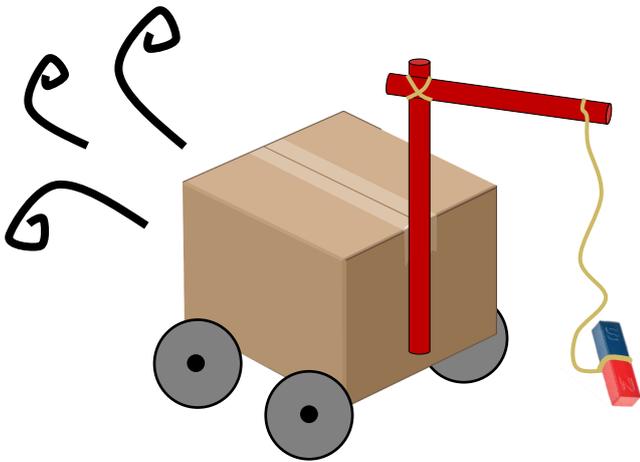


Get Creative Challenge

Design and make your own recycle-bot!



 ~30 mins	 easy	 supervised
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An easy children's junk-modelling activity to design and make a toy robot from card and household recycling.

You will need:

- paper or card
- pens or pencils
- various clean recycling items
- sticky tape
- colouring pens, pencils or paints (optional)



Cutting Edge Technology for 1820

These wrought iron chains and links on the Union Chain Bridge were cutting-edge technology in 1820. Advances in iron manufacturing techniques in Britain during the Industrial Revolution allowed engineers to use much larger quantities of wrought iron material in bridge building than before. This children's *Get Creative Challenge* was inspired by the innovative new technology displayed in the bridge and the conservation works currently ongoing.

Why is the Union Chain Bridge celebrated?

The bridge holds the Guinness World Record as the first chain suspension bridge in Europe to carry wheeled traffic, and it remains the oldest still in use worldwide. The Scottish pylon is the oldest standing road suspension bridge masonry tower in the world and the bridge retains the earliest examples of Samuel Brown's patented eye-bar wrought iron chains and links (pictured).



Children's Activity Learning Aims:

Solving an imagined problem using recycled technology —retrieving an iron chain link that has fallen in the river. The activity encourages engineering thought processes to develop design and technology skills, problem solving skills, mathematical thinking, and creativity.

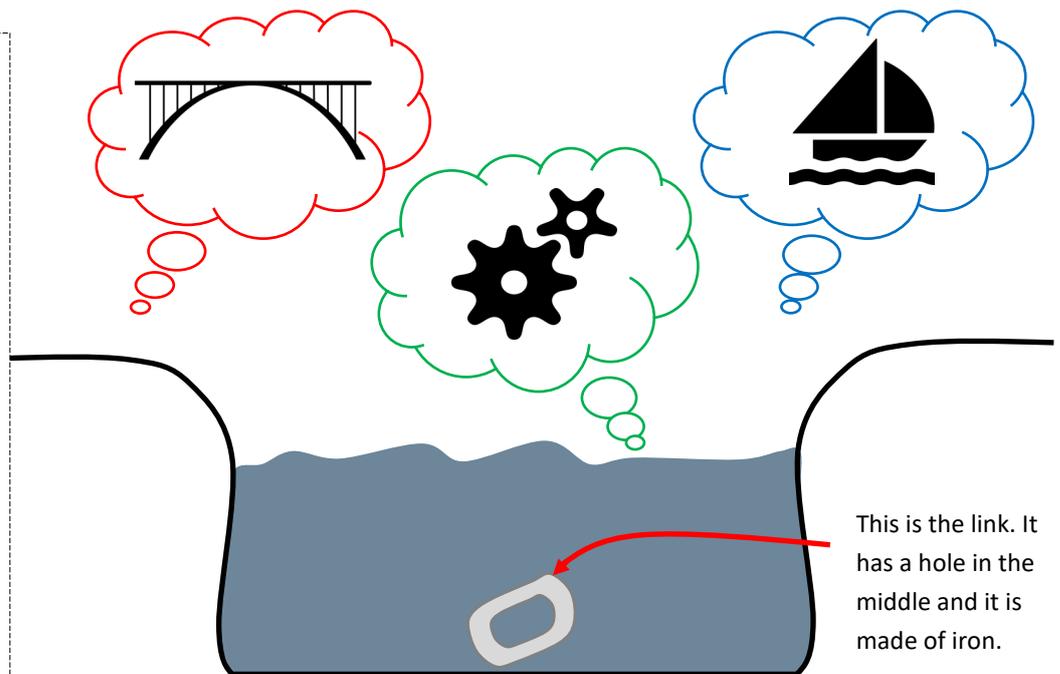
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Uh-oh! We've got a bi-i-i-i-g problem 🤖! Engineers have dropped an important, fragile iron link in the river! **Can you help** by designing a robot out of recycling to get it out?

You will need:

- your imagination
- paper or card
- pens or pencils
- various clean recycling items (see what you can find)
- sticky tape
- colouring pens, pencils or paints (optional)



Did you know?

On a bridge, a link is used to join iron rods together to form a chain. The Union Chain Bridge *really does* have iron links, but our engineers make sure nothing falls in the river. Phew!

What To Do

- Collect your materials. (Don't worry if you don't have everything on the list.)
- Take a moment to think about the problem: the iron link we want to retrieve is fragile and it is under water. We need some sort of robot to go down and get it out gently. Could a submarine, a hook, a bridge, a boat, a robotic arm, or a big magnet help?
- Using the pen and paper, plan the design for your recycle-bot. What features will it have to remove the link from the river?
- Make your robot out of recycled items and sticky tape.
- Colour in your bot, decorate it, and you can even name it, if you wish.
- If you want to show us what you have made, ask an adult to send a photo to ucb@museumsnorthumberland.org.uk.

Afterwards...

1. Explain how your recycle-bot will **collect** the iron link. You could film yourself explaining, or write a users' manual to control your robot. What other ways could you share this vital information with people who don't know how to use your recycle-bot?

2. Make your recycle-bot **automatic** by writing step-by-step instructions for it or drawing a map for it to get from the riverbank to the iron link and back. If you use symbols, remember a key!

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Parents' FAQ Corner

Q. What questions can I ask during the activity?

Children can show they are learning by answering questions you ask. Here are some suggestions:

- What problem do we need to overcome here?
- How do you think we could...?
- What would happen if we change/move/add/remove...?
- There is a hole in the middle of the link. Does that make a difference to anything?
- Will this all work underwater? What effect will the water have on the materials and the design?
- What is special about iron? Would the iron link stick to a magnet? [answer: yes] You can explore materials which attract magnets further by going on a hunt around the house with a fridge magnet.

Q. What if the recycle-bot doesn't work right away?

Keep encouraging your child to revise their design and try again. An added bonus of this activity is that it can be used to build resilience and perseverance in young people using the engineering loop of assessing the problem - identifying a solution - implementing & testing the solution - evaluating the solution - refining the solution. There is no one right or wrong answer. Encourage children to keep experimenting. Above all, think through the problem first to begin to devise a solution. Remember F.A.I.L. = First Attempts In Learning.

Q. What have we learned?

This activity is a free-build design and technology activity, which broadly helps to develop problem solving skills, and creativity. It has been designed as a cross-curricular / interdisciplinary resource centred about STEM (Science, Technology, Engineering, and Maths) and inspired by the 'real world' engineering of the bridge. By completing this activity children will have:

- Produced a design solution to a problem, using logical thinking.
- Constructed a recycle-bot, using their creativity and fine motor control skills.
- Explained their idea to others in an effective way, using appropriate vocabulary, and in an appropriate medium.
- Produced step-by-step instructions, demonstrating empathy with learners, showing spatial awareness and algorithmic thought processes.

Q. What can I do next?

- More learning and outreach activities can be found on our website: www.unionchainbridge.org.
- Some amazing robots can be seen found online on www.bostondynamics.com. You can even see the Boston Dynamics robots dance here: <https://www.youtube.com/watch?v=fn3KWM1kuAw>
- If your child enjoyed this activity, he/she might be interested in the following careers:

Marine Engineer

Mechatronic Engineer

Robotics Technician

Go to www.nustem.uk/primarycareers for more information about these careers and more.