

Inventor's Lab

Bridge Builders Challenge

Instruction sheet

Guidelines for Taking an Inventors Lab Session:

Aim

To challenge the students to use their creativity skills in a team, to create the strongest bridge from the materials provided.

Instructions

- Read the brief to the students and then divide them into groups of no more than 3 per group.
- Give out the materials and get building!
- Test the bridges in the last 15 minutes of the session using the model bridge & tiles provided.

Brief

- You are engineers for New Zealand roads and you are required to build a bridge that must withstand heavy loads and earthquakes. The time is short as Carey Park needs to access land across the raging Opanuku stream.

Task

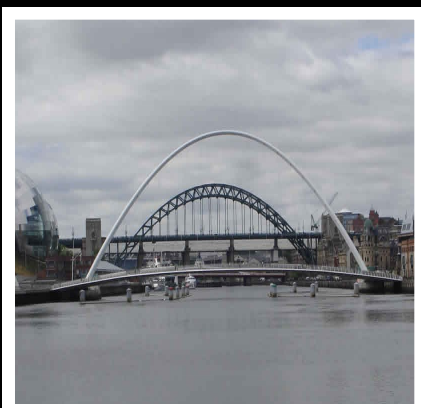
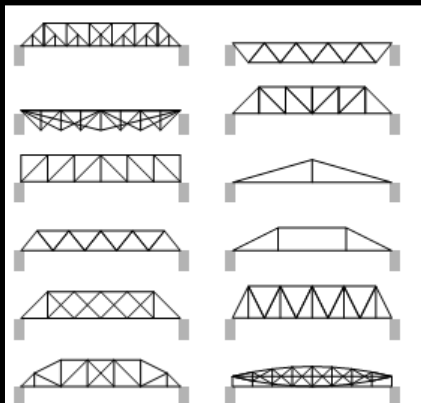
- You will have 45 minutes to construct a bridge that is at least 32 cm in length using the materials provided.

You will have:

- 8 straws
- 15 ice block sticks
- Glue
- 2m Sellotape/masking tape
- 1/2 A4 Card or A4 Paper folded
- 1m String or Wool

It will be judged on:

- The bridge will be tested using a miniature version of Salisbury Gorge, a part of the raging Opanuku Stream.
- Your bridge will be placed on the testing platform and then loads will be added until your bridge fails to hold the weight!



Inventor's Lab

Delicate Drop Challenge

Instruction sheet

Guidelines for Taking an Inventors Lab Session:

Aim

To challenge the students to use their creativity skills in a team, to create a device that can drop delicate items without breaking them!

Instructions

- Read the brief to the students and then divide them into groups of no more than 3 per group.
- Give out the materials and get building!
- Test the landers in the last 15 minutes of the session using eggs, by dropping them from the dining room balcony.

Brief

- You are engineers for the New Zealand Space Agency (NZSA) and you have been asked to design a special rocket lander for a mission to one of Jupiter's moon, Io. The mission needs to land a delicate payload on the moon so NZSA astronomers can conduct tests of the surface.

Task

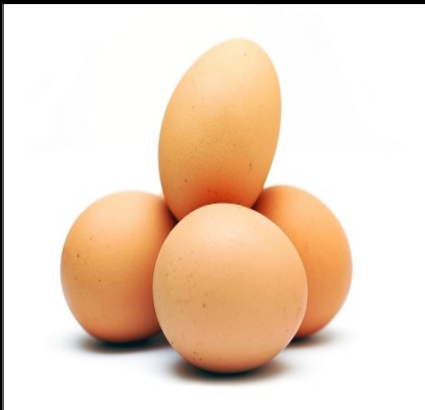
- Your task is to design a lander to safely drop an egg from a height of about 5m. The egg represents the delicate load which must land without breaking!

You will have:

- 3 sheets of paper
- A plastic bag
- 1 sheet of A5 thin card
- 1m of string
- Tape
- Glue
- 2 ice block sticks
- 2 straws

It will be judged on:

- Your design will be judged on whether the egg is totally unharmed. If several groups have undamaged eggs they may be required to drop them again (after rebuilding to the same specifications) but the height may be increased for each drop. This may continue until the best 'lander' is identified.



Inventor's Lab

Extendastick Challenge

Instruction sheet

Guidelines for Taking an Inventors Lab Session:

Aim

To challenge the students to use their creativity and teamwork skills to create a device that can hold the weight of small items.

Instructions

- Read the brief to the students and then divide them into groups of no more than 3 per group.
- Give out the materials and get building!
- Test the structures by balancing a marble on the end of each one to see whether it can support the weight.

Task

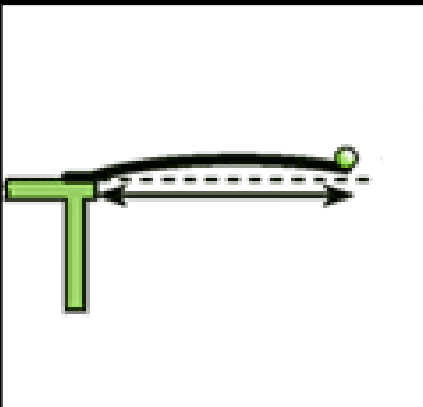
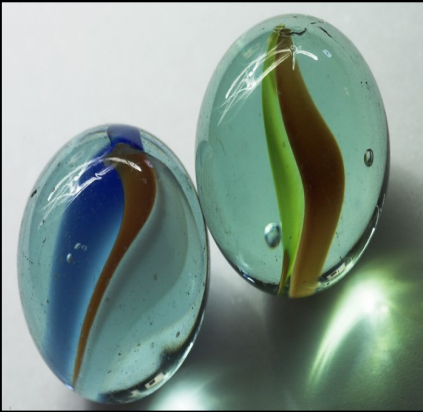
- Your task is to design a structure that can support one marble on the end of it as far out from a table as possible.

You will have:

- 15 ice block sticks
- 3 drinking straws
- Tape
- 1m of thread
- 1 marble to test

It will be judged on:

- Your design will be judged on the ability to support the marble. It must be free standing and must not be attached to the table.



Inventor's Lab

Make a Hot Air Balloon

Instruction sheet

Guidelines for Taking an Inventors Lab Session:

Aim

To challenge the students to use their team work skills to effectively produce a flying hot air balloon in the time allowed.

Instructions

- Read the brief to the students and then divide them into groups of no more than 3 per group.
- Give out the materials and get building!
- Test the balloons by lighting them outside by the barbeque and allowing them to float up.

Brief

- You have taken an apprenticeship at Hot Air Ballooning NZ and your first task is to produce a model of a hot air balloon before you are allowed to work with the real thing.

Task

- Your task is to design a hot air balloon within 30 minutes, with the materials provided, that when lit will float into the air.

Hint

- Make your design as light as possible, i.e. do not use too much tape/glue.

You will have:

- A plastic bag
- 6 drinking straws
- Tape
- 1 2inch cardboard square
- 4 birthday candles
- 1m of thread

It will be judged on:

- Your design will be judged on whether the hot air balloon becomes air born when the candles are ignited. The teams whose balloons 'fly' have successfully performed the task.

Example

- Attach straws together to form a circle – do this without tape by inserting the end of one into another, etc.
- Tape the opening of the plastic bag to the circle of straws using as little tape as possible.
- Attach a 20cm piece of thread to each corner of the cardboard square.
- Punch 4 holes in the centre of the cardboard and insert candles.
- Attach the thread to the plastic bag.



Inventor's Lab

Tallest Tower

Instruction sheet

Guidelines for Taking an Inventors Lab Session:

Aim

To challenge the students to use their team work skills to produce a freestanding structure in the time given.

Instructions

- Read the brief to the students and then divide them into groups of no more than 3 per group.
- Give out the materials and get building!
- Test the towers by having all students step back from the structure and measure the heights.

Task

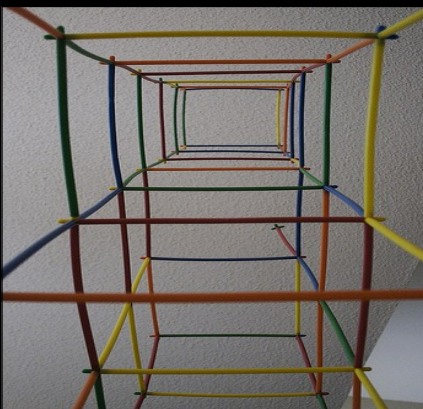
- Your task is to, as a group; create a free standing tower structure within 30 minutes, using the materials provided with the aim being to make the tallest tower.

You will have:

- A box of straws
- Pins
- Tape

It will be judged on:

- Your design will be judged on whether the tower can stand unsupported. The winning team will have the tallest free-standing tower.



Inventor's Lab

Waterslide Challenge

Instruction sheet

Guidelines for Taking an Inventors Lab Session:

Aim

To challenge the students to use their creativity skills, in a team, to create a model of a water-slide that will propel the object the furthest and the fastest!

Instructions

- Read the brief to the students and then divide them into groups of no more than 3 per group.
- Using the pencils and paper provided, get them to discuss and draw design ideas briefly before starting construction.
- Give out the materials and get building!
- Test the 'slides' in the last 15 minutes of the session using marbles.

Brief

- Carey Park wants a new and exciting waterslide for people to ride down into the swimming hole. You have been asked to design and test this new slide.

Task

- Make a sculpture with the materials provided to represent the new slide, with a marble as the moving part, representing the person. The marble will begin its journey at the top and be powered only by gravity in its journey. The marble should change direction as many times as possible and should complete as many turns as possible, and take as long as possible.
- At the end of the journey the marble must finish on the floor; timing ceases when it hits the ground (NOT when it stops rolling along the floor after finishing the slide), or if the marble stops moving at any point on its journey to the end of the slide.

You will have:

- 10 sheets of paper
- Tape
- 10 straws
- 10 ice block sticks
- Scissors
- Marbles
- 1 x thin wire, 0.4m long

It will be judged on:

- Your design will be judged on the length of time the marble is on your waterslide. Timing will start when the marble is released and stops when the marble hits the ground.

