

The right bike



The right bike Years 4 – 6

Aims

Pupils will...

- have a positive attitude to cycling
- learn science terms
- understand aspects of bicycle
- understand the connection between design and function of different bikes

Materials

- Whiteboard and marker pens
- Photos of the road, mountain and hybrid bikes
- Worksheet: *Comparing bicycles* Worksheet: *Bicycle science*
- Pictures of Yaseem and Jemima

Introduction

- Show photos of the road and mountain bikes. (**Not** the hybrid bike at this stage.)
- Pupils name different parts of a bike.
- Ask pupils to spot which parts differ between the two bikes.
- Write pupils' responses on the board.

What does each bike do best?

- Ask pupils what activity each bike would be good for.
- Elicit the terms:

Bicycle A: Mountain bike For riding on tracks and off-road cycling
Bicycle B: Racing bike For racing/fast riding on roads and travelling a long way



Detailed comparison

- Tell the class that they are going to investigate why each type of bike suits its purpose.
- Hand out worksheet *Comparing bicycles*.
- Pupils work in groups and fill in the chart.

Friction, materials, air resistance and aerodynamics

- Pupils join the meanings to the words on the *Bicycle science* worksheet.
- Pupils fill in the missing words. (See *Physics glossary* for explanation of science terms.)

The right bicycles for Yaseem and Jemima

- Yaseem and Jemima need new bikes. Pupils read what Yaseem and Jemima say about themselves and decide which sort of bike they should ask for.
- Point out that mixing features from both bikes would create a 'hybrid' bike, which would suit Yaseem. Show the picture of the hybrid bike. A mountain bike would suit Jemima.



Physics glossary

Friction

Friction is the loss of energy from a system as heat. Friction is a force that slows down moving objects and may prevent objects from starting to move. It is a force generated by contact between two surfaces, smooth surfaces generally create less friction than rough surfaces.

On a bicycle the most obvious example of friction is on the brakes: the brake blocks rubbing against the rim of the wheel produces friction which stops the wheel.

There is friction between the road and tyres, giving riders grip on the road – beware of tread however, we rarely cycle fast enough for the amount of tread on the tyres to make much difference in terms of friction. Flat tyres increase the friction between the tyres and the road, as there is more rubber in contact with the road, making the bike harder to move.

Air resistance

Air resistance is friction with air molecules – so the greater the area of the surface moving into air the greater the air resistance. The more air molecules hitting a surface, the greater the air resistance, so air resistance is greater when it's windy. (Something cyclists are very familiar with!)

The most obvious example is drop handlebars – this means the rider leans forward and reduces the amount of contact between the rider and the air. A thin frame and thin tyres also reduce air resistance.

Slip-streaming (for example cycling very close behind another cyclist) is another way of reducing air resistance for the rider behind: the rider in front is hitting the air and moving it out of the way of the rider behind.

Aerodynamics

This is the science of reducing air resistance through design. In other words, how the shape of an object affects its speed. The idea is to reduce the amount of surfaces in contact with the air so that air resistance is minimised.

We improve our aerodynamics and reduce our air resistance by using drop handlebars and leaning forwards. We can then go faster or use less energy to maintain the same speed.



Comparing bicycles answers



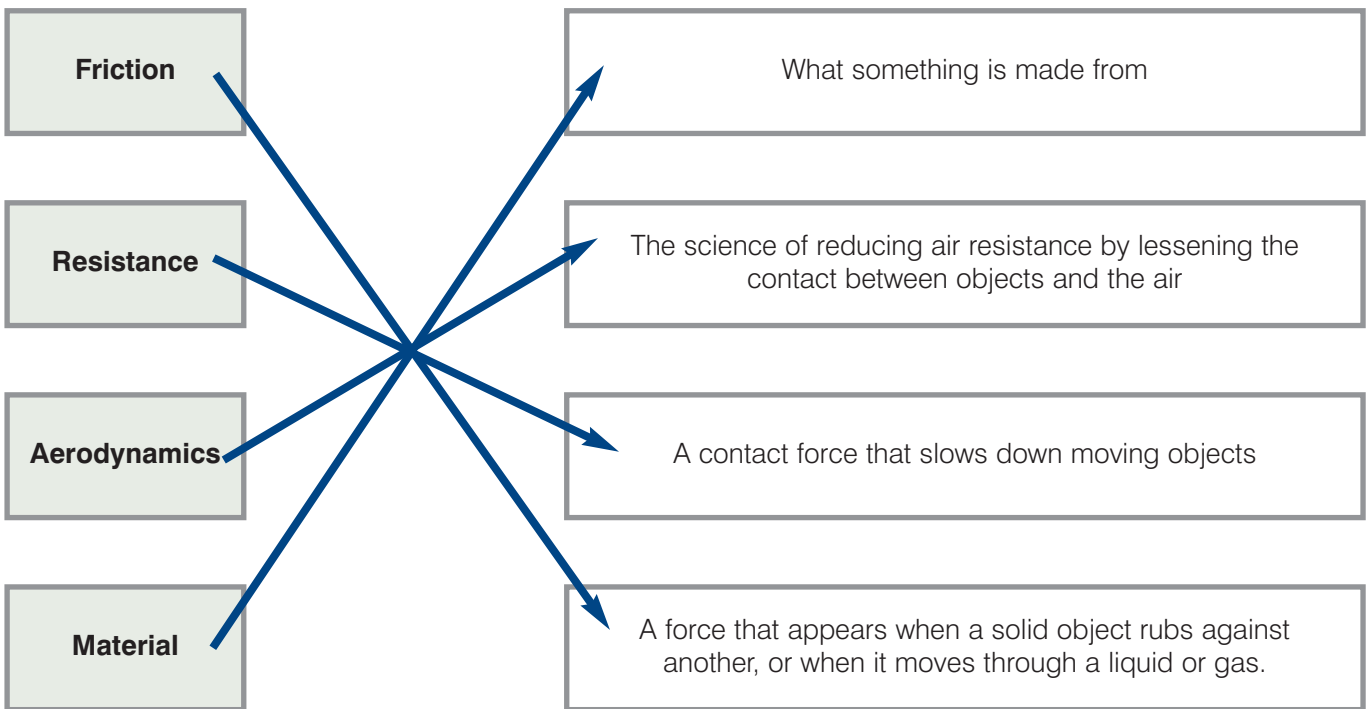
**Bicycle A:
Mountain bike**



**Bicycle B:
Racing bike**

	Bicycle A: Mountain bike	Bicycle B: Racing bike
Tyres	Thick and knobbly	Thin and Smooth
Frame	Thick and strong	Thin and light
Handlebars	Straight	Dropped
Suspension? (Yes/No)	Yes	No

Join the science terms with their meanings.



This is a report to help Yaseem and Jemima choose their bikes.

Fill in the missing words. (Use the words below.)

Racing bicycles are mainly used for riding on tarmac. They have light frames and thin tyres to help reduce friction so they can move at high speeds. Racing bikes have dropped handlebars which make the rider lower down so lessening air resistance. Mountain bikes are mainly used off-road and need to be strong. They have stronger frames and good suspension to ride over bumpy ground. Mountain bikes have thick, knobbly tyres which improve grip and help the cyclist balance on rough slippery ground.

Useful words:

handlebars grip speeds racing resistance off-road stronger tyres bumpy frames rough



Bicycle A



Bicycle B



Hybrid bicycle



Comparing bicycles



**Bicycle A:
Mountain bike**



**Bicycle B:
Racing bike**

	Bicycle A: Mountain bike	Bicycle B: Racing bike
Tyres		
Frame		
Handlebars		
Suspension? (Yes/No)		

Join the science terms with their meanings.

Friction

What something is made from

Resistance

The science of reducing air resistance by lessening the contact between objects and the air

Aerodynamics

A contact force that slows down moving objects

Material

A force that appears when a solid object rubs against another, or when it moves through a liquid or gas.

This is a report to help Yaseem and Jemima choose their bikes.

Fill in the missing words. (Use the words below.)

_____ bicycles are mainly used for riding on tarmac. They have light _____ and thin _____ to help reduce friction so they can move at high _____. Racing bikes have dropped _____ which make the rider lower down so lessening air _____. Mountain bikes are mainly used _____ and need to be strong. They have _____ frames and good suspension to ride over _____ ground. Mountain bikes have thick, knobbly _____ which improve _____ and help the cyclist balance on rough slippery ground.

Useful words:

handlebars grip speeds racing resistance off-road stronger tyres bumpy frames rough



I like to cycle both
on roads and on tracks.
I like going fast and racing with
my friends, but I also want to use
my bike to go to school and
to the cinema.





I like cycling on bridleways
and tracks in the countryside.
We get very muddy sometimes
in the winter but it's
very exciting!

