

# Bridges to Schools

## Facilitator Guide



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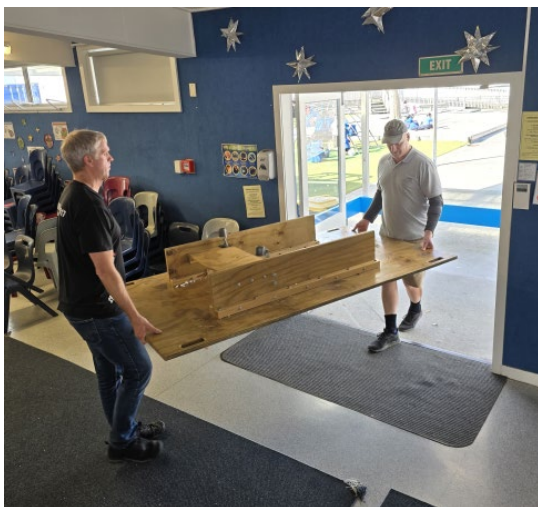
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### Room Setup

Follow the guidelines provided by the Engineering Services team.

Some additional points to consider:

- There are 4x heavy items to carry. 2x base boards and 2x frames. Ensure you have at least 2x people carrying each item, more would be ideal.



- If it is your first time setting up the bridge, it's encouraged to do a test build before the students arrive to ensure your measurement between base boards is correct and they are exactly parallel to each other.
- Place 6x panels and 12x billets on each side of the bridge, in no specific order.
- Gather PPE (**hard hat, glasses, hi viz vest, boots**, ear protection, chin strap and gloves) and put it to one side (out of sight of students).



## Pre-session with group

### Intro to the session

(As students arrive, check that they are all wearing closed-toe shoes, send the ones that aren't back to class to get them. This should also be mentioned to the school beforehand)

Introduce yourself and mention you're from Fletcher Construction to teach them how to build a bridge.

Has anyone built a bridge before? What about a Lego bridge?

Tell them that **THEY** are building the bridge and you're just there to supervise. And they'll get to walk on the bridge afterwards!

Keep this section short!

### Students facilitated learning

Students will learn more from thinking about a question and given time to answer it as opposed to being given information, so spend less time talking about Construction and Engineering and give students the time to answer questions and teach each other.

Has anyone heard of Fletcher Construction?	
What do you think we do?	

<p>Fletcher construction has built some really cool things around Auckland.</p> <ol style="list-style-type: none"> <li>Who knows what the tall pointy building in the city is called?</li> <li>Who has gone through a long tunnel out in west Auckland?</li> </ol>	<ol style="list-style-type: none"> <li>Sky Tower</li> <li>Waterview tunnel</li> </ol> <p>You can add others.</p>
<p>What do you think engineering means?</p>	<p>Ask a few students as they may have differing responses</p>
<p>Does anyone know someone who is an engineer?</p>	<p>Allow students to pop their hand up and say who the person is and what they do. Ask a few students. Emphasize the different types of engineering as students mention it.</p>
<p>What does STEM stand for?</p>	<p>Science, Tech, Engineering, Mathematics</p> <p>These are really important and fun subjects to learn if you want to consider a career in engineering</p>
<p>Has anyone heard of PPE? What do the letters PPE stand for?</p>	<p>Hint if needed: They are used to keep us safe on site</p> <p>Personal Protective Equipment</p>
<p>What are some types of PPE? Ask them what each one protects you from.</p> <p>What do you think is inside the boot?</p> <p>When do you think you'll need to wear a chin strap? Or ear protection? etc</p>	<p>As a student calls out the answer, give them the item to wear and stand in the front of the group (don't force them to, someone else can stand up if someone doesn't want to)</p> <p>Pass around the boots and ask students to knock on them!</p> <p>Tell them what mandatory PPE is at all sites (Hat, glasses, Hi-Viz, boots), the others are only mandatory at some sites.</p>



## Toolbox talk

What is a toolbox talk?

Every morning, everyone onsite comes together to talk about the hazards that are onsite for the day. Each day could be different. And each site can be different too.

So, we're going to have a Toolbox Talk. (*Demonstrate as you go through the below*)

At this site everyone must wear closed-toe shoes, because some of the items are heavy and can injure your bare feet
We are going to use billets, which are like connectors used to put the panels together. Be careful when pushing them into the panel not to pinch your fingers
2x students need to carry a panel and communicate to each other when moving around the site
The cables are quite heavy and if you drop them, you could knock someone on the face, shoulder, leg
Do not walk on the bridge until it is completely built, and we have given the all-clear
Everyone grab a Hi-Viz, and remember to zip it up, a hard hat (and gloves if they want to)

Split the group into 2x even groups.

**Tip to get started:** Show the trig and tell them it needs to go into the first panel. Allow the students to figure out what that means.

## During the build

DO NOT MENTION THE FOLLOWING (allow students to figure it out):

Colour coding on the panels	Allow them to figure it out, but if guidance is needed, ask: how do you know that panel goes next? Is there something indicating on the panel that that is that correct one?
Colours of the cables	As above, let them figure it out
Twisted cables	They might figure it out, if not ask if the cables look safe and neat
How to connect the shackles	Ask other students to show a struggling student how to do it

Students learn from trial and error. Let them get it wrong and spot their own mistake and how to fix it.



## Completed bridge game

### Paper, Scissors, Rock game

Once the bridge is complete, set up cones and wands like the image below.

Let the 2x teams line up on either side of the bridge to play a game on Paper, Scissor, Rock.

- One from each team meets in the middle, plays the game and the loser gets off the bridge as indicated in the image.
- The next person from the losing team walks to the middle to challenge the winner of the previous round. The loser steps off and so it continues.
- The team who runs out of players is the losing team.
- You can play several rounds as some of the winning team player may not have had a turn.

### Post build discussion

Get everyone to sit down and ask a few questions:

Was that difficult?
What was the hardest part for you?
What part was really easy?
You could point out some students that stood out. Maybe one of the shy students spotted something important, or someone showed great leadership skills, someone helped another Student etc

Then, instruct the students to disassemble the bridge, reminding them to work backwards.

