

TYPES OF BRIDGES

Each time a new bridge is built, a decision has to be made on the type of bridge that will work best in the situation and location. This activity is designed to give an introduction to five different types of bridges.

TASK

Your task is to look at the specifications for each challenge and choose the bridge that works best for each situation.

Each situation provides the length the bridge will need to be, what it is crossing, and the price that can be paid. The special notes will also help you make a decision on the bridge.

The types of bridges and images are provided at the end.

BRIDGE CHALLENGE #1

You have been asked by a community to design a bridge for commuters who work and live on opposite sides of the river. Based on their requirements, choose the best bridge for this situation.

Span: 2,000 feet
Crossing: River
Connects: City highway
Cost: \$ or under

Special notes:

The bridge needs to leave enough room for boats underneath but the residents do not want a drawbridge which will cause traffic jams.

BRIDGE CHALLENGE #2

You have been asked to design a bridge for pedestrians to connect two walking paths that end at the river. Based on their requirements, choose a bridge that works best for the situation.

Span: 175 feet
Crossing: Stream
Connects: 2 walking paths
Cost: \$ or under

Special notes:

The stream does not have any waterway traffic that will need to be accounted for.

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BRIDGE CHALLENGE #3

You have been asked by to build a new bridge over a ravine in the mountains that can support a railroad track. Based on their requirements, choose a bridge that works best for the situation.

Span: 240 feet
Crossing: Uneven terrain
Connects: Railroad track
Cost: No restrictions

Special notes:

The bridge will need to support the weight of trains. There is a steel mill in the community and the company would like to use that material.

BRIDGE CHALLENGE #4

You have been asked to build a bridge that connects two countries on opposite sides of a strait (a waterway that connects 2 bodies of water). Based on their requirements, choose a bridge that works best for the situation.

Span: 6,500 feet
Crossing: Strait
Connects: Two countries
Cost: \$\$\$

Special notes:

The bridge only needs to support the weight of vehicles like cars and trucks.

BRIDGE CHALLENGE #5

You have been asked to build a bridge at the entrance of a harbor that allows for boats to pass under and serves as landmark for the city. Based on their requirements, choose a bridge that works best for the situation.

Span: 700 feet
Crossing: Harbor entrance
Connects: Harbor
Cost: No restrictions

Special notes:

There is no rush on construction because the bridge is for the 300th anniversary of the city which is still 6 years away. The city needs the bridge to be able to support the weight of a city transit system like a train.

TYPES OF BRIDGES

Arch Bridge

Length: Up to 800 ft

Cost: \$\$

Advantages: Very strong due to the weight being transferred along the curve of the arch rather than directly down and become stronger over time due to compression.

Disadvantages: Take a long time to build and need stronger supports and foundations than other bridges.



Truss Bridge

Length: Up to 350 ft

Cost: \$

Advantages: Few materials are needed with little waste. Can be built in almost any area and strong enough to hold weight (like trains).

Disadvantages: If built incorrectly, there can be beams that support no weight and can be costly to maintain.



Cable-Stayed Bridge

Length: Up to 3,000 ft

Cost: \$\$

Advantages: Less expensive and quicker to build than suspension bridges and can be built high to allow for traffic (like boats) to pass underneath.

Disadvantages: The cables need to be checked regularly as they are exposed to high levels of stress and can be unstable in certain environments like wind.

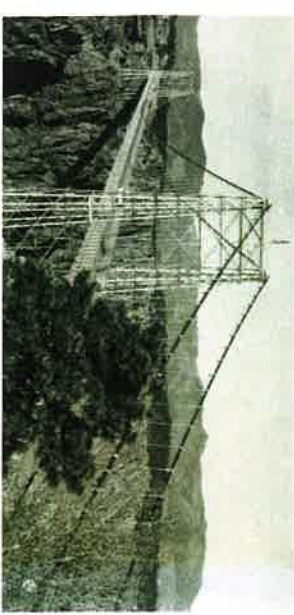


Suspension Bridge

Length: Up to 7,000 ft. **Cost:** \$\$\$

Advantages: Can span longer distances than other bridges and built high to allow for other traffic to pass underneath (like boats)

Disadvantages: Expensive to build and cannot hold a lot of weight (like trains).



Beam Bridge

Length: Up to 250 ft

Cost: \$

Advantages: Simple to build, very affordable, and can be built fairly quickly with a variety of materials

Disadvantages: Only good for short spans and cannot support too much weight.

