







*Bearwood Primary School*

# IMAGINEERING



The  
Helicopter



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## History

The first helicopter was sketched by Leonardo Vinci in 1475.



Not until 1909 was a helicopter able to remain in the air for two minutes.

In 1942 de la Cierva managed to fly 12km in his autogiro



The first helicopter worthy of the name was the Focke Wulf Fw61.



In 1963 it flew for 16 minutes at an altitude of 20 metres above the ground.



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## How does a helicopter fly ?

### LIFT

The rotor of a helicopter creates lift and generates propulsion (forwards, backwards and sideways).

Individual rotor blades are shaped like aeroplane wings with a curved upper surface.

Air flows faster over the top of the blades than beneath giving rise to an upward suction effect.

The air flow below the rotor blades is slower resulting in pressure, so the total effect is that the helicopter is pushed upwards.



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## Propulsion

### FORWARDS

The direction in which a helicopter flies is controlled by changing the angle of attack, or pitch, of the individual rotor blades. This change is cyclical

The pitch of the rotor blades is varied precisely as the blades pass a certain point determined by the swash plate.

### BACKWARDS

Pulling the cyclic control back increases the pitch of the rotor blades as they pass in front of the hub. This results in backward flight.



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## Propulsion

Pulling the cyclic control to the right or left increases the pitch of the rotor blades as they pass to the left or right of the hub.

**SIDEWAYS**

The result is sideways flight.

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## Tail Rotor

### STABILITY

The main rotor generates a torque which has to be offset by controlling the thrust produced by the tail rotor.

So, the tail rotor serves to stabilise the helicopter. Without it the helicopter would rotate about its own axis.

The tail rotor is controlled by the pedals





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What jobs are helicopters  
used for ?



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## Our Model

Based on Augusta / Westland EH101

Designed to satisfy Naval, Military and Civil roles

### SPECIFICATIONS

Height 6.63 metres

Length 22.8 metres

Main Rotor diameter 18.6 metres

Payload 5400 Kg

Range 1000 km

Speed 309 km/hr

3 Jet engines but can run on only 2.

