

Building Bridges

Learning Objective:

To develop criteria and design a prototype bridge for a purpose.



This power station needs a new road bridge so that trucks and other vehicles can cross the river nearby. There is a lot of traffic travelling to and from the power station every day. Some of the vehicles are very heavy. Boats use the river.



Design a bridge and build a prototype model to scale.





Before designing a bridge that will meet a brief, we need to write the design criteria, which is a bit like a list of all the things a design must do if it is to meet the brief. Here's a bit more information to help you:

The approved location for the new bridge is 50m wide.

Some of the boats that use the river are up to 20m high.

Local residents and the power station's directors want a design that is functional and attractive.

What should the design criteria for this bridge say?

Did you think of these design criteria?



- The bridge must span a gap of 50m
- It must allow traffic to pass in both directions
- It must have a clearance of at least 20m
- It must be strong
- It must be attractive



The prototype model for this bridge will be 100:1 scale.
What does that mean?

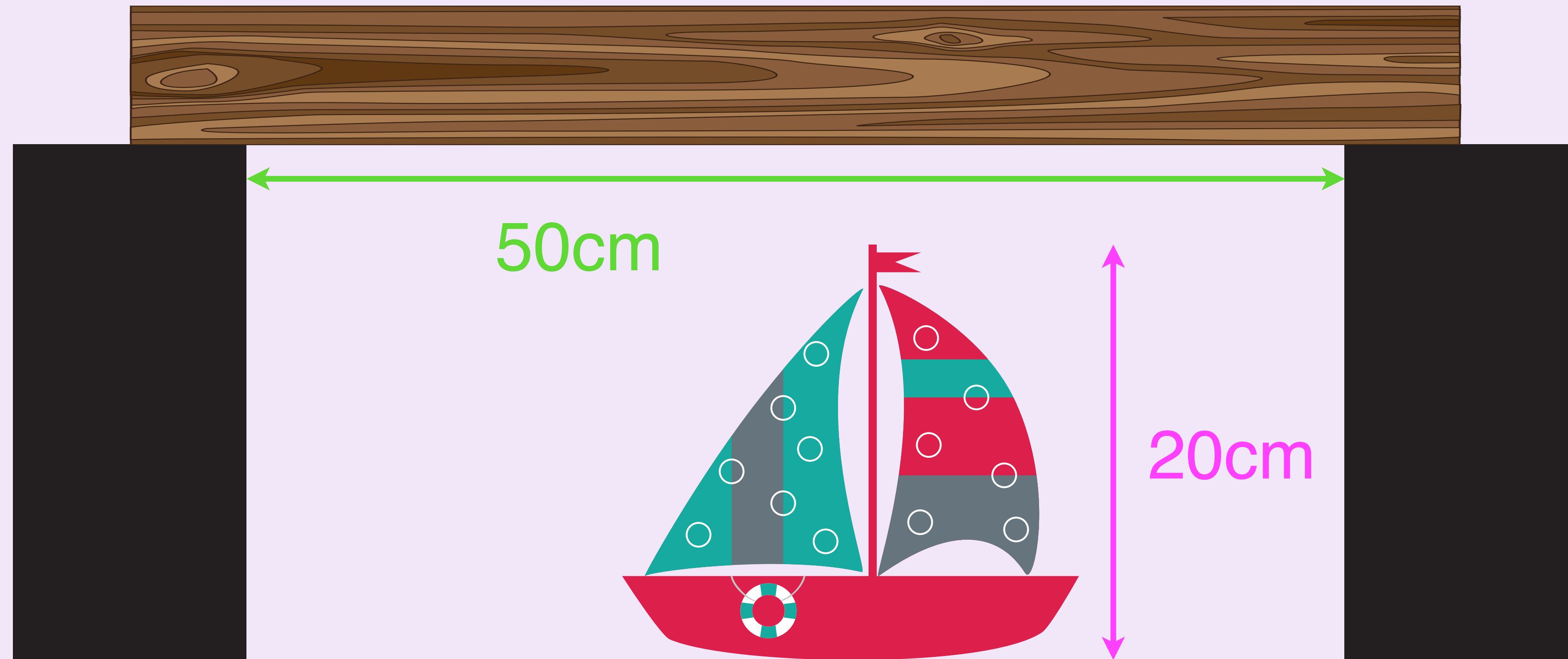
Technical drawings and models are often drawn and built to a scale that is smaller than the final product. This prototype model bridge will be built at 100:1 scale, which means it will be $1/100^{\text{th}}$ the size of the real thing!

What sizes would the model need to be?

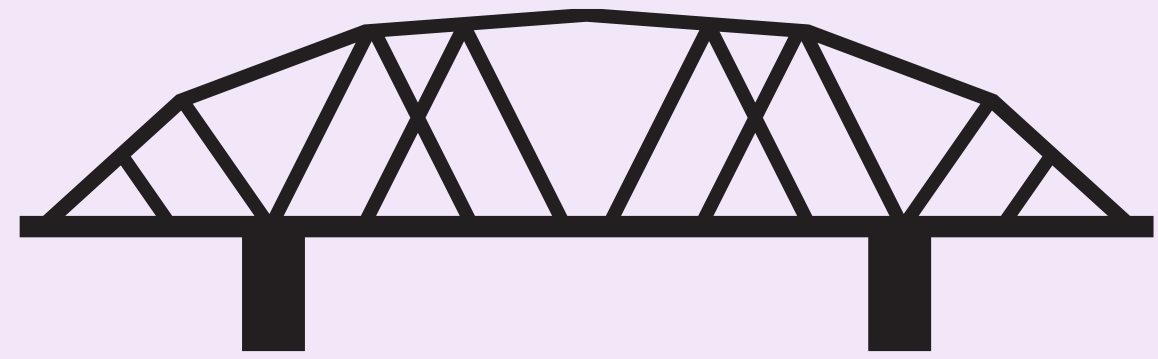
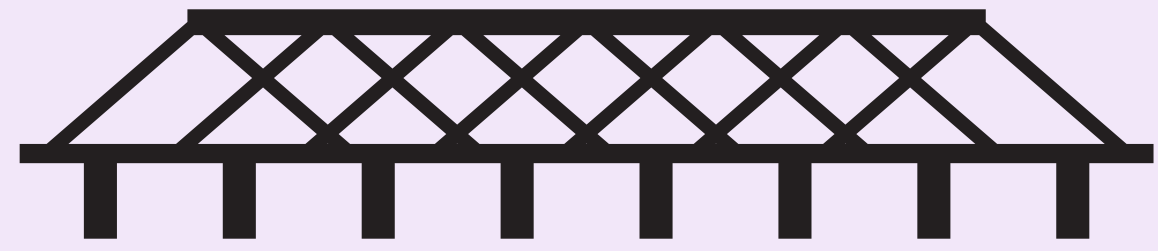
Discuss your ideas.



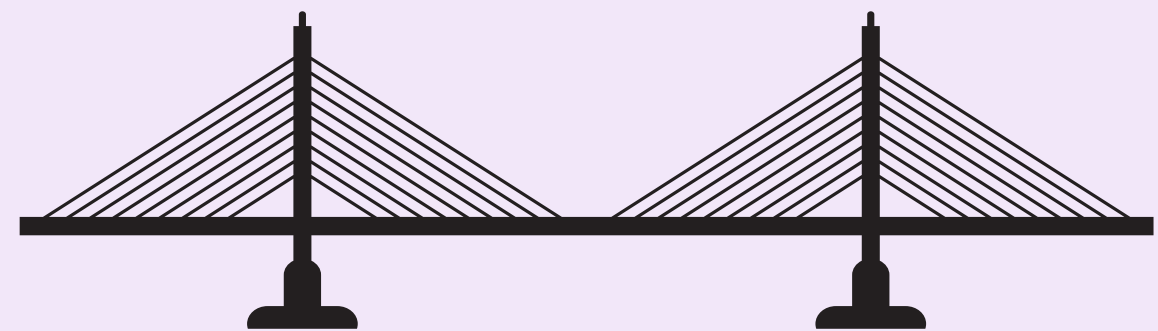
The model bridge would need to be a bit more than 50cm long and have a clearance of a bit more than 20cm to meet the brief.



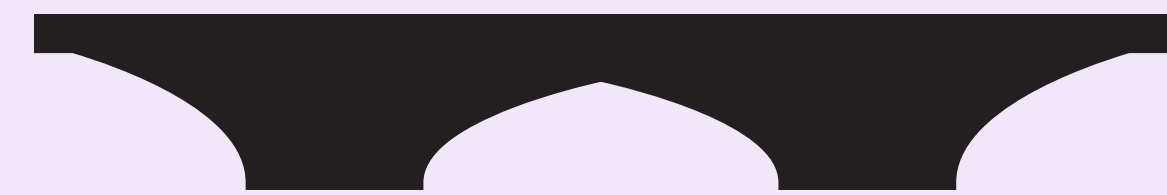
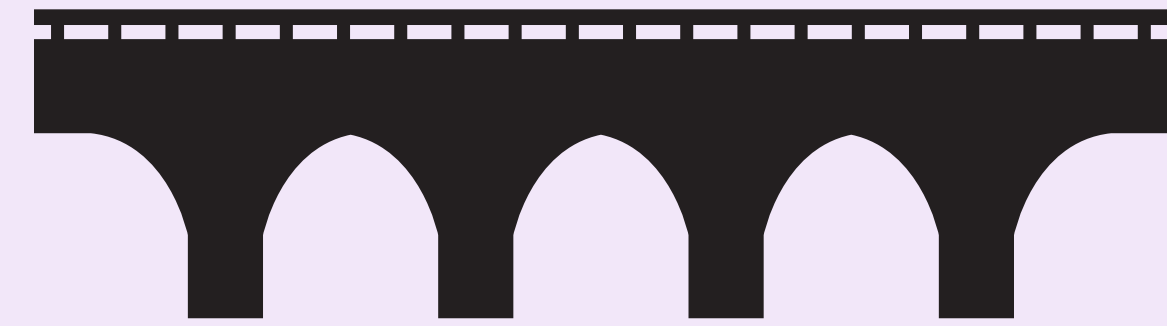
What type of bridge could you design?



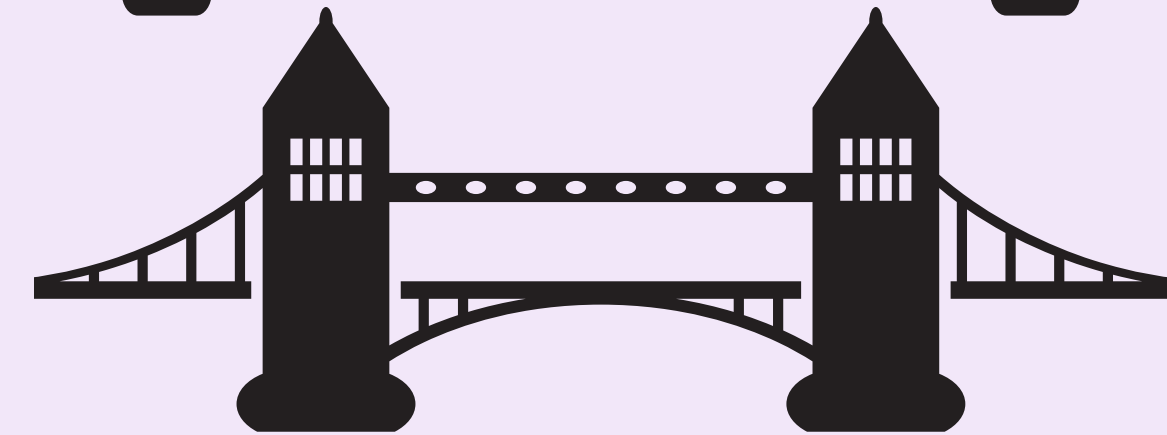
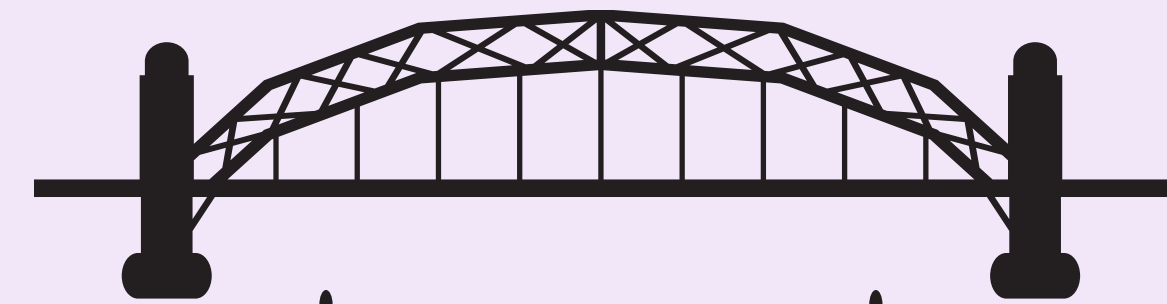
A truss bridge?



A suspension bridge?



An arch bridge?



You could even combine techniques in your design!

These are the only equipment and materials you may use to make your model:



scissors



paper and card



sticky tape



glue



paper straws



string



Are you ready? Today we will be designing and building prototype model bridges according to design criteria such as these:



- The bridge must span a gap of 50m
- It must allow traffic to pass in both directions
- It must have a clearance of at least 20m
- It must be strong
- It must be attractive