



# Travel Times

YEAR 7, 8, 9, 10

EARTH AND SPACE SCIENCES

DESIGN AND TECHNOLOGIES



**QGC**

**FUTUREMAKERS**



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# Future Makers

Future Makers is an innovative partnership between Queensland Museum Network and Shell's QGC business aiming to increase awareness and understanding of the value of science, technology, engineering and maths (STEM) education and skills in Queensland.

This partnership aims to engage and inspire people with the wonder of science, and increase the participation and performance of students in STEM-related subjects and careers — creating a highly capable workforce for the future.

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*Cover image: The Southern Cross flown by Sir Charles Kingsford Smith on the first trans-Pacific flight. Image credit: State Library of Queensland.*

# EXPLORE

## Travel Times

### Teacher Resource

Life would be very different today if we did not have modern transport. In this activity, students will use calculations to tell a story about how technological advances in transport have changed the world.

One story of change over time is the relationship between two Australian heroes – Dr Andy Thomas and Sir Charles Kingsford Smith. When Sir Charles Kingsford Smith piloted the first trans-Pacific flight from America to Australia it took 83 hours and 38 minutes, and it had to be completed in three stages. Today, many trans-Pacific flights depart Brisbane airport every day. These flights can take as little as 12 hours to reach their destination.

Sir Charles Kingsford Smith's flight was a worldwide sensation, dominating news at the time and opening up a new way to travel across the Pacific. Being the first to safely complete this journey was a significant achievement, and Sir Charles Kingsford Smith has had many landmarks named after him, including Kingsford Smith Airport in Sydney and Kingsford Smith Drive in Brisbane. Andy Thomas was also a pioneer, becoming Australia's first member of NASA's elite astronaut corps. He honoured the great Sir Charles Kingsford Smith by carrying the aviator's watch during his mission on the space shuttle Discovery.

A single watch is not the only thing that connects these explorers – without invention, the advancement of technology, and brave people willing to try new things, humans would never have taken to the sky, let alone flown across the Pacific or into space.

In this activity students are required to calculate the time it would take for humans to travel long distances through different modes of transport. They will then analyse the impact of these technological developments. Students may use their knowledge, and additional research as required to answer the question: 'How has this development changed the world?' You may wish to prompt student answers and facilitate discussions, for example, what is the advantage of walking upright (bipedalism)? How does flying between countries affect the way we live, and society as a whole?

Life would be very different without the development of new technologies and advancement over time. We would not be able to reach many of the places we are currently able to or do many of the things that are now part of our daily lives.

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## Curriculum Links

### Science

YEAR 5

#### Science as a Human Endeavour

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)

YEAR 6

#### Science as a Human Endeavour

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE100)

YEAR 7

#### Science as a Human Endeavour

Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE120)

People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE121)

YEAR 8

#### Science as a Human Endeavour

Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE135)

People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE136)

YEAR 9

#### Science as a Human Endeavour

Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries (ACSHE158)

Values and needs of contemporary society can influence the focus of scientific research (ACSHE228)

YEAR 10

#### Science as a Human Endeavour

Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries (ACSHE192)

Values and needs of contemporary society can influence the focus of scientific research (ACSHE230)

### Design and Technologies

YEAR 7 and 8

#### Design and Technologies: Knowledge and Understanding

Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)

YEAR 9 and 10

#### Design and Technologies: Knowledge and Understanding

Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved (ACTDEK040)

Explain how products, services and environments evolve with consideration of preferred futures and the impact of emerging technologies on design decisions (ACTDEK041)

### General Capabilities

#### Literacy

Comprehending texts through listening, reading and viewing

#### Numeracy

Estimating and calculating with whole numbers

Using spatial reasoning

# Travel Times

## Student Activity

On December 17, 1903, Wilbur and Orville Wright invented the first successful airplane, making four brief flights near Kitty Hawk, North Carolina. Once the Wright brothers demonstrated that the basic technical problems of flight had been overcome at the beginning of the 20th century, military and civilian aviation developed quickly. Just 66 years later, Commander Neil Armstrong and pilot Buzz Aldrin landed the Apollo Lunar Module *Eagle* on the moon on July 20, 1969.

Humans are always working to travel places faster and improve our technology. We can now build rockets and fly into space, something that even 100 years ago humans only dreamed of! What new frontiers will be explored this century?

## Going to Space

When rockets are launched into space the mass of the rocket is really important. If a rocket is too heavy it will not be able to blast off from the ground. This means every item the rocket is built from and every item that is taken into space, including an astronaut's possessions, must be chosen very carefully.

In March 2001, Australian-born astronaut Dr Andy Thomas undertook his third space mission STS-102, aboard the space shuttle Discovery, to the International Space Station (ISS). Andy Thomas took special Australian artefacts into space during the mission, including a watch worn by Queensland aviation hero Sir Charles Kingsford Smith during a number of historic flights. Why did Andy Thomas decide to take this object with him?



*Sir Charles Kingsford Smith wearing his watch*  
Image credit: State Library of Queensland.



*Andy Thomas.*  
Image credit: Andy Thomas/NASA

## First Trans-Pacific Flight

During the First World War, Sir Charles Kingsford Smith was a lieutenant and flying instructor in the Royal Flying Corps. He served in Gallipoli, Egypt and France. In 1928 Kingsford Smith piloted a three-engined Fokker Plane, the *Southern Cross*, in the first trans-Pacific flight from the United States of America to Brisbane, travelling with Australian Charles Ulm and two American crewmen. This flight took 83 hours and 38 minutes. They also had to stop twice to re-fuel!



*The Southern Cross flown by Sir Charles Kingsford Smith on the first trans-Pacific flight.  
Image credit: State Library of Queensland*

The watch, seen in the portrait of Kingsford Smith, was worn as he flew 11 585 kilometres from California to Brisbane, completing the first successful trans-Pacific flight. Just over 70 years later in March 2001, it travelled 8.5 million kilometres with Andy Thomas into space. This piece of Australian history can be seen in the Queensland Museum's collection.



*Part of the Queensland Museum's collection since 1975, the watch was loaned to Andy Thomas for the ISS mission in 2001. The back of the watch is engraved to commemorate two of Kingsford Smith's historic flights.  
Image credit: Queensland Museum, Peter Waddington*

1. Considering this information, why do you think Sir Charles Kingsford Smith's watch was important to Andy Thomas?

2. How long would it take different types of transportation to:

- Travel this distance today?
- Travel the average distance of 384 400 km the Moon?

**Speed of different types of transport**

Transport	Average Speed (km/h)	Travel Time from Brisbane to California 11 585 km	Travel time to the Moon 384 400 km	How has this changed the world?
Walking	5			
Ship	25			
<i>The Southern Cross</i> – Sir Charles Kingsford Smith's plane	138			
787 Dreamliner Aircraft	903			
International Space Station	27 500			

3. How would your life be different if technology had not improved human transportation?

4. Conduct research to predict how space travel will change between today, and when humans reach Mars.

5. Astronauts are assigned 0.682 kg (1.5 lbs) to carry personal items on Space Shuttle missions. This Personal Preference Kit (PPK) does not include day-to-day clothing and must fit in a container approximately 12.82 centimetres x 20.51 centimetres x 5.13 centimetres (5" x 8" x 2"). What items would you take to space?