TEACHER INSTRUCTIONS

TORPEDO BAY
NAVY MUSEUM

Challenge: Operation Claw

Each group will need:

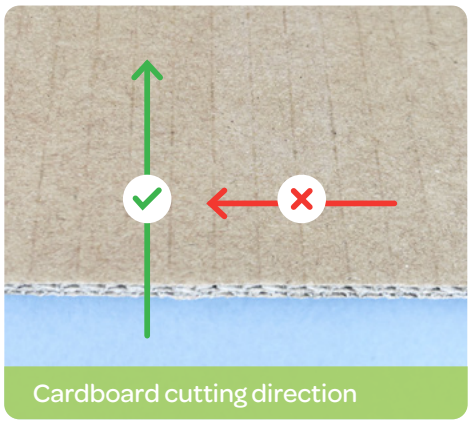
- **7 cardboard strips** – 4 cm x 22 cm
- **Ruler**
- **Extra materials for claw** – e.g. cardboard, rubber, felt, straws, paper cups
- **4 split pins**
- **Rubber band**
- **40 cm string**
- **Tape**
- **Teacher slides**

Challenge aim ideas:

- Choose 3 different objects that they need to pick up and take to the other side of the room in the least amount of time.
- Choose a range of light to heavy objects that they could try to pick up.
- Use the claw to do rubbish duty as a class and whoever picks up the most rubbish wins.

Challenge prep:

- Strong cardboard best for this challenge, **NOT** card.
- You need to cut down the corrugation of the cardboard **NOT** across. Cutting across weakens the cardboard.


Cardboard cutting direction

- Depending on your students' ability you may want to prepare the cardboard strips for them.
- Scoring the card along a ruler with open scissors makes it easier to cut. Using a craft knife is a good idea.

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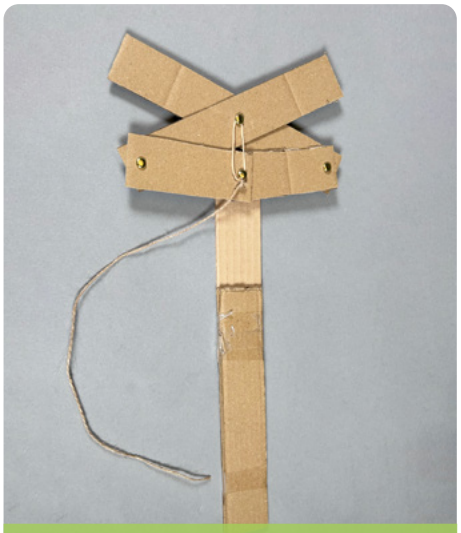
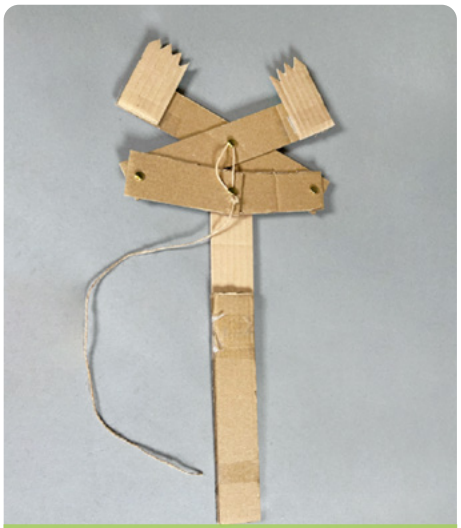
The challenge:

1. Split the class into groups and hand out equipment.
2. All groups make the basic robot arm following the challenge instructions, either independently or stepping through the instructions with you.
3. The next step is to modify the arm to add a grabbing claw that can pick up objects.
4. They need to select the material to make the claw from the ones supplied.
5. You will set the challenge for the class and share it at the beginning.



Extendable robot arm that all groups make



Extendable robot arm with modified cardboard claw

Extra ideas:

- Can they extend the arm handle with more cardboard strips and string so it can pick up an object 75 cm away?
- Does it make a difference using different length or width strips of cardboard?
- Can they work out the calculations to either scale up or down their arm?
- Could they set up a claw obstacle course?