



Radka Píro • Diarmuid Ó Catháin

PLANES



ALL ABOARD!

PLANES

Radka Píro • Diarmuid Ó Catháin



Albatros

Before take-off

Just like Karl, humans also envied the ability of birds to fly. It took quite a while and many failed attempts before they managed to mimic them and invent machines that could carry them high up in the sky. These machines are called planes.



What we'll talk about here is passenger planes, which can carry both passengers and cargo.

PILOT TRAINING



Becoming a pilot isn't easy. The training takes several years and the future pilots have to pass many tests and test flights. The trainees study up on navigation, meteorology, and communication.



To learn how to pilot a plane, the trainees need to spend a lot of time in the cockpit. During test flights, overseen by an instructor, they can apply their knowledge in practice and try steering various machines.



The applicants also need to be in excellent physical shape. They have to undergo a medical examination and psychological testing.

WHAT'S AERODYNAMICS?

To understand how flying works, it's a good idea to delve into aerodynamics – a scientific discipline studying the way gases move around solid objects. For example, if you block an air current, the air starts flowing around it like river water flowing around a rock. This is exactly how air moves around a moving plane. Our knowledge of aerodynamics allows us to build very efficient machines.



The 4 forces

In the air, a plane is subjected to four opposing forces called **lift**, **weight**, **thrust**, and **resistance**. This is what keeps the plane moving through the air without crashing down.

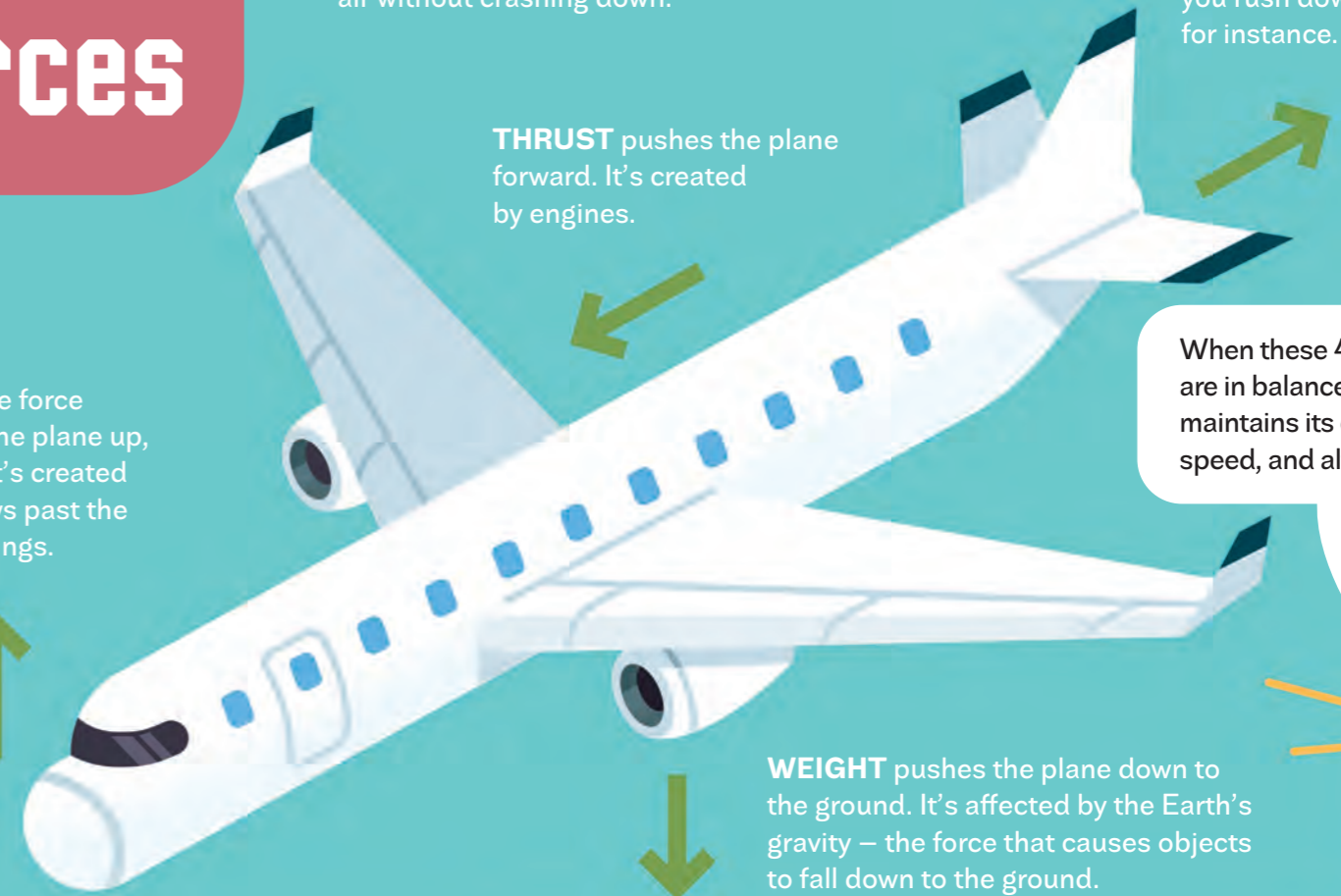
RESISTANCE acts against thrust. You can feel it for yourself when you rush down a hill, for instance.

THRUST pushes the plane forward. It's created by engines.

LIFT is the force pushing the plane up, lifting it. It's created as air flows past the plane's wings.

WEIGHT pushes the plane down to the ground. It's affected by the Earth's gravity – the force that causes objects to fall down to the ground.

When these 4 forces are in balance, the plane maintains its course, speed, and altitude.



WINGS

Lift is provided by the plane's wings. Their shape makes sure that when the plane starts moving fast, individual air particles begin hitting the wing's bottom part quicker and stronger than the upper part, thereby pushing the plane up.

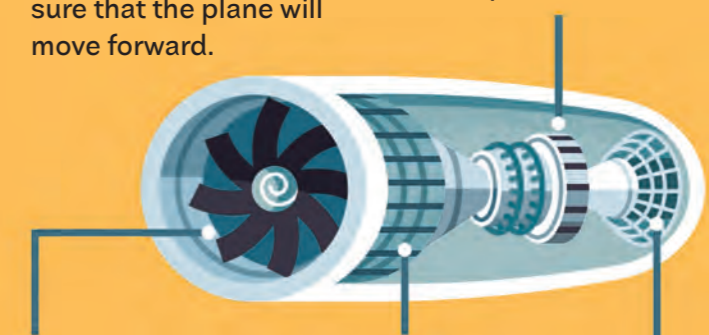


ENGINES

The plane's engines make sure that the plane will move forward.

The air mixes with fuel in a **COMBUSTION CHAMBER**. This mixture lights on fire and spins a turbine at the end of the engine.

The air shoots out of an **EXIT JET** faster than when it was sucked into the engine, propelling the plane forward.



A **BLOWER** sucks air into the engine.

The air is squeezed in a **COMPRESSOR**, becoming hotter.

The **TURBINE** spins the blower and the compressor's rotors.

Planes that went down in history



In 1903, the first controlled flight took place, lasting only 12 seconds. After several years of planning and testing, Wilbur and Orville Wright, the Wright brothers, built a plane that took off only four times in total but still went down in history.



Louise Blériot, a French pilot, made his mark in 1909 when he was the first person ever to fly over the English Channel, sitting in his single-seat **Blériot XI**. The triumphant flight lasted 36.5 minutes.

This beauty became the first ever all-metal plane with space for passengers. Apart from the pilot, the **Junkers F13** could fit only four other people. The aircraft was also notable for having safety belts for the passengers. Truly unusual for the 1920s!



The **De Havilland Comet** was the first ever commercial jet-powered aircraft. Today, planes make extensive use of the jet engine. The De Havilland Comet began flying regularly in 1952.



This interesting-looking beauty was called the **Concorde**, one of only two passenger planes capable of flying faster than the speed of sound. The Concorde flew this fast because of its innovative wing and the shape of its fuselage (the body of the plane). It could fly from Paris to New York twice as quickly as planes today. Its last flight took place in 2003.



The Ukrainian **Antonov An-255** was one of the largest planes in the world. This giant could transport up to 250 tons of cargo and was an incredible 275 feet long. No wonder it was called *Mrija*, meaning “dream” in Ukrainian. The fact that such a huge plane was able to stay in the air seems like the stuff of dreams.

Boeing or Airbus?

If you've ever flown in a passenger plane, it's highly likely it was either an Airbus or Boeing model. These two companies are the largest passenger plane manufacturers in the world. They're also each other's great competitors. Airbus comes from Europe while Boeing was founded in the United States.



Boeing 737



Airbus A320

The Earth's Envelope

To understand flying, you need to understand the Earth's atmosphere. Our planet is wrapped in a protective layer, like an orange wrapped in its peel. This protective layer is called the **atmosphere**, and it is held together by the Earth's gravity. It has several layers.

The **exosphere** is the farthest from our planet. This is where most satellites orbit the Earth, sending us information on weather and helping us with navigation and communication.

The **thermosphere** is home to the International Space Station, the only permanently inhabited space station around. By the way, the thermosphere is where the Northern Lights come from.

The **stratosphere** can be reached by weather balloons. This layer contains the ozone layer, which protects the Earth against the harmful effects of solar radiation.

The **troposphere** is the layer closest to the planet. Pretty much all weather occurs here and it's teeming with planes, birds, and hot-air balloons. Breathable air comprises only a tiny part of the troposphere.

The **mesosphere** is a very cold layer. Most meteors entering the atmosphere burn up here – something we can watch from down below. Only spaceships can reach this place.

HOW HIGH DO WE DARE?

Passenger planes usually fly 5 to 6 miles above the surface of the Earth. It's a good altitude because the air is thinner there and the air resistance the plane has to overcome is lower, allowing the aircraft to move faster and save fuel. They don't fly any higher, though – the air would be too thin and the engines would malfunction.

Mount Everest
(29,000 feet) – the highest mountain in the world

Burj Khalifa
(2,700 feet) – the tallest building in the world

Wow!

Planes and weather

The weather forecast is as vital to pilots as the knowledge of waves is to sailors. You can often tell what weather has in store for you by looking at the clouds, which differ in appearance, formation, and altitude.

Cirrus clouds look like individual threads with “hooks” at the end. It heralds good weather.



Cirrocumulus clouds are a thin layer of regular small waves.

Cirrostratus clouds look like a white misty veil.



Altostratus clouds are a thin gray layer that often heralds rain.



Stratocumulus clouds are whitish or grayish in color and have a cylindrical or round-shaped bottom.



The **cumulonimbus** is a threatening cloud that brings storms, torrential rain, or hail.



The **stratus** is a shapeless gray matter that covers the sky. Sometimes it produces drizzle.



Cumulus clouds usually signal good weather, but when they start to grow they can turn into storm clouds.



Weather forecast

Pilots are trained to recognize and predict weather patterns. They work closely with meteorologists. When flying, modern planes also constantly measure the surrounding temperature, air pressure, wind speed, and air humidity. They send this data to meteorologists so they can make accurate weather predictions.



Weather balloons

These balloons contain a **radiosonde**, which measures pressure, temperature, and humidity and sends the data to meteorologists. The balloons can reach all the way up to the stratosphere.

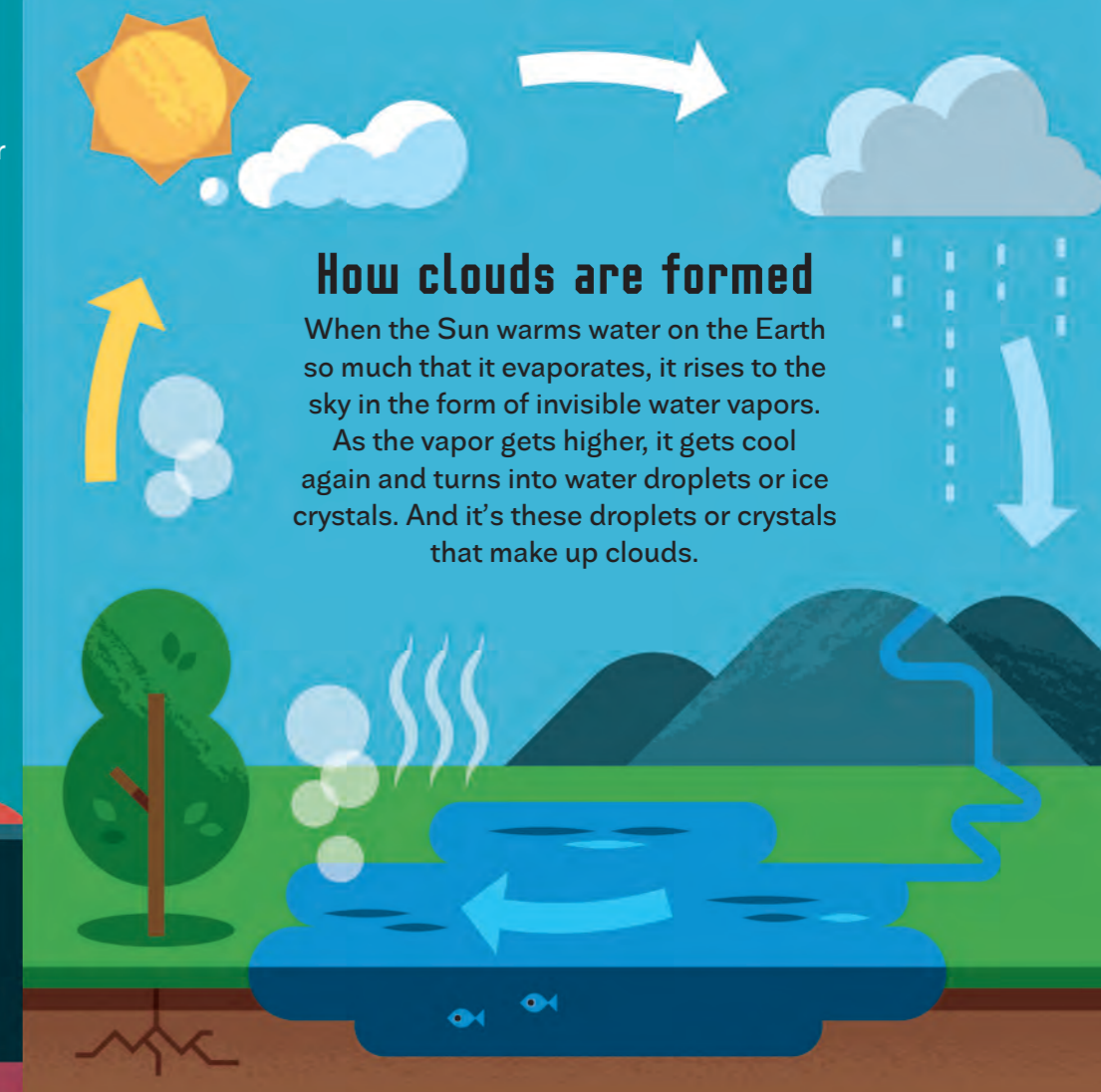
At night

Flying at night is a different kettle of fish compared to flying during the daytime. The pilot needs to be prepared for various sensory illusions, like vertigo or optical illusions, as well as poor visibility or glare during landing.



How clouds are formed

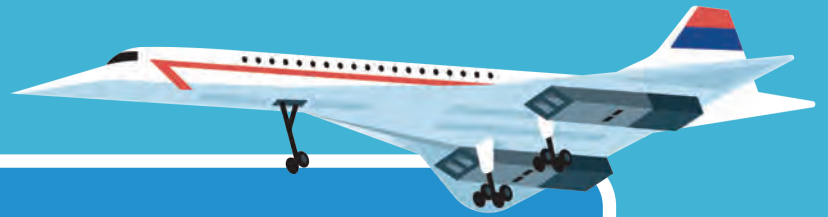
When the Sun warms water on the Earth so much that it evaporates, it rises to the sky in the form of invisible water vapors. As the vapor gets higher, it gets cool again and turns into water droplets or ice crystals. And it's these droplets or crystals that make up clouds.



Congratulations!

The sky is waiting! Try to pilot this plane for a while and enjoy the view of the endless clouds. If you're unsure about anything, just ask Karl and put your heads together . . . And now, without any further ado, away we go!






Have you ever wondered what it would be like to fly a plane? Would you like to see the world from high above? And are you interested in learning about the training that pilots have to go through?

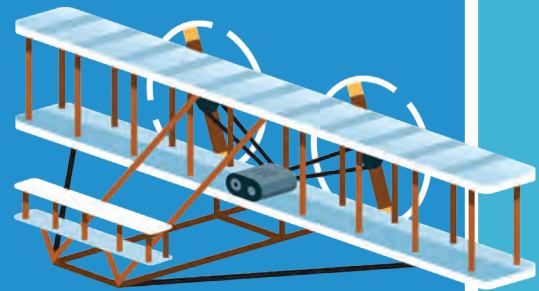
You are? Well, so is Karl, a kiwi bird who can't fly. But he'd so love to figure it out!

Join Karl as he learns what flying a plane is all about. We'll take a peek at the history of aviation and find out what kinds of things can be encountered in the sky.

So come board our plane with Karl and let's take off for the skies!



Up, up, and away we go!



Check out the other titles in this series:



© B4U Publishing for Albatros, an imprint of Albatros Media Group, 2024
5. května 1746/22, Prague 4, Czech Republic
Author: Radka Píro. Illustrator: Diarmuid Ó Catháin
Translator: Radka Knotková. Editor: Scott Alexander Jones

All rights reserved.
Reproduction of any content is strictly prohibited without the written permission of the rights holders.

ISBN 978-80-00-07099-5



5 1 4 9 5

9 788000 070995



\$14.95
Printed in China
by Asia Pacific
www.albatrosbooks.com

@ albatros_books_
Albatros Books
Albatros Media US
BooksAlbatros

