

■ BRIDGE

STUDENT QUICK-START

SCENARIO

You and your team are stuck in an old mine shaft and have discovered a trolley of gold. You need to build a bridge to transport your gold to the outside world.

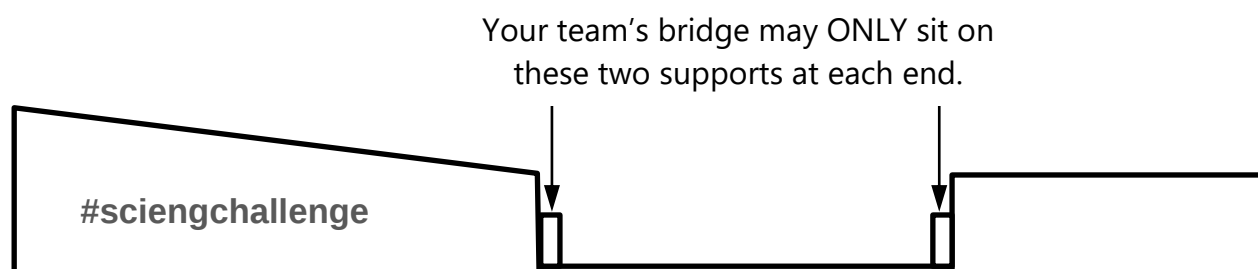
AIM

The aim of this full-day activity is to build a light and strong model bridge to carry 'gold' ingots from one side of the test rig to the other.

WHAT TO DO

Your team needs to design and construct a model bridge from a fixed quantity of balsa, cardboard, wooden sticks, string, masking tape and paper. Masking tape will be dispensed by the Activity Personnel; paper clips are also available. A small saw, cutting block, ruler and scissors are provided as tools to use for your construction.

Begin by using the paper provided to draw a design of the bridge your team will construct. Take note of the recommended height and width and determine the length your bridge will need to be. Before finalising your design, consider the strengths of the materials and how these can be used to distribute the weight on your bridge to the supports at each end of the gap. Additional help may be found in the Tips section (over page).



TIMETABLE

Full Day Activity	
Session 1 (1h 45m)	Following a 5-minute briefing by your Activity Personnel, your team should spend about 10 minutes designing the bridge that you'll build before moving onto its initial construction.
Lunch Break (30m)	
Session 2 (1h 45m)	After the break, your team has approximately one hour to complete your bridge. The official Weigh-In and Pre-Finale test will start 20 minutes before the end of the session.
Finale	Your team's bridge will be tested in front of everyone present at the end of day Finale.

RULES

Your team must construct one bridge to be tested during the Finale from only the materials provided. None of the equipment, for example a ruler, may be used to construct the bridge.

The trolley and ingots may be handled but cannot be placed onto a bridge before the Finale.

The saw may only be used to cut materials that are securely placed on the cutting block.

The bridge must sit on these two supports at each end and cannot touch the bottom of the gap or be attached to the test rig in any other way.

You have access to the test rig right up until the Pre-Finale testing. Once your bridge has been officially weighed and completed the Pre-Finale testing it cannot be further modified.

At all stages, your team is responsible for placing your bridge into the test rig and laying the deck across it. During the build phase, you may only test the deck without trolley or ingots.

During the Finale testing of your team's bridge the trolley will be released, **not** pushed, by a member of the team from a fixed, stationary position at the highest point of the slope.

During the Finale testing, each team has a total of 60 seconds to make any minor adjustments to their bridge between attempts. At most 3 attempts per load are allowed.

Official judges will decide if an attempt is successful or whether a bridge is busted. The trolley must completely clear of the gap before tipping over or leaving the track.

SCORING

The final score is determined by the weight of the bridge and the load it carries. A Weigh-In Bonus of one point per gram under the upper weight limit is awarded.

Points for weight and holding the deck are awarded during the Pre-Finale test. Additional points are awarded in the Finale testing according to the load the bridge can carry. Each test must be done in order.

It is critical to read the score sheet and rules to understand how points are awarded.

⚠ Ensure that your Score Sheet is returned to the Activity Personnel.

TIPS

Your bridge must fit into the test rig; if your bridge doesn't fit, it can't be tested!

Before you start to build, it is essential that you measure the test rig carefully. Throughout the day you should continue to check that your bridge fits into the rig.

Triangles are common in bridges and other structures as they are very strong. Consider how they may be joined to add strength to different sections of your bridge

Light bridges earn more points, so choose materials carefully and weigh your bridge often.

There is a big difference between a static and dynamic load. Keep this in mind when you are placing the deck on top of the bridge; a sudden drop could prove catastrophic!

If the top of the bridge is uneven the trolley may bounce as it crosses the deck. Neat construction also reduces the dynamic load when the trolley and ingots cross the bridge.

Materials perform differently if they are compressed, stretched or bent.

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