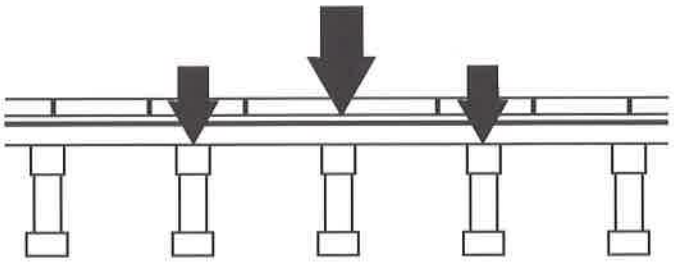
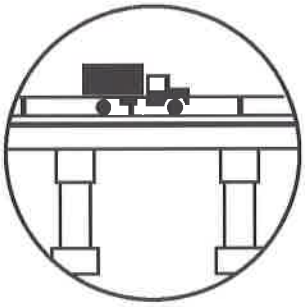
Part B: Why are different structures used for similar functions?

The word "**bridge**" means to connect two different things. **Structural bridges** are used to carry a road, path or railway across water, canyons, roads, etc., to connect both sides together. A bridge must be strong enough to carry the weight (load) of the road and the vehicles that travel across it. There are six basic bridge designs that are used today—the beam bridge, truss bridge, arch bridge, cantilever bridge, cable-stay bridge and suspension bridge.

Beam Bridge

A beam bridge is made of long timber (wood), metal, or concrete beams anchored (firmly attached) in the ground. The road sits on top.

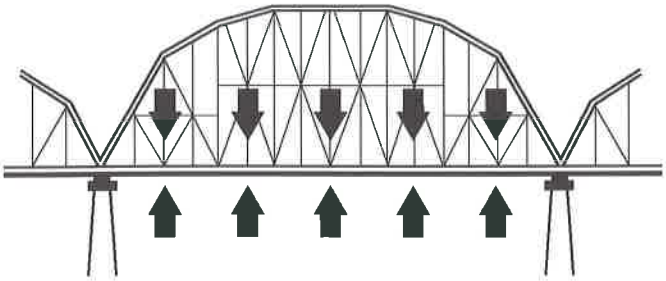


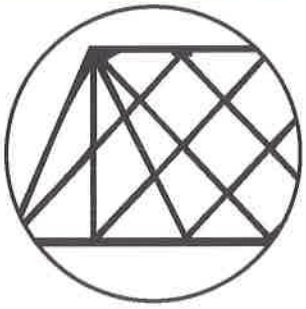


The weight of the road travels down the support beams. The bases of the beams are wider to try to spread the load and make the bridge stronger.

Truss Bridge

A truss bridge is a beam bridge with extra beams that cross over in a lattice pattern (see graphic) to share the weight of the road more evenly.

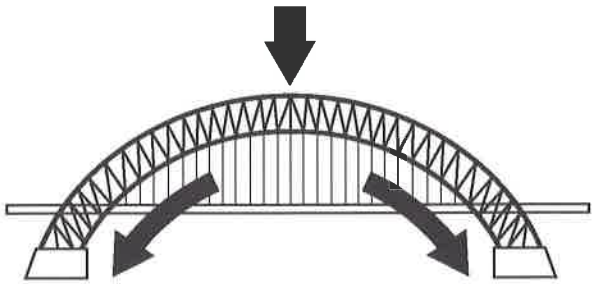




The weight of the road is shared evenly by the lattice of beams and makes the bridge stronger.

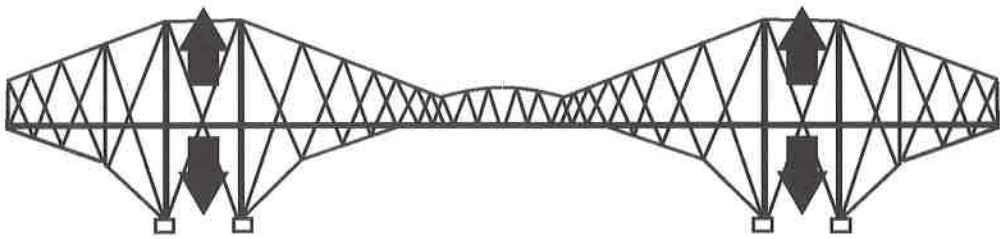
Arch Bridge

An arch bridge is made of steel or concrete parts that form a semi-circle shape. It shares the load evenly and presses outward at each of its ends and holds it tight against the bank.



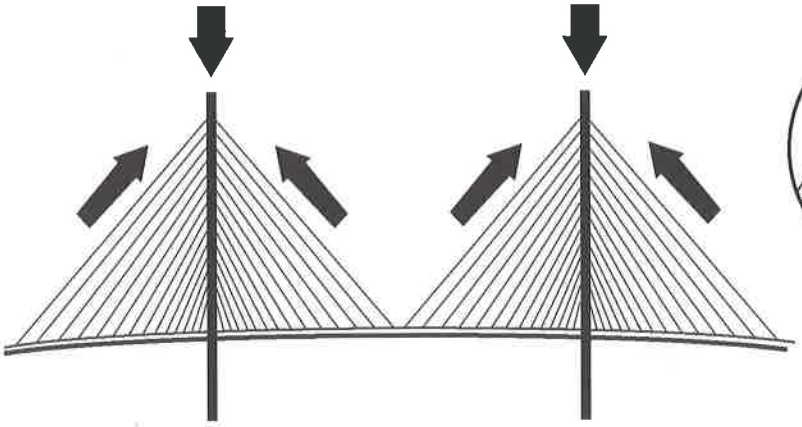
Cantilever Bridge

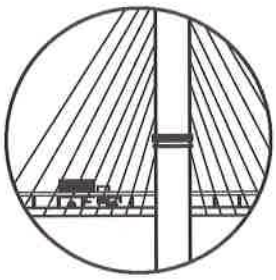
A cantilever bridge is made of two "arms" that are anchored at the end and hold themselves up. The two arms meet in the middle and are connected by a third piece.



Cable-stay Bridge

A cable-stay bridge has steel cables that are connected to support towers all along the bridge. The road hangs from the cables.

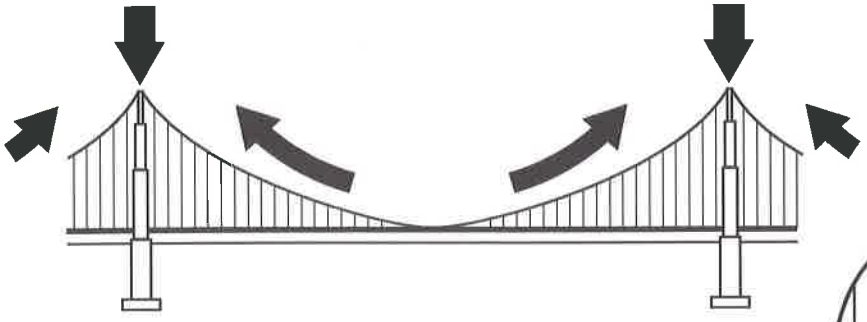




The weight of the road is supported by the towers that all of the cables connect to.

Suspension Bridge

A suspension bridge has steel main cables that are attached to support towers and have their ends anchored in bedrock or concrete down below. The cables along the bridge are attached to the main cables.



The weight of the road is supported by the towers and shared along the main cables that all of the other cables connect to.