

# Building Bridges

Learning Objective:

To explore ways in which trusses can be used to strengthen bridges.







A truss is made up of several beams connected together in different ways.



These are truss bridges. Engineers can make stronger, longer bridges by using trusses in their designs.



The bridge deck runs through, or on top of the trusses.





# Why do trusses make bridges stronger?



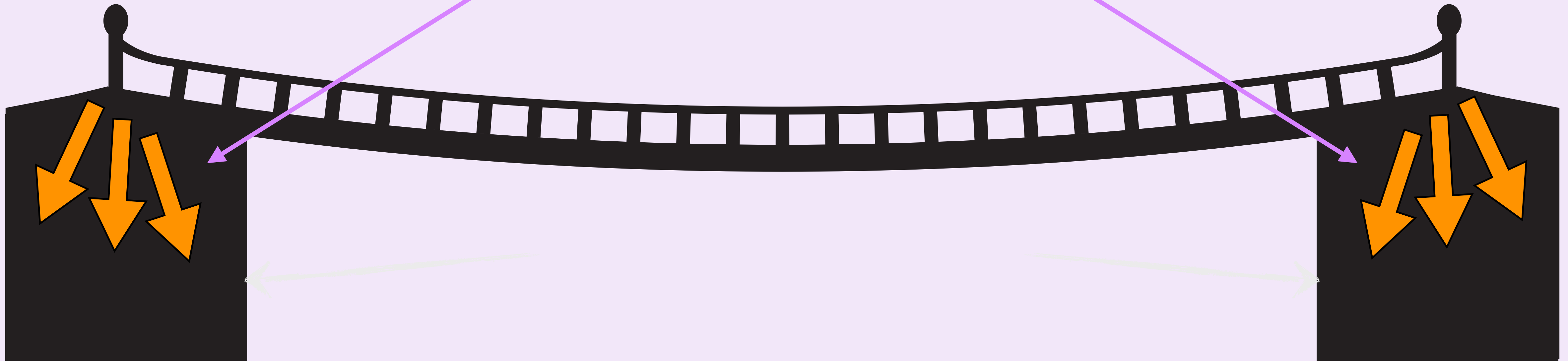
This old roof is sagging and bending because of the downward force of gravity. Imagine what could happen if a bridge sagged like this!



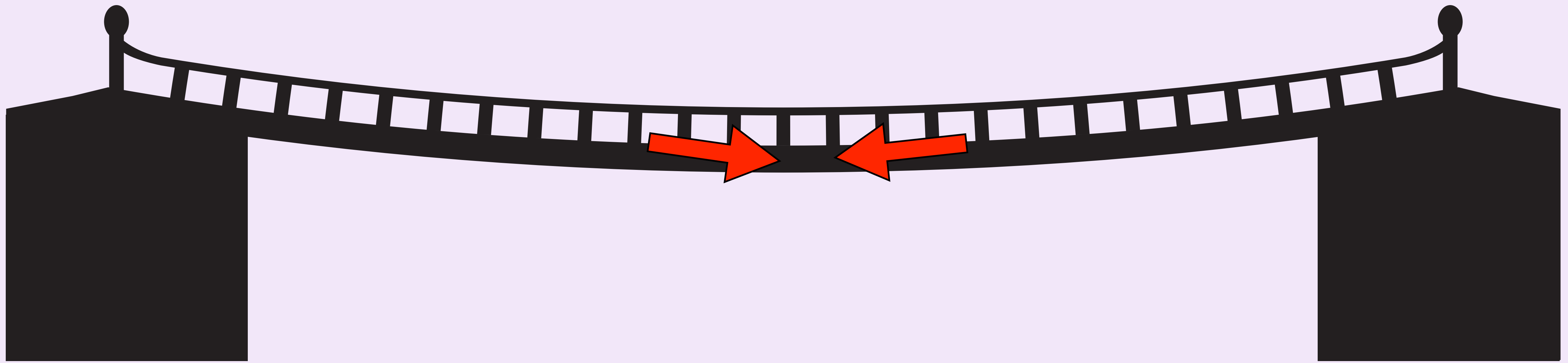
Gravity is a downward force acting on bridges. This downward force pulls down on the beams and decks, causing them to squeeze, stretch, twist and bend.



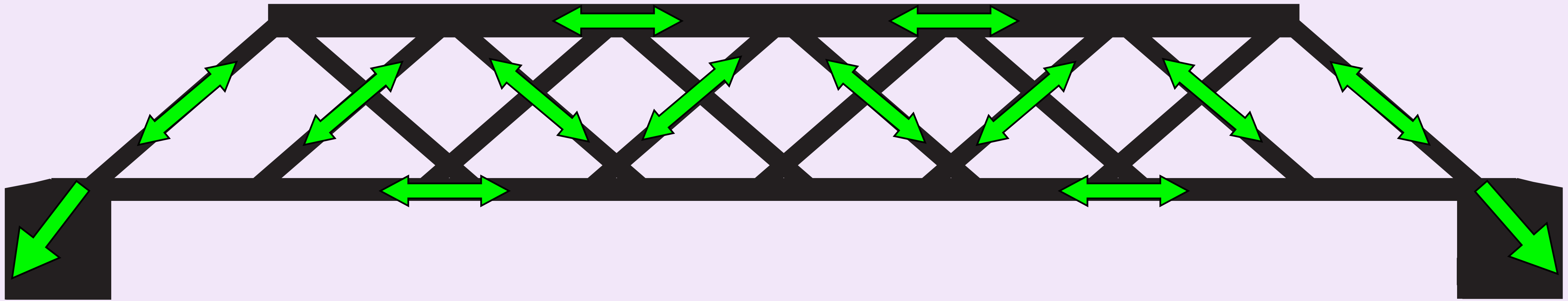
# ABUTMENTS



Gravity acts on the beams, decks and pillars of bridges, generating compression forces. The orange arrows show how these compression forces are spread out at either end of the bridge, where it rests on its abutments.



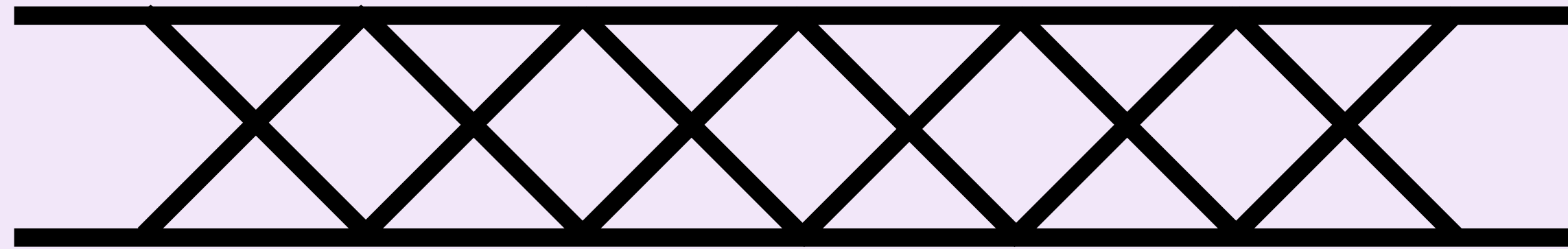
Gravity has the greatest effect at the points furthest from abutments or pillars. The downward force compresses, bends and stretches the beams. Unless it is supported, or the weight is spread out, the bridge might break!



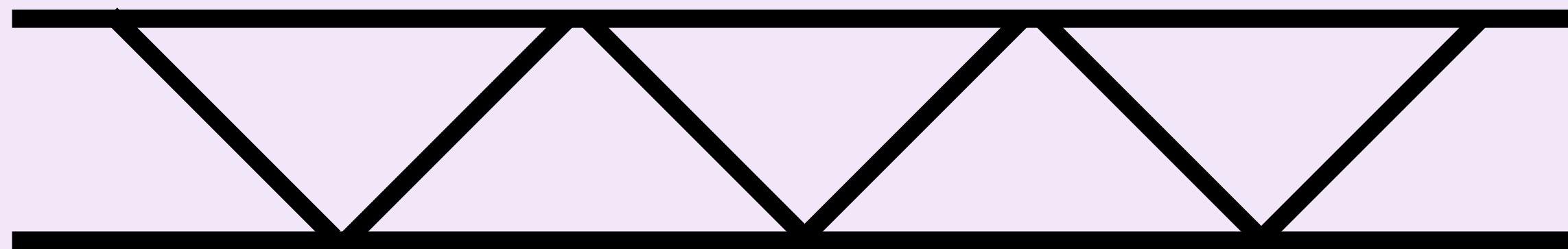
Trusses help strengthen bridges by distributing the weight along its length and transferring the compression forces down through the pillars and abutments.



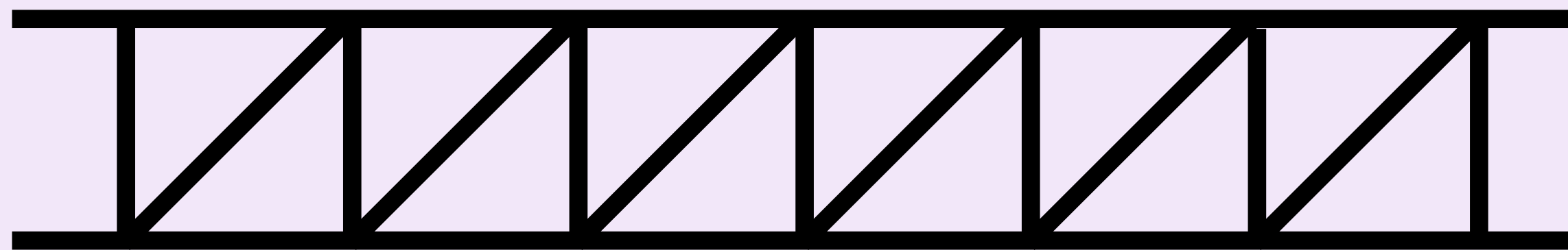
These three types of truss are all commonly used in bridge designs...



Lattice truss



Warren truss



Pratt truss



I wonder which one bends the least? Or which one twists the least? Is there a way we could test them?



Today we will be exploring ways in which trusses can be constructed and used to strengthen bridges.





## PLENARY

Define this technical vocabulary in your own words:

pier

parapet

deck

abutment

truss

pillar

compression

Can you link two or more words in a statement to show what you have learned?

