



# Architecture meets Nature

**Creative Learning**  
Teacher Resource



# Architecture meets Nature

## Notes for Teachers

In this creative workshop students will learn how to create their own natural buildings using recycled and sustainable materials, taking inspiration from the ingenuity of the natural world.

The workshops can be delivered alongside a tour of the House exploring First Nations perspectives, the architectural practice of Jørn Utzon and his collaborators, as well as the contemporary uses of the site as a world-class performing arts venue.

The following Creative Learning Notes contain video links and suggested activities to build on an excursion to *Architecture meets Nature* in the Centre for Creativity.

We recommend using this resource as a starting point, to adapt content in a way that suits the learning needs of your students.

# Architecture meets Nature

## Workshop Overview

Designed by the Danish architect Jørn Utzon, the Sydney Opera House is a unique and innovative design representing a breakthrough in modern architecture. Utzon was inspired by the ingenuity of the natural world to inform his design – evoking Sydney’s cliffs, the wingspan of birds and the sails of boats on Sydney Harbour.

Climate change is demanding that we find new ways to build our cities, so learning from nature has never been more important. Utzon had a passion for nature, and was a keen observer, translating it creatively to his designs. Students will embrace this design thinking as they consider what lessons can be learned from nature.



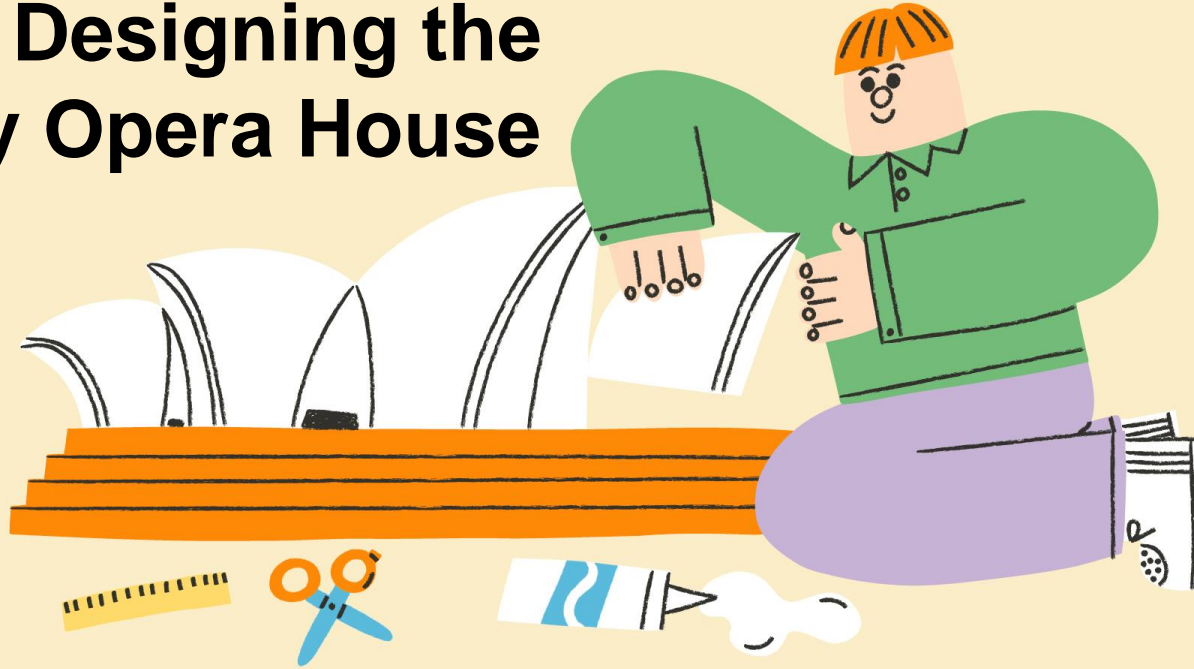
## Architecture meets Nature

In this workshop, students will:

- Learn about Jørn Utzon, his love of nature and how the Sydney Opera House was built.
- Be inspired by the natural world through the Utzon Design Principles of biomimicry.
- Consider sustainability and the built environment by creating artworks (and cities!) that work with nature and a changing climate.
- Build design thinking skills by using elements and principles of design to create experimental architectural forms.



# Designing the Sydney Opera House





## **The Sydney Opera House was designed for performing arts and cultural experiences**

The Opera House is a World Heritage-listed masterpiece of 'human creative genius' that belongs to all Australians.

It is the Country's number one tourist destination and its busiest performing arts centre, welcoming more than 10.9 million visitors a year on site and hosting more than 1,800 performances attended by more than 1.4 million people.

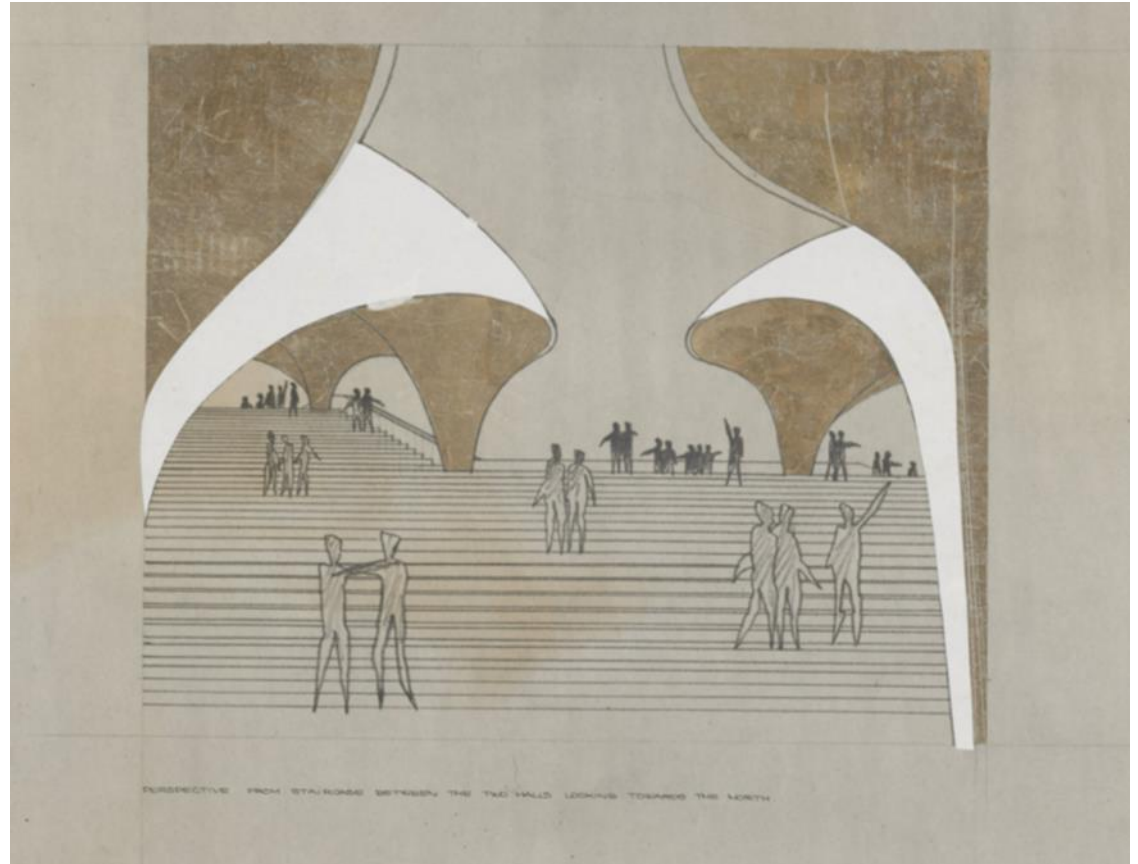


## Jørn Utzon is a Danish architect who designed the Opera House

His design was received in 1957, there were 223 entries from 28 countries.

Utzon was announced the winner, receiving £5,000 for his design. His drawing presented an idea in a unique and unconventional way, and used gold leaf, pencil and white paper.

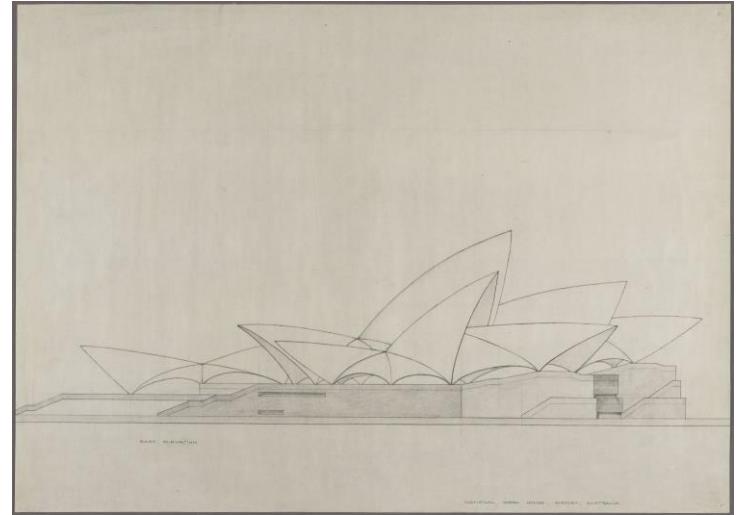
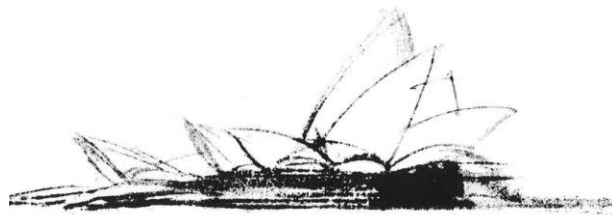
The Opera House was completed and opened in October 1973.



## Utzon and nature

Jorn Utzon observed nature and took his inspiration from it. He travelled to many places and saw lots of different landscapes. In particular, he loved the water and clouds and wanted the Opera House to feel like the sea (and land) was connected to the sky.

You can see the evolution of this design thinking in Utzon's drawings below. Two are quick sketches and one is technical drawing.





# Biomimicry in design



## What is biomimicry?

Very simply, biomimicry means to copy nature.

For designers and architects this might be using or copying the patterns, colours and textures of natural environments in their buildings. The drawing on the left is Jorn Utzon's sketch of organic (rounded) shapes to work through how to build the iconic roof of the Opera House.

Another term for this is **biophilic design**. This approach aims to create the best conditions for people to live in and use buildings – it has minimal impact on the environment, is inspired by the beauty of the natural world and can be a more sustainable way of designing and building cities.



## What is a pavilion?

A pavilion is a light-weight, usually open building, used for shelter and relaxing or for concerts and exhibitions. It is usually a temporary structure, adding on to an existing building or any public space.

Because they are smaller and temporary, unlike a permanent building, pavilions allow architects to experiment with materials and ideas that might inspire cities and buildings to be more interesting and unusual.

**Teaching point:** research architectural pavilions around the world – What makes them unique? What materials are used? Why did the architect make them?



**Curriculum  
connections and  
further research**



# Curriculum Links

## Connecting with the classroom

### Mathematics

- MA2-PF-01: represents and compares halves, quarters, thirds and fifths as lengths on a number line and their related fractions formed by halving (eighths, sixths and tenths)
- MA2-GM-01: uses grid maps and directional language to locate positions and follow routes
- MA2-GM-02: measures and estimates lengths in metres, centimetres and millimetres
- MA2-2DS-01: compares two-dimensional shapes and describes their features
- MA2-3DS-01: makes and sketches models and nets of three-dimensional objects including prisms and pyramids

- MA3-2DS-01: investigates and classifies two-dimensional shapes, including triangles and quadrilaterals based on their properties
- MA3-3DS-01: visualises, sketches and constructs three-dimensional objects, including prisms and pyramids, making connections to two-dimensional representations

### Science and Technology

- ST2-DDT-01: uses a design process to create products to address user needs or opportunities and assesses their individual and collaborative skills for learning
- ST3-DDT-01: uses design processes to create, evaluate and modify designed solutions



# Curriculum Links

## Connecting with the classroom

### Human Society and it's Environment

- HS2-GEO-01: explains how people care for Australia's environments and participate in Australian society, using geographical information

### Creative Arts (Visual Arts)

- CA2-VIS-01: makes artworks using art forms to represent subject matter and ideas, and describes ways artists convey ideas about their world to audiences through artworks
- CA3-VIS-01: makes artworks in intentional ways to represent ideas about their world, and explains ways artists are influenced by contexts and how artworks are interpreted by audiences



# Resources

## More about the Sydney Opera House

### Sydney Opera House: Our Story

- <https://www.sydneyoperahouse.com/our-story>

### How we work – strategic plans and programs

- <https://www.sydneyoperahouse.com/about-us/how-we-work>

### Community projects

- <https://www.sydneyoperahouse.com/about-us/in-the-community>

### Careers and opportunities

- <https://www.sydneyoperahouse.com/about-us/careers-and-other-opportunities>

### Creative Learning resources

- <https://www.sydneyoperahouse.com/learn/teachers-and-students/classroom-resources>

## Get in touch

Got questions? Contact us with any enquiries about our education programs for schools via phone or email.

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