



GO

**BUILD
A FUTURE**

**Building Bridges
CREST Challenge**

TEAM BRIEF



A British Science Association programme



TEAM BRIEF

Completing a CREST Bronze Award for the Building Bridges CREST Challenge means that you have shown lots of skills that employers want. Ask the employers you meet during your project! If you succeed, you've shown you can:

- **Plan** a project
- Do the **research** behind your project
- Carry out the project in a **methodical** way
- Make sound decisions and draw **sensible** conclusions
- **Understand** the science and engineering behind your project
- **Produce an outcome** that meets the brief, or give good reasons why it didn't meet the brief
- **Communicate** your project to the companies you worked with, and to other audiences
- Show **initiative** in managing your project
- Show **creativity** in **solving problems**.

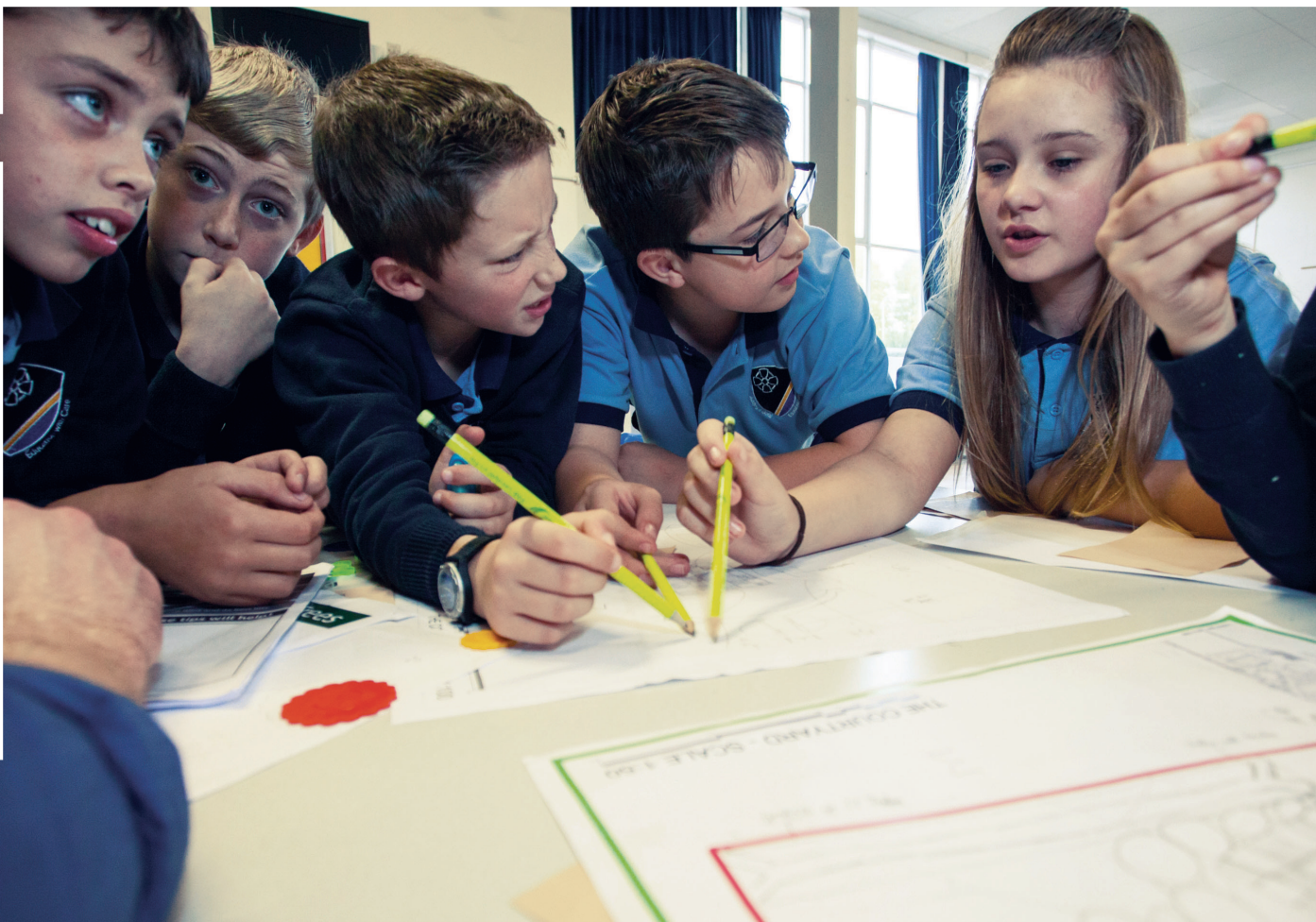
What do you have to do?

In this Challenge, you will become civil engineers. Civil engineers are professional people who plan and build the world around us, whether it's getting water to our homes, taking sewage away, building motorways, country roads, bridges and tunnels, or even laying out new towns.

To get started, you need to think of a name for your team's company.

WHAT DOES THE CLIENT WANT?

- You have been asked by a client – a local council – to develop plans for a new bridge across the Learning River. The bridge has to be built within a 5km stretch of the river. At either end of the river are two towns, Oldsby and Newtown. You can see them on the map provided. The river runs from east to west
- The contaminated land on the map was once the site of a metal processing plant so the soil is contaminated with metals, some of them poisonous
- The local council wants to include some new areas of woodland within the plan. This is to ensure that the road is screened (made less visible) from the edge of the town and the homes that are there. Trees also cut down noise levels. Your plans must include at least 20,000m² of woodland planting
- One of the main reasons for building the bridge is to shorten the route for getting rubbish from Newtown to the incinerator in Oldsby.
- A single carriageway two-way bridge must join Oldsby and Newtown. The bridge must be capable of supporting heavy traffic and heavy-goods vehicles. To help you to design your bridge, the client has given you a design manual
- The bridge must cross the river in a way that minimises damage to the river banks and the species that live there
- The bridge must have a sustainable drainage system
- The bridge must be visually appealing and must meet the current requirements for road bridges across rivers. These are included in the design manual
- The bridge must have a minimum working life of 50 years, but the client understands that routine maintenance, for example painting, resurfacing of the roadway and replacement of any barriers, will be needed
- To satisfy the client, you must include 20,000m² of tree planting around the site. This should screen the road, and at least half of it must be on the contaminated land to the south of the river. Research carried out so far on the site indicates that any species of tree that can tolerate acid soil will do well on the site. The council is currently using phytoremediation (growing plants to absorb heavy metals) to clean the site.





WHAT DO YOU NEED TO PRODUCE?

1. A site plan for the whole area, so the site fits neatly onto an A3 sheet of paper.
2. A description of the type of bridge you propose building and the types of materials you would use to construct it.
3. A proposal that describes your plan, and identifies how your plan meets the client's needs. This doesn't have to be a written report. Written reports work well, but it can also be:
 - a. A video
 - b. A presentation with a voiceover recording
 - c. Any other format which gets the message across in a professional way.

If you produce an alternative such as a video or presentation, each member of the company must present in the video, or be heard in the voiceover.

In your proposal, you also need to state what kind of drainage system you would use. This should be shown on your large plan (see the design manual for requirements).

4. A copy of the project plan that you used.

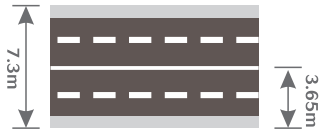
QUESTIONS YOU SHOULD ASK YOURSELF

- How strong does the bridge need to be to carry the expected loads? What safety factor do we need to allow so that we can be sure the bridge is safe?
- There are many materials that we could use for our bridge but which will be visually appealing and easy to maintain? Think about the kinds of bridge you could build and which materials are appropriate for building them.
- Once you've looked at the information provided in your Challenge pack, is there anything you don't know that you think would be useful to know? If you think you are missing some information, you should ask your activity lead.

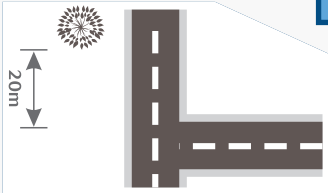
To get a CREST Bronze Award, you also need to complete a CREST Bronze Profile. This is a report to explain how you undertook your project.

DESIGN MANUAL FOR ROADS AND BRIDGES

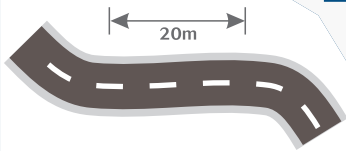
OLDSBY TO NEWTOWN LINK ROAD



The road is classified as a main access road. It needs to have a minimum carriageway width of 3.65m so the two carriageways together are 7.3m wide.



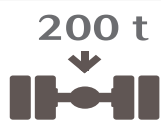
There should be no trees within 20m of a road junction, so that drivers can see oncoming traffic.



If the road curves one way, then the other, you need to allow 20m of straight road between the curves.



A combined cycleway and footpath 3m wide must be added on each side, with 0.5m-wide barriers separating the roadway from the cycleway and footpath.



The maximum load the bridge needs to carry is 200 tonnes.



The bridge must have a sustainable drainage system which could be a soakaway, a surface drain into the river or a drain that creates a pond within the woodland area.



Any soakaway or pond needs to have a minimum area of 200 m².

GO

MAKE A DIFFERENCE

For more information on
CREST Awards and Go Construct

Please visit

goconstruct.org

Or contact

experience@goconstruct.org

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