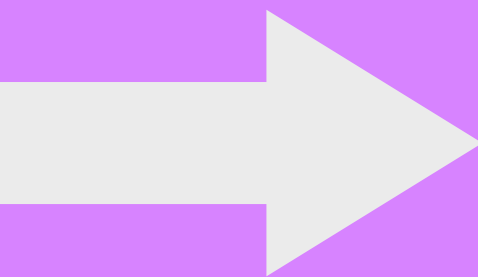


Building Bridges

Learning Objective:

To explore ways in which pillars and beams are used to span gaps.



What were the first bridges like?



The earliest bridges were probably found, rather than built.

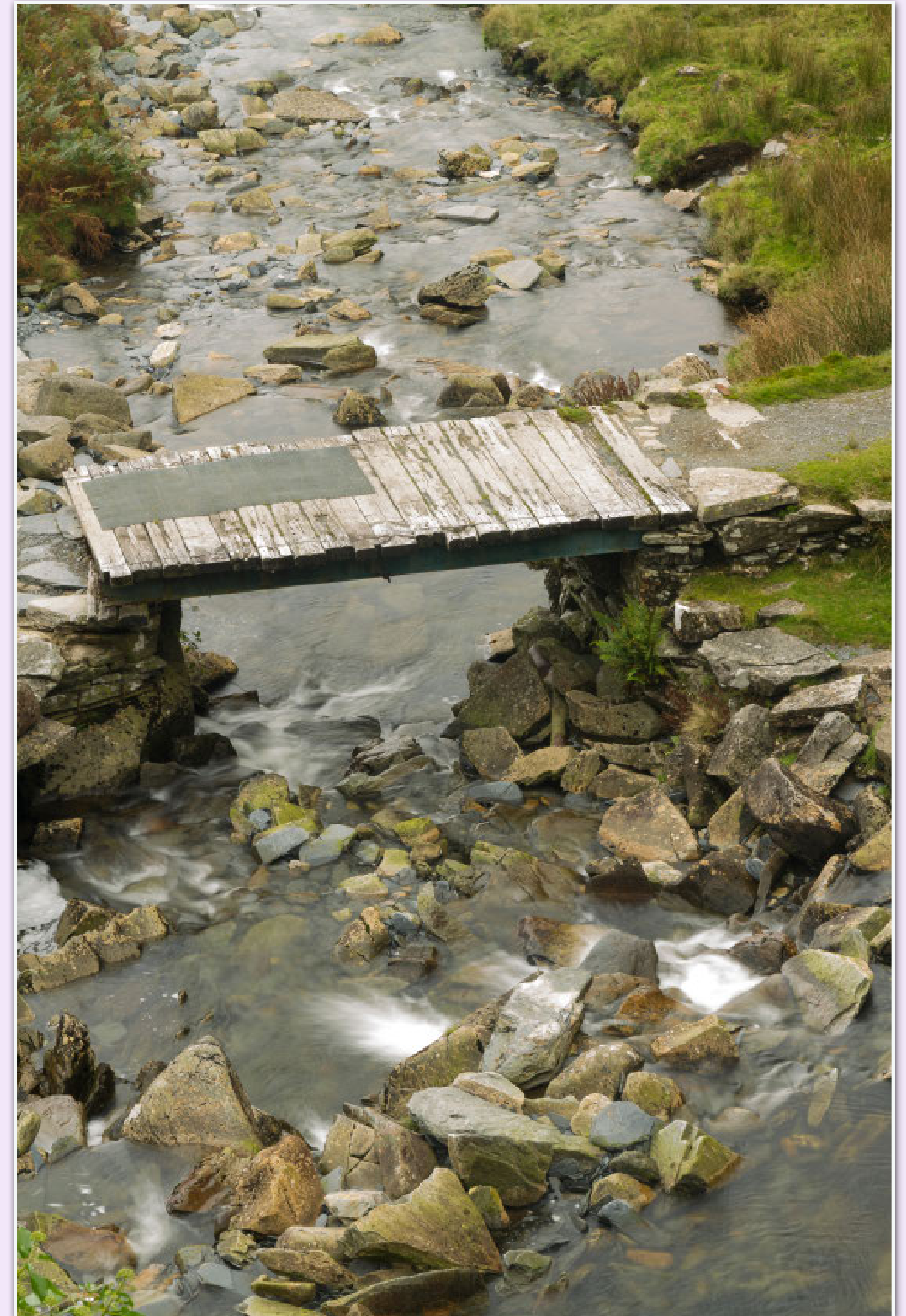


Fallen trees, like this one, allowed people to cross streams safely without their clothes or belongings getting wet.

Early bridge designs were not much different. Beams were used to span gaps, much like fallen trees did.



Put simply, a beam is just a length of sturdy material that has been cut and shaped to span a gap or support a floor or roof.





The flat surface of a bridge is called the deck. A smooth, flat deck allows wheeled vehicles to cross.

This wooden beam bridge has side sections with hand rails. The side sections of bridges like this are called parapets. They make the bridge more sturdy.

Spanning bigger gaps

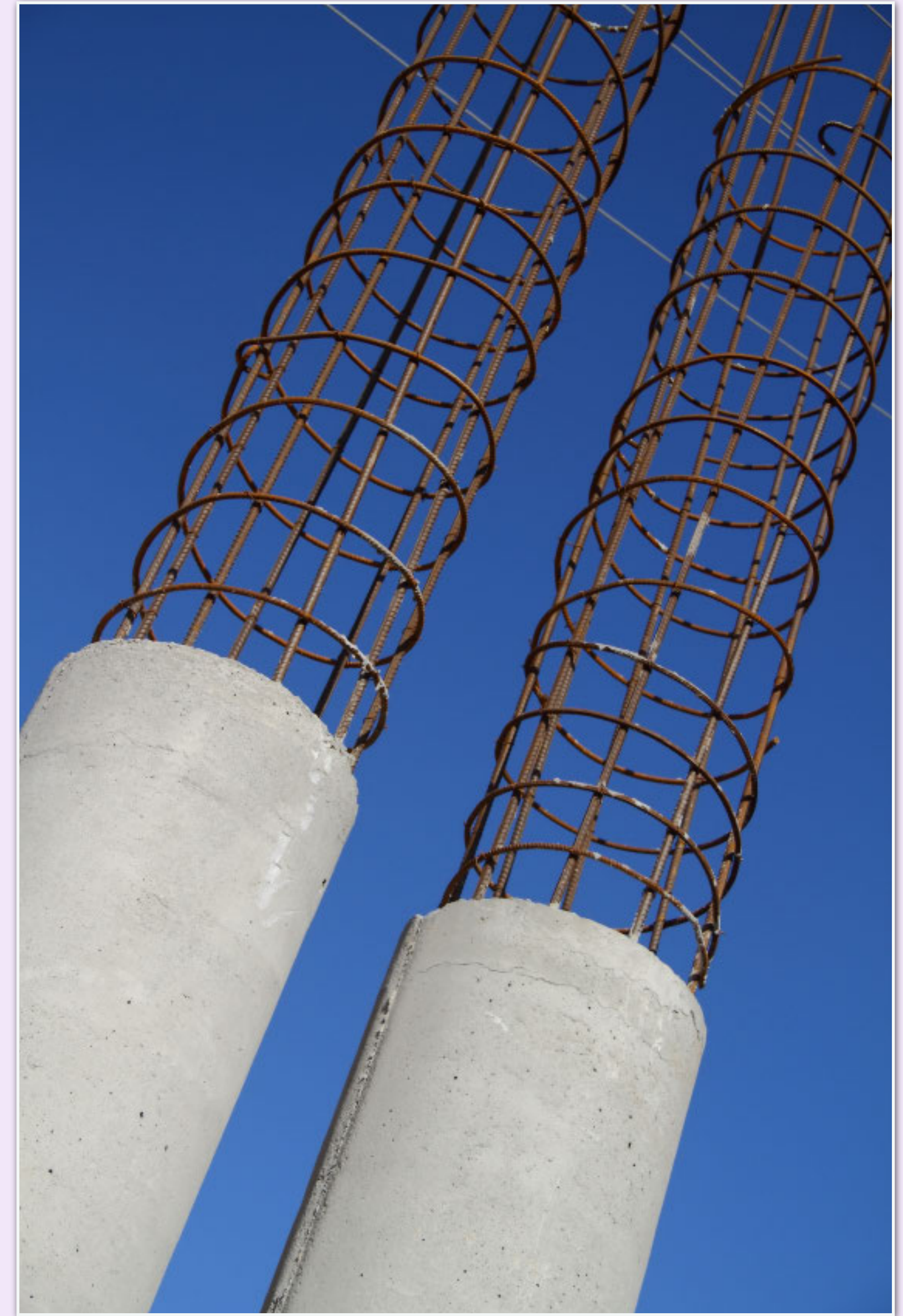
Building pillars allows bridge builders to span bigger gaps. The pillars of this old 'clapper bridge' have been made using cut and shaped stone.



Steel and concrete are often used in the construction of modern bridges. Beams and pillars made of these materials can be made much bigger, longer and stronger.



Another useful property of steel and concrete is that they can be formed into different shapes...



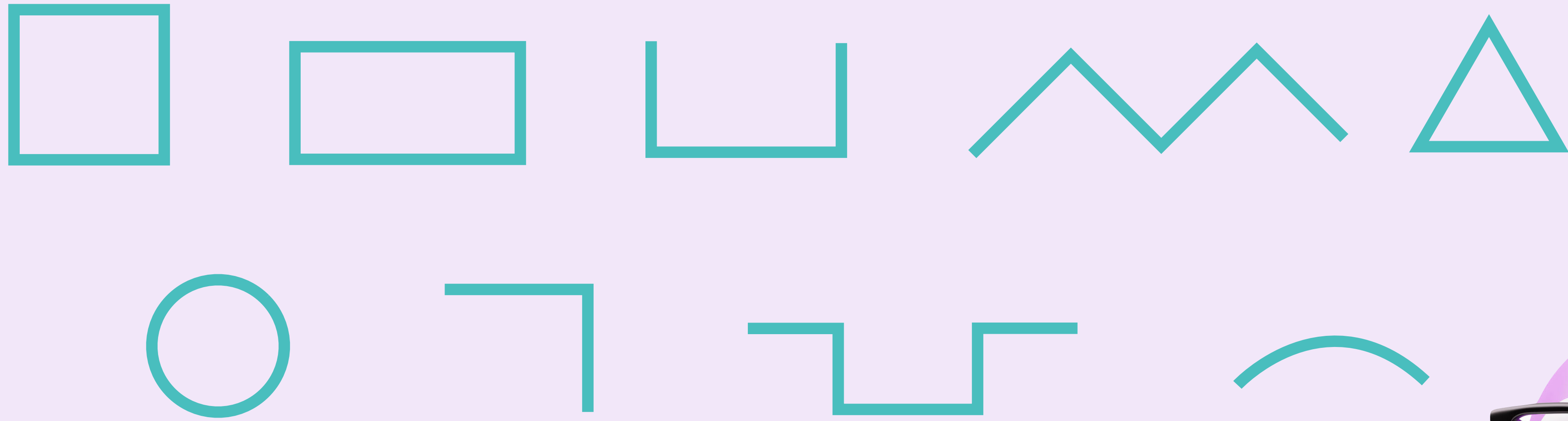


Beams and girders

Beams are formed into different shapes for different purposes. Certain shapes are much stronger than others, too. Steel girders, like these, are often used in bridge construction. Tubular steel in different shapes is also used frequently.

Different beams for different jobs...

Here are some cross-sections of different beams used in modern construction:



Which do you think will be strongest?





The Millennium Footbridge in London stands on huge, concrete piers.

Modern materials and techniques mean that huge bridges can be built across deep water. Bridge pillars cannot be stood on the river bed – they would wash away. Instead, they stand on man-made islands with deep foundations called piers.



Today we will be investigating and exploring the effectiveness of different beam or pillar designs.