

ROBOT HAND ACTIVITY

Briefing

In this activity you will be an engineer with the job of creating a simple model of the human hand that could become a robotic hand for use on the International Space Station.

Background

The international Space Station (ISS) is a permanently manned laboratory in space, orbiting (going around the Earth) at a speed of 28 000 km/hr.

Tim Peake, the UK's first European Space Agency Astronaut spent 6 years training for his mission to the ISS. Part of his training involved learning how to use the CANADARM 2, a robotic arm that he can control from inside the ISS. This allows Tim to make repairs or fit equipment remotely – without having to go outside the ISS himself and allowing him to move objects much heavier and bulkier than he could himself.

The CANADARM has many joints – much like the human arm and a specialised unit at the end that allows it to fix on to objects. You can even use it to move astronauts around outside the ISS!



Robot Hand



Often, when designing a robot, scientists and engineers will try to copy what has been proven to work well at moving and working with objects – the human hand!

Most hands have four fingers and a thumb. The fingers have three bones and the thumb has 2 bones (the finger bones are called phalanges). These are connected to bones in the palm which connect to bones in the wrist and so on.

To open and close the hand you need stretchy material that is connected to the bones and can pull on them in different directions. These are called **MUSCLES** and **TENDONS**. **FLEXOR** muscles and tendons cause the fingers to bend, while **EXTENSORS** cause them to straighten out.

You are going to build a simple model robot hand with FLEXORS which will allow the fingers to close and let you pick up objects with the hand.

Think about how you could improve the design:

Would other materials be better?

Could you alter the design to move each finger independently?



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You will need:

- Corrugated cardboard at least as big as your hand
- Craft knife/scissors
- A straw
- String
- Sellotape

Instructions:

