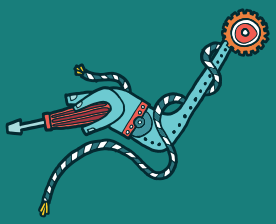

Classroom Challenge Information Pack

Introduction

The Creating Engineers contest gives P5 and/or P6 pupils a chance to demonstrate their creative design and building skills by solving set engineering challenges using the construction set K'Nex. Working in teams of two, pupils compete against fellow pupils in order to progress through the stages of the competition to be in with a chance of becoming the 'Creating Engineers Champions 2024'.

Schools enter as a cluster. Each primary school hosts the first stage which is the Classroom Challenge. The winning teams then participate in a Cluster Challenge hosted at the secondary school. It is up to individual clusters to decide how many classes participate in both these stages. The Classroom Challenge is designed and set by the teachers with some examples provided in this pack. The Cluster Challenge is set by Glasgow Science Festival, all information can be found on our website.

Glasgow Science Festival Creating Engineers

Competition Rules

Pupils compete in teams of two.
Competition is open to P5 and P6 pupils.
One hour to complete challenge, including preparation and planning.
Pupils shouldn't see the challenge beforehand.
Before starting to build the teams should sketch out and plan some ideas, so please ensure they have access to pencils and paper before the challenge begins.

Example Challenges

The Classroom Challenge is to be set by the teacher. Some examples of Classroom Challenges are provided at the end of this information pack. Other resources can be found on the Glasgow Science Festival (GSF) website.

Glasgow Science Festival Creating Engineers

Feel free to share any builds or designs with us on social media using #GSFCreatingEngineers or tag us @GlasgowSciFest on Twitter/X.

Creating Engineers

Judging

The Classroom Challenge can be judged by e.g. the teachers, teaching assistants, secondary school pupils or local organisations. We have provided a judging sheet at the end of this document, this is the same judging sheet used throughout all stages of the competition.

Certificates

The winners of the Classroom Challenge will receive a certificate, a copy of which is attached to this document ready to be printed and filled in.

Deadline

There is no hard deadline for when you can hold your Classroom Challenge. We recommend the Classroom Challenge takes place between **November - March** as we require all Cluster Challenges to have taken place and submitted the winners to GSF by **Wednesday 27th March 2024.**

Creating Engineers Kit Loan

Glasgow Science Festival (GSF) have a class-worth of kits available on short-term loan for a period of one week or longer. This booking system allows you to select a kit loan slot of between 7 and 13 days, during the period **November 2023 to end of March 2024**.

Glasgow Science Festival Creating Engineers Kit Loan

Where requested, please enter Cluster School name and Cluster person contact details, along with details of the person completing the form. No payment is required.

Next Stage: Cluster Challenge

The next stage of the competition is the Cluster Challenge. Information packs can be found on the Glasgow Science Festival Website

Glasgow Science Festival Creating Engineers

Winners of the Classroom Challenges compete in the Cluster Challenge, dates can be decided to suit the participating schools in the cluster. We require all Cluster Challenge Winners to be submitted by **Wednesday 27th March 2024** in order to secure your invite to the Semi-Finals.

Contact details

Any questions about the Creating Engineers challenge can be sent to sciencefestival@glasgow.ac.uk.

Classroom Challenge Example

Design and Build a Passenger Lift

The scenario

Your school been asked by the local council to install a passenger lift in the building. The headteacher needs your help and wants you to design and build a prototype.

The Challenge

You have **ONE** HOUR.
Your task is to design and build a passenger **lift** which can travel **up and down** within it's shaft. The lift needs to have a **door** which will open and close to allow entry and exit.

The Specifications

Your lift shaft and lift within must:

- Be **at least** 30cm high (the height of a standard ruler)
- Have a strong robust structure to stand on its own
- Be able to move up and down within it's shaft
- Have a door which can open and close.

Things to think of

- Remember to discuss plan and draw your design
- What K'Nex pieces have you been given? How do they connect together?
- Are smaller rods with more connectors better than long rods with less connectors?
- Can the structure stand without tipping?
- Does your lift move freely up and down – how is it going to do this (pulley)?
- Does the door open and close – how are you going to attach this (hinges)?
- Levers, pulleys and ropes will all gain more points as will any innovative designs!

GOOD LUCK!

Classroom Challenge Example

Build a Bridge

The scenario

The Engineers who designed the bridge over the River Forth have been asked to design and build a new road bridge over the river Clyde and they need your help.
Can you design and build a bridge that will allow all vehicles to cross the river but also allow boats, which may be taller than the bridge, to pass under?

The Challenge

You have ONE HOUR.
Your task is to design and build a **bridge** which can span across 2 desks and have **a way of opening** to allow boats to pass under. The bridge needs to be able to support the weight of a small bottle of water without collapsing and open to allow any size of boat through.

The Specifications

Your bridge must:

- Be **at least** 19cm high (the height of a grey K'Nex rod)
- Be **at least** 30cm long (the length of a standard ruler)
- Have a strong robust structure to stand on its own
- Be able to support the weight of a small bottle of water or equivalent weight
- Be able to open to allow tall river vessels to pass through safely.

Things to think of

- Remember to discuss plan and draw your design
- What K'Nex pieces have you been given? How do they connect together?
- Are smaller rods with more connectors better than long rods with less connectors?
- Can the structure stand without tipping - with and without the weight of the water?
- Does your bridge have a road wide enough for your water bottle to sit?
- How is your bridge going to open to allow boats to pass through – is it going to lift up or move to the side?
- Levers, pulleys and ropes will all gain more points as will any innovative designs!

GOOD LUCK

Creating Engineers Judging Sheet

Pupil 1		Pupil 2	

Judging Criteria	Consider	Score	Judges Comments:
Presentation, Communication & Teamwork Max Points 25 Poor 1–6 Average 7-15 Good 16–21 Excellent 22-25	• Did the pupils plan the model before building it? • Do they have drawings they can show, were they made before, during or after they started to build? • How well did the team communicate about their design? • Do they play to their individual strengths and use them to make a good team? • Do they work well together?		
Problem Solving Max Points 25 Poor 1–6 Average 7-15 Good 16–21 Excellent 22-25	• Discuss the problems the pupils encountered during the design & construction stages of the model. • Did they overcome the problems methodically & analytically? • What ideas were tried before the final solution was adopted? • Have they shown a clear understanding of how to problem solve? • Did they work together on solving them?		
Operation & Function Max Points 25 Poor 1–6 Average 7–15 Good 16–21 Excellent 22-25	• Have the pupils built an effective model that meets the criteria - interesting, novel and sturdy with moving parts? • Does it perform the intended function competently, could it be improved?		
Design & Visual Appeal Max Points 25 Poor 1–6 Average 7–15 Good 16–21 Excellent 22-25	• Has safety been considered, is it strong and sturdy? Review your overall impression of the model, is it visually appealing?		

Judged by:	**Max Score: 100 points** **TOTAL**		Any other comments:

GLASGOW SCIENCE FESTIVAL

Creating Engineers

Creating Engineers Classroom Challenge 2024

Congratulations to the winners

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