



# Science

## Forces

# Balanced and Unbalanced Forces



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# Aim

- I can identify forces acting on objects.

# Success Criteria

- I can identify forces as pushes and pulls.
- I can identify and explain the different forces acting on objects.
- I can identify and explain balanced and unbalanced forces.

# What Are Forces?



Forces are often referred to as **pushes** and **pulls**.

Have a look at the pictures below and talk to your partner about whether each picture shows an example of a pushing or pulling force.



# What Are Forces?

Forces affect the movement or shape of an object. They can make an object start to move, move faster, stop moving or move more slowly. They could also cause a moving object to change direction or make an object change its shape.

Even when an object is stationary (not moving), there are forces acting on it.

What is the name of the force pulling the boy down?



# What Are Forces?

**Gravity** is a **pulling** force exerted by the Earth. The gravitational force pulls in the direction towards the centre of the Earth.

As the boy stands still, gravity is pulling him down towards the centre of the Earth.

**gravity**



# What Are Forces?

But of course, he isn't actually pulled to the centre of the Earth!

There is an **opposing** force pushing him back.

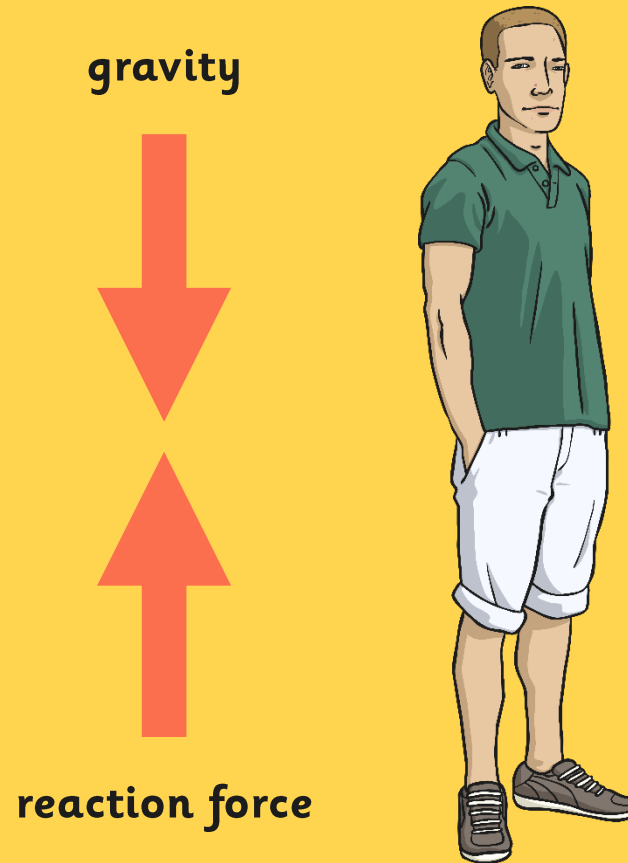
This force is exerted by the ground, and it is called the **reaction force**.

**reaction  
force**



# What Are Forces?

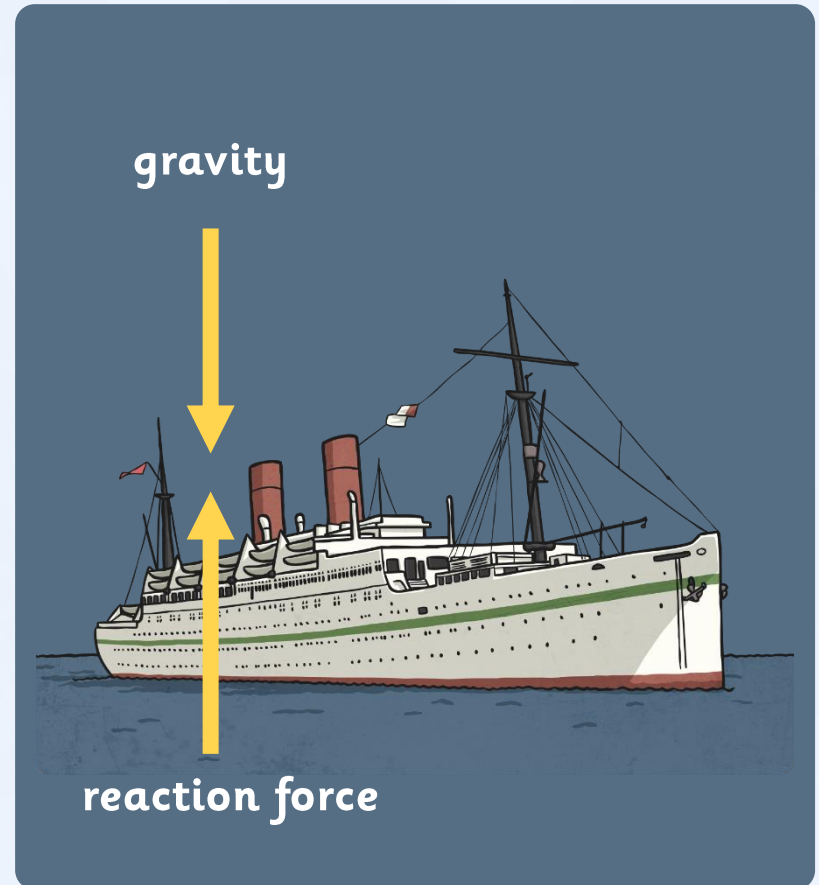
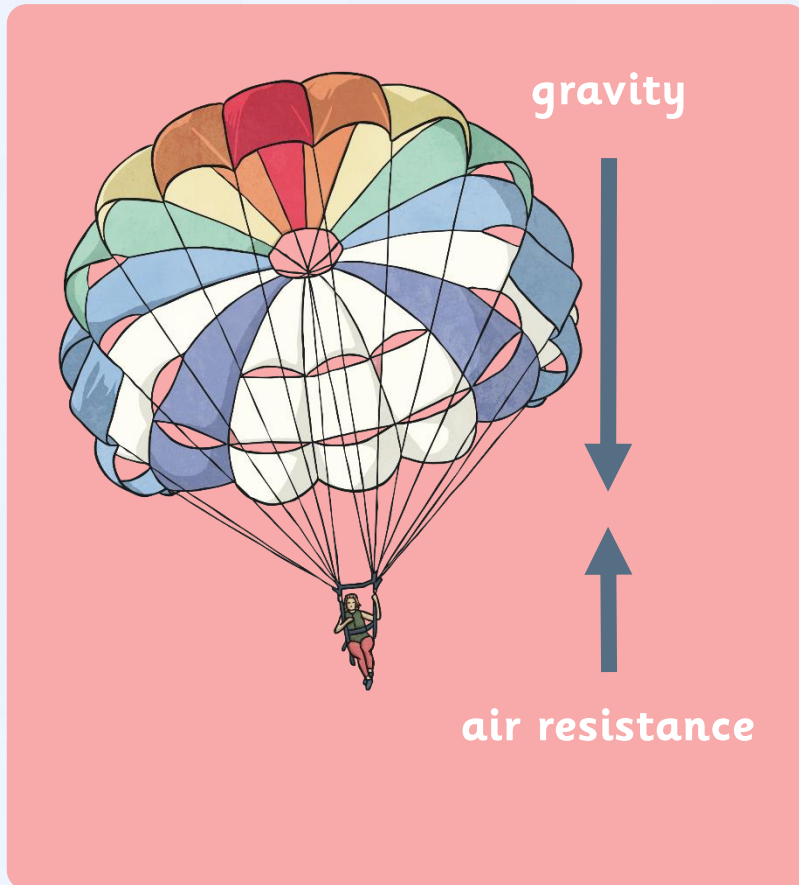
These forces are **equal**, or **balanced**. The **reaction force** from the ground is the same strength as the force of **gravity** pulling him down. This means that the boy stays still.





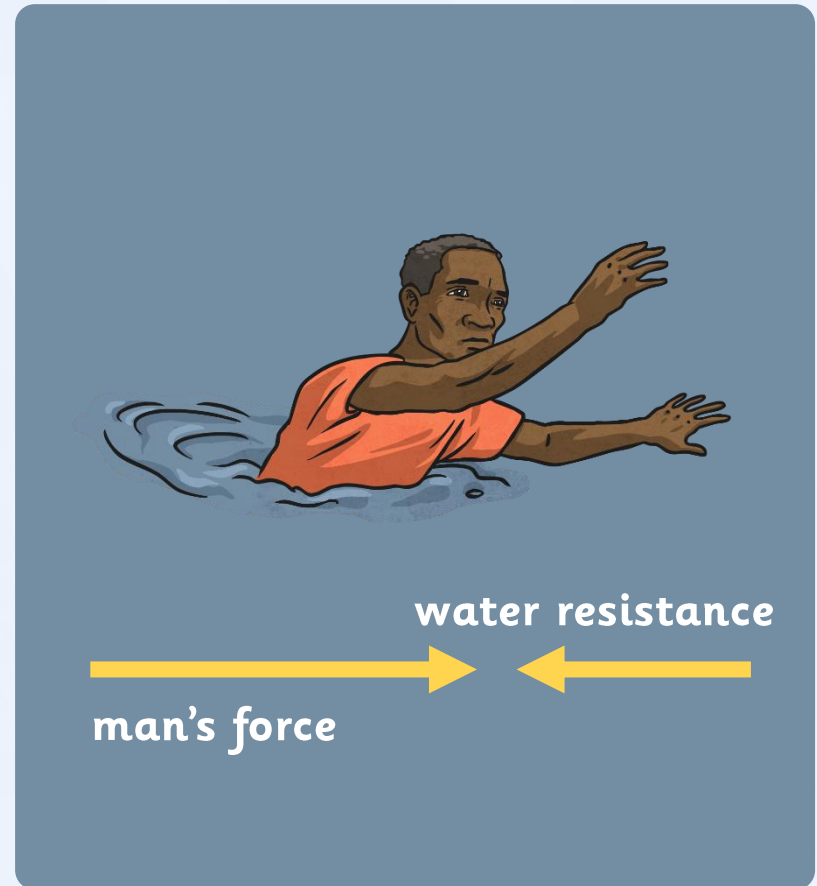
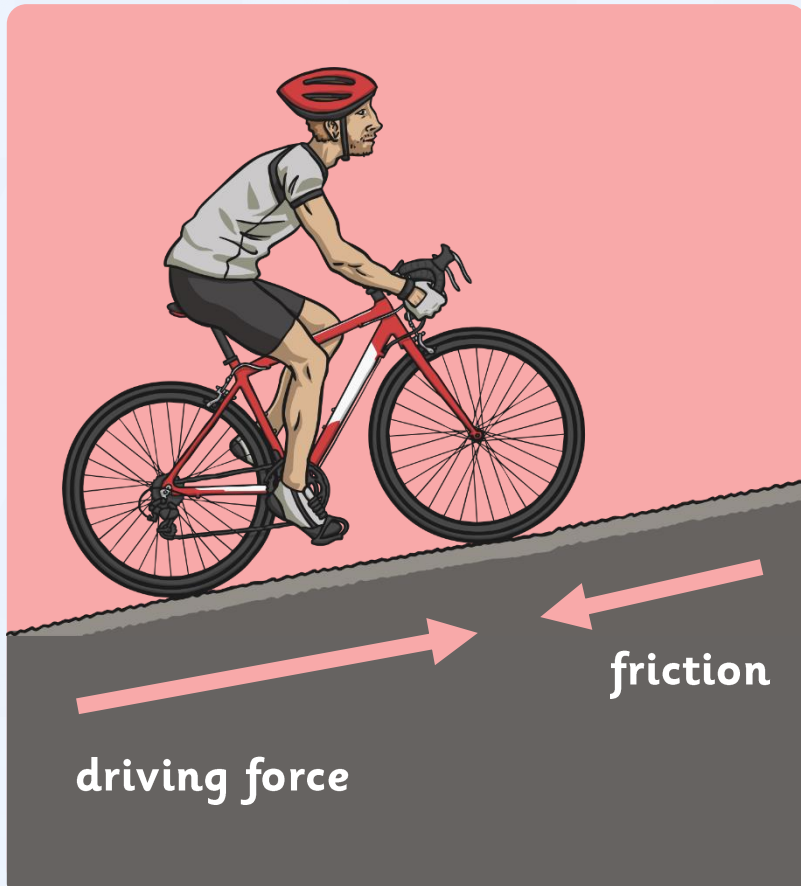
# What Are Forces?

There are other forces that can act on objects as well as gravity.



# What Are Forces?

There are other forces that can act on objects as well as gravity.



# Identifying Forces



You are going to play a game to identify different types of force!  
Each person has an Identifying Forces Bingo Board with pictures of different actions on.

The actions have arrows to show the forces acting on the object pictured but some names of forces are missing.

Your teacher will choose a Force Card and say the name of a force.

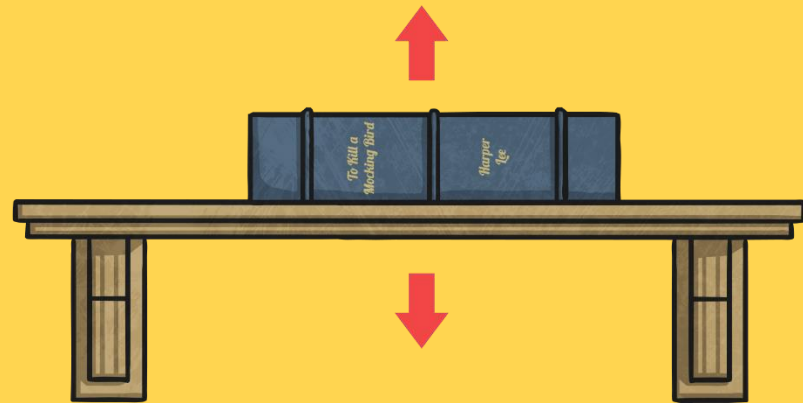
If you have this force missing on one of your pictures, you can write the name of the force next to the correct arrow. You may be able to choose from more than one picture when writing the missing force.

When you have completed 3 pictures in a row, you should shout 'Bingo!'

# Balanced and Unbalanced

The forces acting on an object can be **balanced**. If the forces pushing and pulling an object are the same strength, they are **balanced**. Look at the books on this shelf. There are two forces acting on the books: **gravity** is pulling them down and the **reaction force** of the shelf is pushing them up. The arrows show the direction of the forces, and the relative size of the forces. The bigger the arrow, the bigger the force.

The reaction force of the shelf pushes upward on the books.



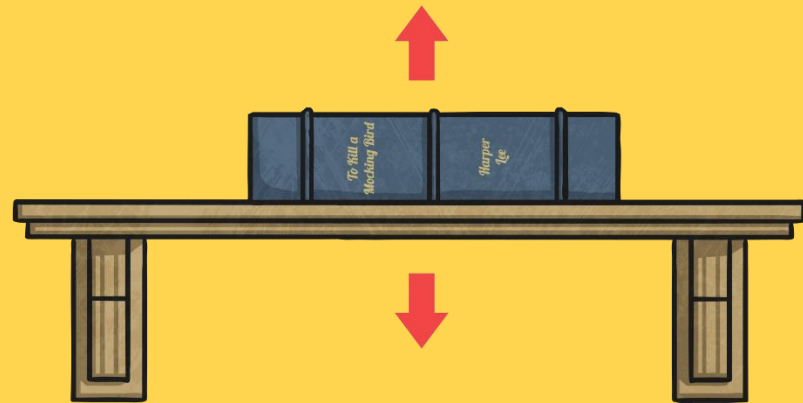
Gravity pulls downward on the books.

# Balanced and Unbalanced

The two forces are **balanced** because they are of **equal** size and strength.

When the forces acting on an object are balanced, the object will maintain its state of motion - this means it will not start or stop moving, speed up or slow down or change direction. In this case, the books will stay still and not move up or down.

The reaction force of the shelf pushes upward on the books.



Gravity pulls downward on the books.

# Balanced and Unbalanced

**Unbalanced** forces do **change** the way an object is moving.

Look at this example of a car accelerating.

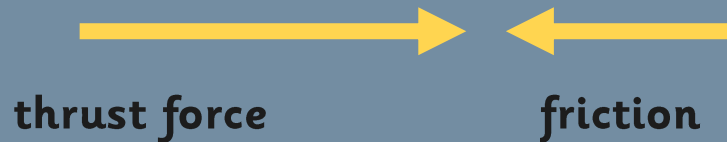
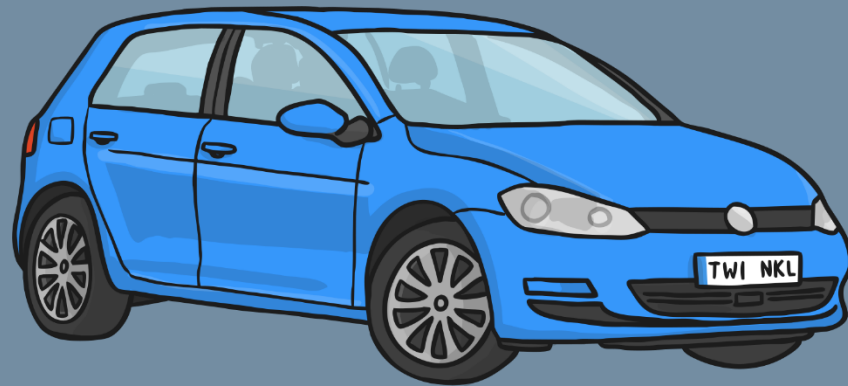
**Friction** is pushing against it at the same time as the thrust force of the car's engine is pushing it forwards along the road.



# Balanced and Unbalanced

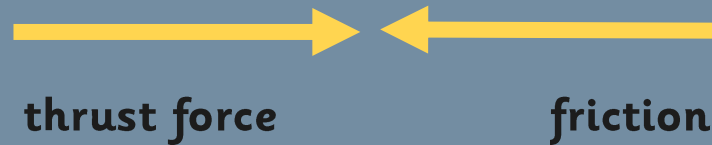
The force of the engine's thrust is greater than the force of friction.

The car can start to move forwards along the road because the forces are unbalanced.



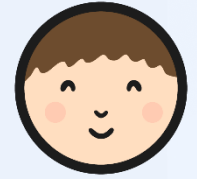
# Balanced and Unbalanced

The car is now moving at a constant speed along a straight road. Now, the forces of thrust and friction are balanced. The car maintains its state of motion - it is not speeding up, slowing down or changing direction.





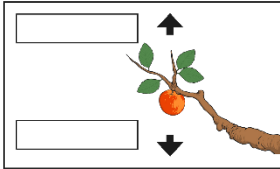
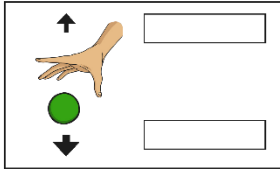
# Forces in Action



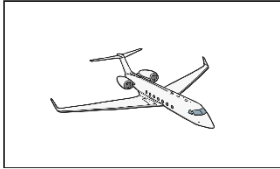
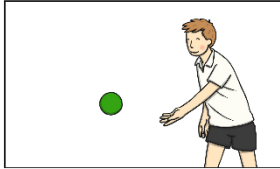
Complete your **Forces in Action Activity Sheet** by naming the forces acting on the objects in the pictures and drawing arrows to show the size of the forces. Then draw your own examples, add arrows and label the forces.

### Forces in Action



In the two pictures below, the arrows represent forces acting. Write the names of the forces in the boxes


|  |   |
|--|---|
|  |  |
|--|---|

Draw your own arrows and label them to show the forces acting.

|  |   |
|--|---|
|  |  |
|--|---|

Draw your own pictures in the boxes below. Then label and draw your own arrows to show the forces acting.

|  |   |
|--|---|
|  |  |
|--|---|

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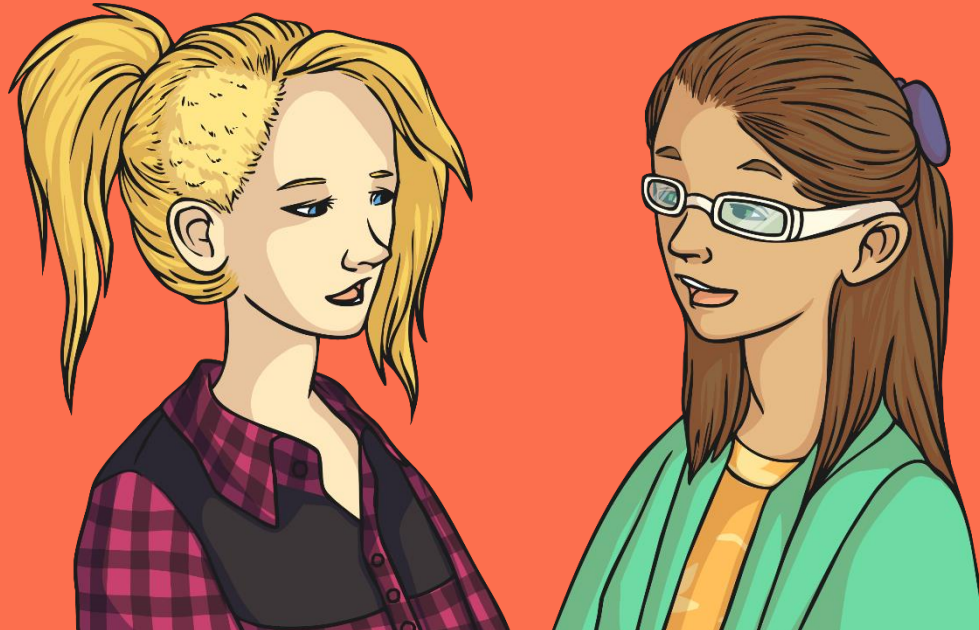
Science | Year 5 | Forces | Balanced and Unbalanced Forces | Lesson 1

# Force Examples



Share your own examples of forces acting on objects with a partner.

Does your partner agree with the forces you have identified and the size of the arrows you have drawn?



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