

# Ilona Hurrell's "Building bridges" badge in a night!



**Ilona is a Bridge Engineer. She's involved in the design, construction and maintenance of bridges! Ilona was curious about how things like bridges work, particularly how they hold themselves up.**

"I know I have always been different from my friends - sometimes picked on for these differences - but it took until I was 33 to be diagnosed with Asperger's. Focusing on the things I can do, rather than the things I can't do, I have channelled my 'super powers' and built a career around this."

- Ilona Hurrell

Want to earn your "Building bridges" badge? Spend a night having a go at the activities in this pack. You can do as many as you like, but have a think about which activities will suit your unit best. Some are aimed at Rainbows and Brownies, while others are more for Guides and Rangers. You'll find the badge [in our shop](#).

## Building bridges

These activities will take you through the whole bridge building process, including planning, designing and construction. You'll need a few things to create and test your bridges:

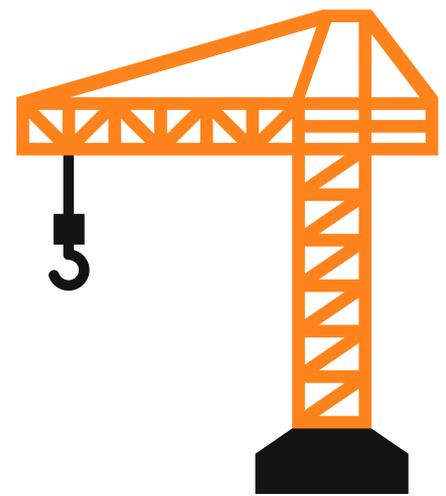
- pens and paper
- cardboard
- scissors
- string
- sticky tape
- a 30 cm ruler
- a clock or timer
- weights for testing

When it comes to testing your bridge, you could use tin cans, toy cars, or something else!

Reduce: can you use less material?

Reuse: can the material be used for something else after?

Recycle: how are you going to dispose of your bridge?



# For leaders

Leaders, in this activity you are the client, so you'll need to tell the teams what kind of bridge you need them to build! You could ask for a bridge that is a certain length, a certain height, or that must hold a certain weight. You could assess the construction based on sustainability or ask for a specific overall design. You could also give points on 'waste management' for teams who tidy their construction site once the building is done.

## 1 Planning

During the planning stage, you'll work with the client to define the scope of the work (what the project will involve) and create a plan for the construction. Your leaders are the clients for this project, so they will tell you the scope. When your team is building your bridge, someone will need to keep an eye on the time to make sure you meet the deadline with a finished bridge!

Once your leaders have selected their criteria, they will give you a brief telling you what they want you to build. You'll need to tell the teams how long they have to design and then construct their bridge.

## 2 Designing

In the designing stage, engineers work in teams to communicate ideas through meeting, reports and drawings. They identify suitable materials and define material properties, like tension (being stretched tight) and compression (being squashed).

As a team, think about how you are going to communicate your ideas. Will you draw them? Write bullet points?

Now you're going to spend some time designing your bridge. You'll be told how long the design stage is in the brief you get from your leaders. Think about what materials you will need. What makes them strong? Are they better at being pulled or being squashed? How sustainable are they?

The weakest part of a structure is often the connection between two pieces of material. How are you going to connect your bridge together?

At the end of the design stage, each person in the team should know what the plan is and how you are going to work together to build your bridge.



## 3 Construction

Now you're in the construction stage! In this stage, contractors are brought in to do the building, making sure everything is being done safely and sustainably, including waste management.

It's time to get building according to your plan... You'll be told how long the design stage is in the brief you get from your leaders.

When you're building, remember to:

- think about being safe
- think about how to make your bridge more sustainable
- communicate with your team to make sure you're following the plan together
- be aware of waste management and make sure you leave a tidy construction site!

## 4 Evaluation

Once the construction stage has finished, the leaders will evaluate your bridge based on the original brief. How well does your bridge fit the brief?

## 5 Bonus activity: costing

Using a ruler to measure your materials and thinking about what equipment you used, estimate how expensive your bridge cost to make. Whose bridge was more expensive? Whose was the cheapest?

Use these amounts to work out the bridge cost:

- cardboard is 1p/cm<sup>2</sup>
- string is 5p/cm<sup>2</sup>
- tape is 10p/m
- a pair of scissors is £1/pair

Leaders, you'll need to decide the cost of any other materials used.

