

# Science and Engineering Challenge

## 2022 ACTIVITY DESCRIPTIONS



	BRIDGE	CONFOUNDING COMMUNICATIONS	ELECTRACITY	GRASPING AT STRAWS
Aim	Design and construct model bridges to support a trolley carrying 'gold' ingots across a gap in the tracks.	Create functional codes to accurately and efficiently send secret messages using pulses of coloured light.	The power is in your hands, the task is to provide the lowest-cost electricity to ElectraCITY's infrastructure.	Building a bionic hand is in reach with everyday materials such as straws, elastics and string!
Method	Understanding physics and material properties will help transform cardboard, balsa, tape etc. into bridges capable of bearing dynamic loads 200 times their weight!	Using light boxes that transmit red, green and blue light along a fibre optic rod, students can communicate using up to seven colours in unlimited combinations.	Work out the most efficient pathways while weighing up the cost of cables and their resistance, and the cost of leaving some buildings without power!	By mounting a thumb and fingers to an artificial wrist, these bionic hands are able to pick up objects and complete finger signs.
Careers	<ul style="list-style-type: none"> <li>• Civil Engineer</li> <li>• Surveyor</li> <li>• Mathematical Modeller</li> <li>• Architect</li> </ul>	<ul style="list-style-type: none"> <li>• Software Engineer</li> <li>• Mathematical Modeller</li> <li>• Computer Systems Engineer</li> <li>• Scientific Analyst</li> </ul>	<ul style="list-style-type: none"> <li>• Mathematical modeller</li> <li>• Energy Systems Designer</li> <li>• Electric/comp. engineer</li> <li>• Data cabling technician</li> </ul>	<ul style="list-style-type: none"> <li>• Biomedical Engineer</li> <li>• Mechatronics Engineer</li> <li>• Manufacturing Engineer</li> <li>• Electrical Engineer</li> </ul>

	HELTER SKELTER SHELTER	RETURN TO MARS	STRINGWAYS	TURBINE
Aim	Design and refine 2 towers to withstand sideways motion as much as possible in a simulated earthquake.	Fashion a buggy with a basic suspension system to transport loads securely over undulating Martian terrain.	Planning efficient transport networks to link towns is one <i>real</i> , modern challenge, so no one is left behind!	A model water turbine that spins efficiently to generate power as water flows over it — <i>wat-er great idea!</i>
Method	Towers are built using common materials e.g. paper and straws, then tested for strength using small weights under both static and seismic conditions.	Mars buggies are built with axles, wheels, and a suspension system using rubber bands, then tested and refined until they are as stable and quick as possible!	String is our visual network to test different pathways and find the minimum travel distance required to connect the most towns and earn more points!	Students must consider rotational resistance, balance and stability in their design. Turbines made of plastic, polystyrene, and wood form around a reusable axle.
Careers	<ul style="list-style-type: none"> <li>• Civil Engineer</li> <li>• Geologist</li> <li>• Construction Manager</li> <li>• Geophysicist</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanical Engineer</li> <li>• Aerospace Engineer</li> <li>• Systems Engineers</li> <li>• Civil Engineer</li> </ul>	<ul style="list-style-type: none"> <li>• Civil Engineer</li> <li>• Transport Geographer</li> <li>• Network Engineer</li> <li>• Urban Designer/Planner</li> </ul>	<ul style="list-style-type: none"> <li>• Renewable Energy Engineer</li> <li>• Energy Systems Designer</li> <li>• Mechanical Engineer</li> <li>• Electrical Engineer</li> </ul>