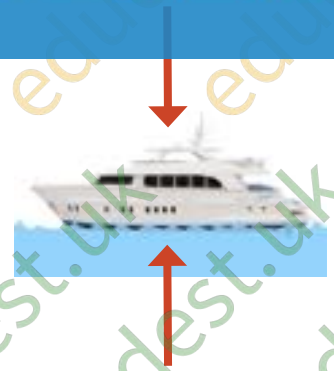
[www.edudest.uk](http://www.edudest.uk)

The boat is floating because the two forces acting on it are the same size, but act in opposite directions.

The forces are balanced.

When forces acting on an object are balanced the object:

- » stays still
- OR
- » continues to move at the same speed in the same direction.



**1** Look at the force arrows to the diagram - they show the boat is moving at the same speed in the same direction. Label the force arrows:

- » thrust from the engine
- » water resistance



**2** Now add force arrows to the force diagram on the left to show a boat accelerating through the water. Use the same labels as above.

Add an arrow to show direction of movement.

## TASK

1. Add force arrows to the following force diagrams:

### Hill Billy Slide

Force arrows: Friction, air resistance, gravity



### Cows Express Children's Train Ride

Force arrows: Thrust from engine, air resistance, friction



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### Falcon Diving

Force arrows: Gravity, air resistance



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Force arrows: Gravity, air resistance



2. Draw a force diagram for the activity below:

### Cheetah Zip Wire

## SPEED CALCULATIONS

### Speeding Down the Toboggan Run!

Can you calculate the speed of different people sliding down the Toboggan Run?

#### Background

- ▶ The speed of an object depends upon the distance moved and the time taken.
- ▶ To calculate speed you use the formula:



**Speed (m/s) = distance (metres) ÷ time (seconds)**

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✓ The length of the toboggan run from the top to the bottom is 400m.

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✓ Kerry travelled down the toboggan run in 35 seconds.

Q. What was her average speed?

Speed = distance ÷ time

Speed =  $400 \div 35$

**Speed = 11 m/s**

#### TASK

It took Tom 40 seconds to travel down the toboggan run.

Calculate his average speed.

**Step 2**

Time yourself (if travelling in pairs) or your friends as they travel down the toboggan run.

- ▶ Then use the formula **speed = distance ÷ time** to calculate your speed.

**Remember:**

- ▶ The distance of the toboggan run is 400m
- ▶ The time needs to be measured in seconds

The unit for speed is m/s

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If you are unable to time yourself or your friends here are some times we recorded for you:

Name	Time (s)	Calculation: $\text{speed} = \frac{\text{distance}}{\text{time}}$	Speed
Jason	30	$400 \div 30$	13 metres per second
Emma	25	$400 \div 25$	
Terry	28		
Alison	33		

