

**YEARS 5-8**

# Emirates Team New Zealand and the America's Cup



## OVERVIEW

These PDF posters, student worksheets, Kahoot quiz and teacher notes provide an introduction to:

- A history of the America's Cup
- The history of sailing
- How Genesis powered Emirates Team New Zealand

## NZ CURRICULUM LINKS

### LEARNING AREAS:

### LEVELS: YEARS:

Science: Physical World, Physical inquiry and physics concepts  
Nature of Science: Communicating in Science

3-4 5-8

Technology: Nature of Technology, Characteristics of Technology  
Technological Knowledge: Technological products

3-4 5-8

## TEACHER INFORMATION:

### Learning sequence



INTRODUCING  
KNOWLEDGE



EXPLORE AND  
INVESTIGATE



CREATE AND  
SHARE



REFLECT AND  
EXTEND



MAKE A  
DIFFERENCE

### Learning intentions

Students are learning to:

- explain how sailing technology has evolved over time
- investigate solar power technology and energy
- explore the history of the America's Cup races and the America's Cup Trophy (also known as the Auld Mug)

### Success criteria

Students can:

- describe how sailing technology has changed over time
- explain what solar power is and begin to understand how it works
- answer America's Cup quiz questions about energy, sailing and the Cup

### Resources needed

PDF posters and student activity sheets - attached at the end of this resource

### Additional Support

[Emirates Team New Zealand official website](#)

[Genesis – Emirates Team New Zealand and Sustainability](#)

Genesis teacher's resource and PowerPoint [Introducing Electrical Energy](#)

### Vocabulary

solar power, solar panel, electricity, sailing, America's Cup, technology, innovation, sailboat, photovoltaic, trophy

Any text highlighted in orange represents a link to further material. If you have printed this resource, please return to [schoolgen.co.nz/for-teachers/resources](https://schoolgen.co.nz/for-teachers/resources) to access the linked material.

## LEARNING EXPERIENCE

*Note: These are suggestions only and teachers are encouraged to adjust the activity to suit the needs and interests of their students.*



### INTRODUCING KNOWLEDGE

Allow approximately 15 minutes

- Discuss the America's Cup and explain that the 2021 race was held in March on the Waitematā Harbour in Auckland. As the winner of the last America's Cup, Emirates Team New Zealand were defending the Cup and had the support of a range of sponsors, including Genesis.
- What do students know already about sailing and the America's Cup? Share and record prior knowledge.
- View some or all of the following introductory resources about the America's Cup, solar energy and sailing technology.

Resource	Details
Video: <a href="#">America's Cup: 170 Years of History</a>	Video by America's Cup about the history of the Cup
School-gen poster: <a href="#">All our energy comes from the sun (Levels 1-2)</a>	Introducing solar energy for Years 0-3
School-gen poster: <a href="#">Solar energy for life (levels 3-4)</a>	Introducing solar energy for Years 4-8
Video: <a href="#">"It began with belief" by Emirates Team New Zealand</a>	Summary of Emirates Team New Zealand lead up to America's Cup
Video: <a href="#">2018 - Emirates Team New Zealand. The day we won back the America's Cup</a>	Summary of the 2017 America's Cup and how NZ won
Video: <a href="#">Solar Powering Emirates Team New Zealand's base</a>	About the solar panel design and installation at the base



# EXPLORE AND INVESTIGATE

Allow approximately 40 minutes

THINKING LIKE A SCIENTIST:  
What is solar power? How does it work?

See [Wind Energy slideshow](#).

View and read the four PDF posters with students:

**Emirates Team New Zealand Powered by Genesis**

**Solar power**  
Solar power is made from changing sunlight into electricity. When sunlight hits photovoltaic (PV) cells, tiny particles in the cells (called electrons) get excited and travel down wires, producing electricity.

**Technology and innovation**  
Producing energy and sailing both need people to work together to design and build new solutions for a changing world. Technology helps us to overcome challenges, do things differently and become more sustainable.

Genesis is powering the Emirates Team New Zealand base with electricity from Genesis power stations as well as power from the solar panels they have installed. Scientists, engineers and designers worked together to build the solar panel technology required to fit on the curved roof of the base. The panels had to be tough as they could handle strong westerly winds. Flexible solar panels were attached to the curved roof with special glue. Auckland has plenty of sunshine to power the panels and ensure Emirates Team New Zealand can use as much renewable energy as possible.

**What's the energy?**  
Energy is the ability to do work or make something happen.

**What's the power?**  
Power is the rate at which work is done. Power is measured in watts (W).

**What's the wattage?**  
The watt is a unit of measuring the strength of electrical energy.

Genesiss are proud to be the Official Energy Partner of Emirates Team New Zealand. [www.schoolgen.co.nz](http://www.schoolgen.co.nz)

Emirates Team New Zealand Powered by Genesis

**Solar Energy for life**

**Solar power**  
Enormous amounts of solar energy arrive on the earth every day. But, to use it, we must find a way to collect the sun's energy.

To collect the sun's energy, we can "harvest" instead of harvest resources. These cells are called photovoltaic cells or PV cells.

We can think of "photovoltaic" as "light electricity".  
 • "Photo" comes from the Greek word "phos" which means "light".  
 • "Voltaic" comes from the word "volt". We use "volt" as the unit for measuring the strength of electrical energy.

This photovoltaic cells are connected together to a solar panel. When sunlight on the photovoltaic cells on the solar panel, a number of energy happen, which results in... electricity!

Electricity is a very useful form of energy. We use a lot of electricity in our everyday lives. The sun is a very useful form of energy, but unlike other energy resources, the solar energy released by the sun is:  
 • inexhaustible and sustainable  
 • free and clean  
 • very reliable  
 • and it's safe to work with.

Can we make electricity from this clean, free solar energy? Yes, we can!

Solar panels make electricity from the sun's energy!  
 When sunlight hits photovoltaic (PV) cells, tiny particles in the cells (called electrons) get excited and travel down wires, producing electricity. If the sun is bright, lots of electrons get free, making plenty of electricity. If it is cloudy, not as much energy can be produced.  
 New Zealand has an average about 3-5 hours of sunshine a day. This means that we can make a lot of electricity using only the power of sunlight!

What things in the future could be powered by electricity from solar energy?

**Something to think about:**

[www.schoolgen.co.nz](http://www.schoolgen.co.nz)

Solar power

**The America's Cup Timeline**

The America's Cup is the oldest sporting trophy in the world and is known as the 'Jules Mugh'. It's awarded to the winner of the America's Cup match race. It's made from sterling silver and has the names of all the winners engraved on it. The Cup has its own security guard and travels in its own special case. It is over 1.1 metres high and weighs over 14 kilograms!

**1851**  
The America's Cup trophy was made by Garrard and Co. in London, England. The first America's Cup is won by a sailboat schooner called 'America'.

**1870 - 1880**  
Americans won the cup 24 times in row!

**1883**  
Australia II is the first non-American team to win the cup.

**1887 - 1992**  
America took the Cup home again.

**1996 & 2000**  
Team New Zealand won the America's Cup!

**2003 & 2007**  
Swiss boat Alinghi won the trophy twice.

**2010 & 2013**  
Oracle Team USA took the trophy home.

**2017**  
Emirates Team New Zealand won the 36th America's Cup in Bermuda with a 7-1 victory.

**2021**  
The 36th America's Cup will be held in Auckland, New Zealand. Who do you think will win?

For more information, see [emirates-team-new-zealand.americascup.com/ky/history.html](http://emirates-team-new-zealand.americascup.com/ky/history.html). [www.schoolgen.co.nz](http://www.schoolgen.co.nz)

The America's Cup timeline

**Sailing Technology Through The Ages**

People have been sailing for thousands of years, and sailing has changed a lot over time. Innovation and technology in particular have brought many changes to the structure of sailing boats and how we sail them.

**Before 2000 BC**  
People around the world started sailing using different traditions and technologies over 4000 years ago! They used wood and other natural materials to make boats. Stone helped them find their way to new places.

**99 BC - 1550 AD**  
Triangle sails started to be used more often. Shape and various explorers around the world discover new places. Pins and cotton are used to make sails.

**1600s - 1800s**  
King Charles II started sailing as a sport in England in 1660. The first yachting club opened in 1789. Captain Cook arrived in Aotearoa on the Endeavour in 1769.

**1800s - 1900s**  
Large sailing ships from Europe arrived in New Zealand, sailing 70-100 days to cross the seas. Some had many sails to catch the wind.

**1900s - 1940s**  
In 1900, sailing became an Olympic sport. The first aerodynamic design for increasing speed were created.

**1950s - 1980s**  
Sails made from polyester were used instead of natural fibres, increasing their strength. GPS was invented for navigation. New hull and keel design technology made the boats faster.

**2010 - 2021 and beyond**  
In 2010, full wings were invented to lift the boats out of the water and allow them to fly. In the last America's Cup, New Zealand boat designers introduced foils on the boat for efficient gliding. These new innovations helped the boats go much faster. What could be next in sailing technology?

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Sailing technology through the ages

After viewing and reading the posters, discuss:

- How does solar power work and how does having solar panels on the roof of the base help the Emirates Team New Zealand team?
- How has sailing technology changed over time?
- What is the America's Cup?
- The history of the America's Cup and New Zealand's involvement.
- How do we use technology and innovation to overcome challenges and become more sustainable?



## CREATE AND SHARE

Allow approximately 30 minutes

- Try this [Kahoot](#) online quiz about solar power and sailing.
- Write your own quiz about the America's Cup, sailing or solar power using Kahoot!
- Share your quiz with others and spread the word about solar power and the America's Cup 2021.



## REFLECT AND EXTEND

Timing will vary.

- Complete the student activity sheets 1-2 to reflect on your learning about solar power, sailing technology and the history of the America's Cup.

### Thinking About Solar Power

1. What is solar power?
2. How do solar panels work?
3. How do you get electricity to power your home and school?  
Is your home or school powered by solar panels?
4. What would you need to think about when deciding where to put a solar panels?
5. Extra for experts: Research in detail about how solar power is produced by photovoltaic (PV) panels. Make a slideshow, using your own words to explain how it works.

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### Emirates Team New Zealand and Sailing Technology

1. What is the America's Cup?
2. Where will the America's Cup race be held in 2021?
3. How has sailing changed over time?

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### Extension activities

- Try School-gen's [Discovering Solar PV technology](#) and its uses activity.
- Or further explore sailboat design technology with School-gen's "[Harnessing the Power of the Wind](#)" activity.
- Learn more about boat design of the AC 75 boats and the technology involved with this America's Cup Video [The AC75- Designed to fly](#).



## MAKE A DIFFERENCE

Allow approximately 10 minutes

- Discuss how solar power could be used more in your community. How could you overcome the barriers to getting solar panels (such as cost and specialised knowledge)?
- How could you and your school use innovation and technology to save resources such as energy and become more sustainable?



We hope you have enjoyed this educational STEM resource.

School-gen is a Genesis community initiative to get kaiako, tamariki and whānau enthused about STEM.

For more free resources please visit our [Genesis School-gen website](#) and follow us on Facebook and Instagram @schoolgennz



# Emirates Team New Zealand Powered by Genesis

## Energy to power Emirates Team New Zealand

Genesis is powering the Emirates Team New Zealand base with electricity from Genesis power stations as well as power from the solar panels they have installed.

Scientists, engineers and designers worked together to build the solar panel technology required to fit on the curved roof at the base.

The panels had to be tough so they could handle strong waterfront winds. Flexible solar panels were attached to the curved roof with special glue.

Auckland has plenty of sunshine to power the panels and ensure Emirates Team New Zealand are using as much renewable energy as possible.

### What is **energy**?

Energy is the ability to do work or make something happen.

### What is power?

**Power** is the rate at which work is done. Power is measured in watts (W).

### What is **innovation**?

New ways of thinking and doing things.



## Solar power

Solar power is made from changing sunlight into electricity.

When sunlight hits photovoltaic (PV) cells, tiny particles in the cells (called electrons) get excited and travel down wires, producing electricity.



## Technology and innovation

Producing energy and sailing both need people to work together to design and build new solutions for a changing world.

Technology helps us to overcome challenges, do things differently and become more sustainable.



Genesis are proud to be the Official Energy Partner of Emirates Team New Zealand

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# Solar Energy for life

## Solar power

Enormous amounts of solar energy arrive on the earth every day. But, to use it, we must find a way to collect the sun's energy.

Electricity is a very useful form of energy. We use a lot of electricity in our everyday lives. The sun is a very useful form of energy, too. Unlike other energy sources, the solar energy released by the sun is:

- renewable and sustainable
- non-polluting
- very reliable
- very safe to work with

Can we make electricity from this clean, free solar energy? Yes, we can!

### Solar panels make electricity from the sun's energy!

When sunlight hits photovoltaic (PV) cells, tiny particles in the cells (called electrons) get excited and travel down wires, producing electricity. If the sun is bright, lots of electrons will flow, making plenty of electricity. If it is cloudy, not as much energy will be produced. New Zealand has on average about 5-6 hours of sunshine each day, enough to make a lot of electricity using only the power of sunlight!

To collect the sun's energy, we use 'cells' made of special materials. These cells are called **photovoltaic cells** (or PV cells).

We can think of '**photovoltaic**' as 'light electricity'.

- 'Photo' comes from the Greek word 'pho', which means 'light'.
- 'Voltaic' comes from the word 'volt'. We use 'volt' as the unit for measuring the strength of electrical energy.

The **photovoltaic cells** are joined together in a **solar panel**. When sunlight hits the **photovoltaic cells** in the solar panel, a transfer of energy begins, which results in... electricity!

Something to think about

What things in the future could be powered by electricity from solar energy?



# The America's Cup Timeline

The America's Cup is the oldest sporting trophy in the world and is known as the 'Auld Mug'. It's awarded to the winner of the America's Cup match race. It's made from sterling silver and has the names of all the winners engraved on it. The Cup has its own security guard and travels in its own special case. It is over 1.1 metres high and weighs over 14 kilograms!

**1851**

The America's Cup trophy was made by Garrard and Co. in London, England. The first America's Cup is won by a sailboat schooner called 'America'.

**1983**

Australia II is the first non-American team to win the cup.

**1995 & 2000**

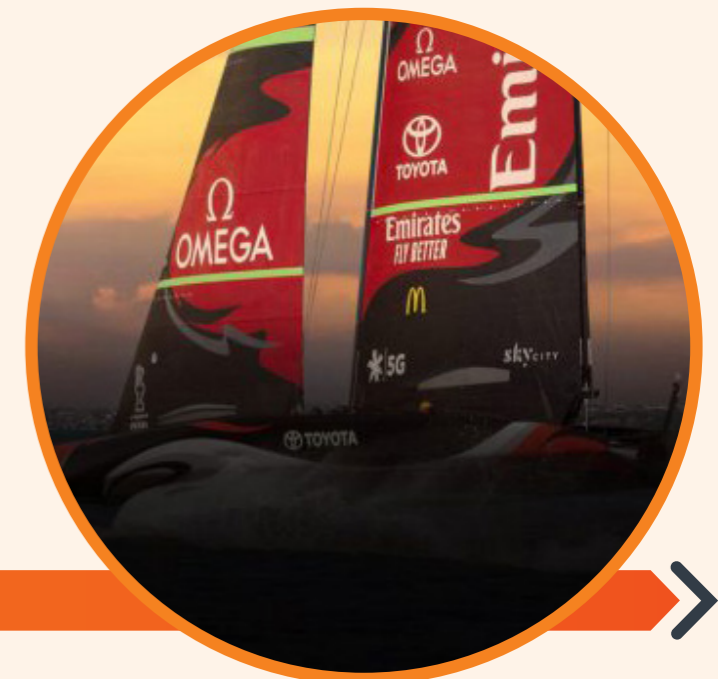
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**2010 & 2013**

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**2021**

The 36th America's Cup will be held in Auckland, New Zealand. Who do you think will win?



**1870 - 1980**

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**2003 & 2007**

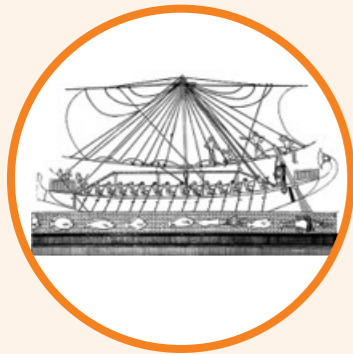
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# Sailing Technology Through The Ages

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Before 2000 BC



Triangle sails started to be used more often. Kupe and various explorers around the world discover new places. Flax and cotton are used to make sails.

99 BC - 1550 AD



Large sailing ships from Europe arrive in New Zealand, taking 75-120 days to cross the seas. Some had many sails to catch the wind.

1800s - 1900



Sails made from polyester were used instead of natural fibres, increasing their strength. GPS was invented for navigating. New hull and keel design technology made the boats faster.

1950s - 1980s

1500 BC - 100 BC

Sailing was a way to travel, trade and sell goods to others. Ancient Greeks and Romans used oars with sails for more power and speed.



1600s - 1800s

King Charles II started sailing as a sport in England in 1660. The first yachting club opened in 1720. Captain Cook arrived in Aotearoa on the Endeavour in 1769.



1900s - 1940s

In 1900, sailing became an Olympic sport. The first aerodynamic designs for increasing speed were created.



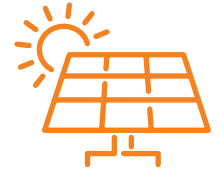
2010 - 2021 and beyond

In 2012, foil arms were invented to lift the boats out of the water and allow them to fly. In the last America's Cup, New Zealand boat designers introduced bikes on the boat for efficient grinding.

These new innovations helped the boats go much faster. What could be next in sailing technology?



# Thinking About Solar Power



1. What is solar power?

2. How do solar panels work?

3. How do you get electricity to power your home and school?  
Is your home or school powered by solar panels?

4. What would you need to think about when deciding where to put a solar panels?

5. Extra for experts: Research in detail about how solar power is produced by photovoltaic (PV) panels. Make a slideshow, using your own words to explain how it works.



# Emirates Team New Zealand and Sailing Technology



1. What is the America's Cup?

2. Where will the America's Cup race be held in 2021?

3. How has sailing changed over time?



# Design a sailboat with new technology



1. Draw a design for a sailboat with new technology and innovative features. It must have at least one sail and use wind energy to move.
2. Label the technology and innovative features.
3. Once you have your design, think about making a model of your boat.