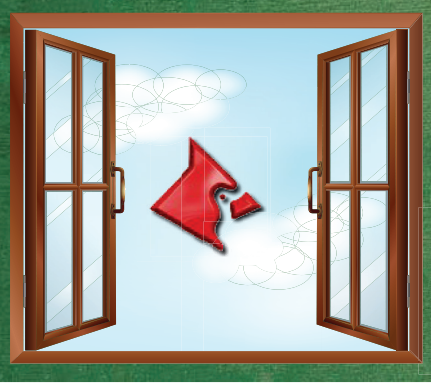


# Opening The Windows Of Curiosity



## WORLD OF WONDER

Exploring the realms of history, science, nature and technology

# BRIDGES

The first bridges were probably made of vines or logs that spanned small streams or rivers. Today, bridges are modern marvels that merge form, function, engineering, architecture and design.

Total length: 6,016 ft. (1, 834 m)
Height: 272 ft. (83 m)
Width: 85 ft. (26 m)
Span: 1596 ft. (486 m)

Originally known as the New York and Brooklyn Bridge or the East River Bridge, it was officially renamed the Brooklyn Bridge in 1915.

The Brooklyn Bridge (1883) spans the East River in New York. It was designed by John A. Roebling of Trenton, New Jersey, and was the largest suspension bridge in the world until 1931, when the George Washington Bridge was built.

## Looking back

The first bridges were formed by natural events such as a tree falling over a river. Humans quickly learned to fell trees and place them over short spans. Simple constructions of cut wooden logs or planks laid over a simple support of stones were then developed.

A revolution in bridge construction came with the ancient Romans, who introduced the arch and used cement (made from volcanic rock and lime) to build bridges and aqueducts.

The Inca civilization of the 16th century built rope suspension bridges.

Many European bridges built between the 12th and 16th centuries also had houses built on them.

The first iron bridge opened in 1779. It crosses the River Severn in Shropshire, England.

## Parts of a bridge

**Abutment**
The main support at either end of a bridge, and the sides that support an arch, are called abutments.

**Arch**
An arch is a curved structure that spans an open space.

**Bent**
A bent is a crosswise structural element used to construct a trestle, a key support element in many bridges.

**Coffer dam**
A coffer dam is a boxlike temporary dam used to create foundations under water.

**Deck**
The deck is the bridge's surface.

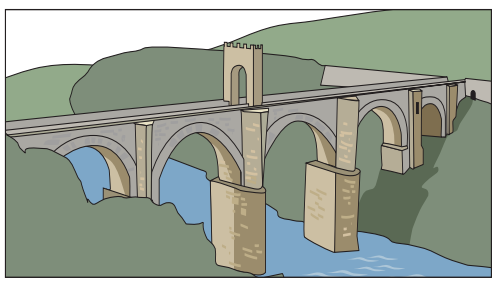
**Foundation**
The foundation connects the structure to the ground.

**Girder**
A girder is the main horizontal support beam on a bridge.

**Piers**
The piers support the bridge from underneath.

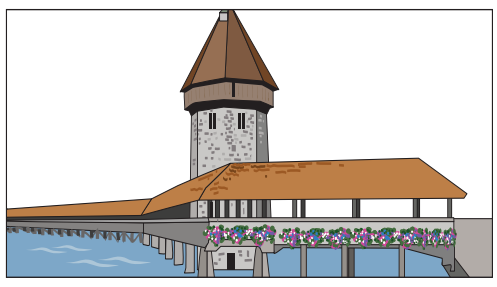
**Piles**
Piles are shafts extending deep into the ground around the piers to increase stability.

**Span**
A span is a section of bridge between two piers.



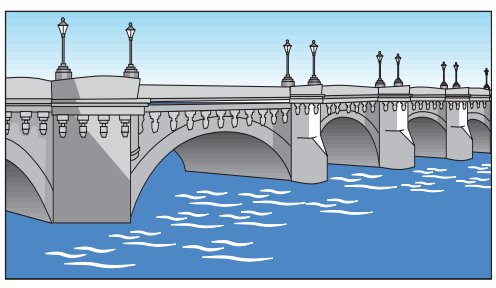
**Alcántara Bridge**, *A.D. 104-106,* Spain

Spanning the Tagus River, the Alcántara Bridge is a masterpiece of ancient Rome. Total length: 596 ft. (181.6 m)



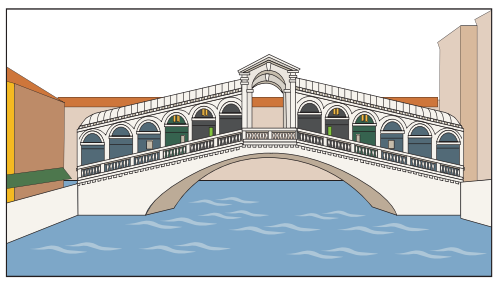
**Chapel Bridge**
*1333,* Lucerne, Switzerland

This covered bridge burned in 1993 and was rebuilt. Total length: 670 ft. (204 m)



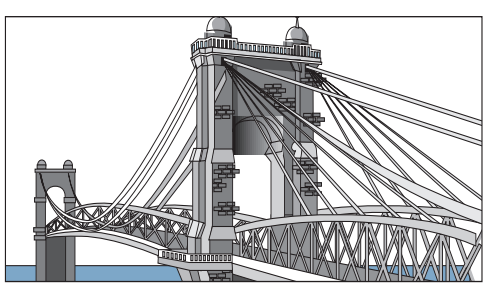
**Pont Neuf**, *1578-1606,* Paris, France

Pont Neuf translates as *New Bridge*. It spans the River Seine and is the oldest bridge in Paris.
Total length: 761 ft. (232 m)



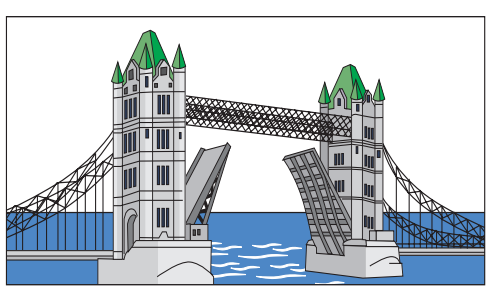
**Rialto Bridge**, *1591,* Venice, Italy

This pontoon bridge crosses the Grand Canal and replaced older wooden bridges at this location.
Longest span: 104.3 ft. (31.80 m)



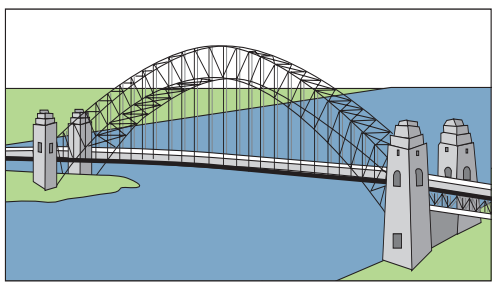
**John A. Roebling Suspension Bridge**, *1866,* Cincinnati, Ohio

Originally called the Cincinnati-Covington Bridge, it spans the Ohio River. Main Span: 1,057 ft. (322 m)



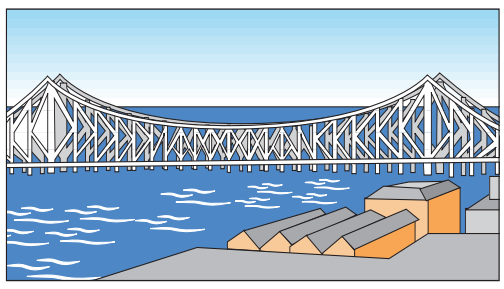
**Tower Bridge**, *1894,* London, England

This combination bascule and suspension drawbridge crosses the River Thames and is a popular tourist attraction. Total length: 801 ft. (244 m)



**Sydney Harbor Bridge**, *1932,* Australia

This bridge took eight years to build and is the world's largest (but not longest) steel arch bridge. Total length: 3,770 ft. (1,149 m)



**Howrah Bridge**, *1943,* Calcutta, India

This is one of the busiest cantilever bridges in the world. It spans the Hooghly River. Longest span: 1,500 ft. (457.2 m)

## Types of bridges

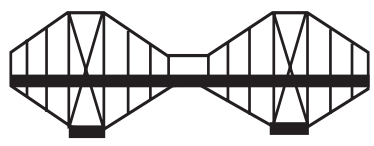
There are seven basic types of bridges: girder, truss, arch, cantilever, suspension, cable-stayed and movable.

**Girder bridges** are made of beams that rest on abutments or piers.

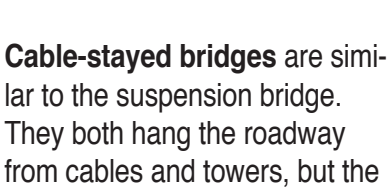
**Truss bridges** use a network of support frames. This type of bridge is often built over canyons and rivers.

The **arch bridge** is one of the oldest types and was popular in ancient Rome.

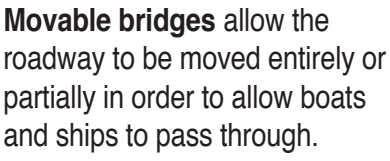
**Cantilever bridges** have two beams that reach from either side of an embankment, joined in the middle by a girder or truss.



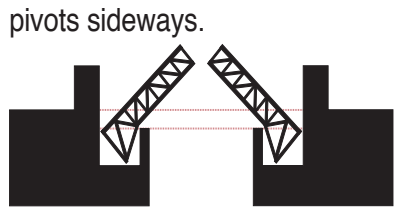
**Suspension bridges** hang the roadway from steel cables supported by towers. These bridges can span great distances, some more than 4,000 feet (210 m).



**Cable-stayed bridges** are similar to the suspension bridge. They both hang the roadway from cables and towers, but the cable-stayed bridge attaches the cables directly to the towers.



**Movable bridges** allow the roadway to be moved entirely or partially in order to allow boats and ships to pass through. There are three kinds of moveable bridge: bascule, vertical lift and swing. The bascule bridge tilts upward to open. The vertical bridge raises the roadway between two towers. The swing bridge moves on an axle and pivots sideways.



SOURCES: *World Book Encyclopedia*, World Book Inc.; The World Almanac for Kids; http://www.bridgesdb.com; http://www.historyofbridges.com; https://www.americanbridge.net; https://www.popularmechanics.com

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