



Jungle Adventure 2019

STEM Challenge

Team Brief

The Aim

The aim of this challenge is to give you the opportunity to take part in an exciting engineering challenge. At the same time you will learn new techniques from the challenge and also develop your teamwork and problem solving skills. Remember that this isn't only a competition but a learning opportunity; so please do not hesitate to ask any of the staff running the testing activity about how they got into a career in engineering.

The Scenario

Our Jungle Adventurer is planning another expedition and is looking for a team of bright and enthusiastic Scouts/Guides to help! Your team will need to help the adventurer navigate through the jungle and cross the great snaking river passing through it. Your team will need to design a portable bridge which can be carried with you through the jungle and that can support you and your equipment whilst you cross the river. Before you embark on this adventure you will need to build a model of your bridge design and test it on a small scale.

Your Team

Teams should be between 4 and 7 young people, perhaps split down into patrols. All team members should take part in the design and construction of the bridge. Before you start your team need to agree on people to take up the following roles, or you may wish to rotate the responsibilities:

Team Leader - Lead team discussions and has final say if the team cannot agree. Report on team decisions to the judges

Quartermaster - Produces the list of materials and arranges purchase of these materials with your adult leaders

Treasurer - Holds the team budget and is responsible for recording how much is spent in supplying these details to the judges

Adult Leaders

The role of your adult leaders is to make sure that you are safe using the tools to build your bridge (especially the sharp or hot tools). They are not allowed to help you build the bridge or tell you how to design it; however, they can ask questions to check that you have thought your design through thoroughly. If adults are found to have done any of the work for you, points will be deducted.

Once you arrive at camp, please do not test load the bridges until under supervision of staff running the event.

Engineering Consultants

There will be Engineers from Rolls-Royce available on the day to advise you on any final adjustments to your bridge once you arrive at the event. The consultants will also be around either side of the event to answer any other questions you might have about careers in engineering or just about engineering in general.

Budget & Materials Price List

You have a budget of £6000 to spend on your bridge. You should record the cost of materials used (from the Materials and Equipment list). Careful, if you go over-budget points will be deducted.

The teams should be given access to the following materials. The "cost" of building materials should be recorded on their budget using the pricing scheme below to ensure consistency.

Material	No. Per Batch	Cost per Batch	Notes
15cm Wooden Skewers ¹	5	£1000	
Paper Straws ¹	2	£100	
A4 Paper	1	£200	
A4 Card	1	£400	
Cardboard	1	£1000	A4 sized. Not corrugated, e.g. cereal box
String	1	£50	30cm lengths
Pipe Cleaners ¹	2	£400	
Staples ¹	2	£200	
Paperclips ¹	10	£100	
Split Pins	1	£100	
Sello-tape	1	£100	10cm lengths
Glue Stick ²	NA	£100	One time cost
Glue Gun ³	NA	£200	One time cost

¹ These items must be purchased in batches. E.g. if your design requires 8 wooden skewers, you would need to purchase 2 batches

² Glue sticks may be used for joining materials together. They cannot however form part of the structure of the bridge. A one-time cost is due for use.

³ A hot glue gun may be used for joining materials together. A one-time cost is due for use.

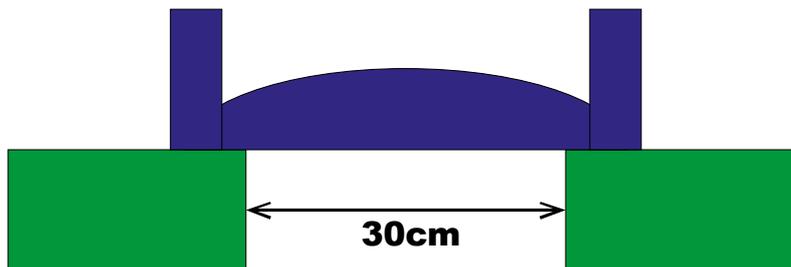
Bridge Design

Your bridge will need to be designed such that it can be transported through the jungle, deployed across the span of a river, carry a load crossing over it and then be taken away with you should you need to cross another river during the expedition.

Your bridge should be capable of the following:

1. Span

Your bridge should be able to span a gap of 30cm.



2. Deployment

- The bridge must be capable of being deployed and removed once crossed, i.e. you should have a method of getting the bridge in and out of position without simply placing it with your hands.
- Deployment structures/devices:
 - These structures cannot be left behind once the bridge is crossed and has been removed – you might need them again!
 - If the deployment structure is separate to the main bridge then the weight of this structure must be added on to the test load (5b).

3. Dimensions

- Height: No restriction on max height of the bridge.
- Width: Bridge platform must be minimum width of 10cm.
- Length: No restriction on max length of the bridge.

4. Weight of bridge & deployment kit

- Total weight of bridge & kit is expected to fall within the range 30-60g.
 - Points will be awarded for being under this weight. Take care not to sacrifice load carrying capability.
 - Points will be deducted for being over this weight.

5. Load Carrying Capability

- A maximum load of 6 units can be applied to the bridge. Each unit simulates one Scout/Guide crossing the bridge.
 - All units have the same mass – 200g.
- Minimum load which must be carried is one unit plus any separate deployment kit.
- The loads must be able to rest on the top surface of the bridge. Loads are not permitted to “hang” from the bridge.

Testing

Testing will take place on our “replica river” to simulate the gap that must be crossed by your bridge. The testing will be carried out over two rounds; each round will be split into 3 parts:

- Bridges will be weighed & budgets provided to the judges. Judges will also assess your design for innovative ideas.
- You will demonstrate how to deploy the bridge.
- The judges will then load the bridge with weights. Failure will be judged as when the bridge is no longer capable of carrying the load. Judges decisions are final.

There will be an opportunity after the first round of testing to seek advice from the Engineering Consultants and make minor modifications. Therefore your team should think carefully about what level to test your bridge to during the first round of testing; if you test to destruction you may not be able to repair it!

Final scores will be taken based on the results of the second round of testing. Should your bridge be un-mendable after the first round, your scores from the first round will be counted as your final score.

Tools

The following tools should be available for the team to use:

- Scissors
- Pencils
- 30cm Ruler
- Paper for sketching designs

Adult leaders may assist when using the following tools:

- Craft / Modelling knife
- Hot Glue Gun

Questions & Queries

If you have any questions relating to this years' STEM Challenge, please get in touch with the Events & Entertainment team.

Email: EandE@springbank.org.uk

We would like to thank Rolls Royce for their support of this event.



<https://www.springbank.org.uk>
information@springbank.org.uk



<https://www.drumhill.org.uk>
bookings@drumhill.org.uk



<https://www.derbyshirescouts.org>
admin@derbyshirescouts.org



<https://www.girlguidingderbyshire.org>
office@girlguidingderbyshire.org