

The Smallpeice Trust
**ENGINEERING
@HOME**

05

The Prosthetic Hand Challenge

#EngineeringAtHome

Suitable
for ages:

5+

Time
needed:

1hr+



smallpeice 
Dare to imagine

Curriculum links: Maths – shapes, measurement; Science – humans, skeleton and muscles; D&T – design, make, evaluate

Skills learnt: Design, building, testing, evaluation



Since our Smallpeice team can't visit schools, we've decided to challenge each other to make a mechanical prosthetic hand which you can test at home.

05

Learning Objectives

Create purposeful, functional and appealing designs

Select from a wide range of materials and use tools to perform practical tasks

Build structures, exploring how they can be made stronger and more stable

Evaluate your ideas and products against design criteria

Topics Covered

ANATOMY OF THE HAND

<https://bit.ly/2VDmiM5>

BIOMEDICAL ENGINEERING

<https://bit.ly/35fw4Y9>

PUSH AND PULL FORCES

<https://bit.ly/3cXVL23>

WHAT MATERIALS TO USE

You can use cardboard, plastic, wood, or anything else that works well and you can get at home.

Try looking in your recycling box.

HERE'S WHAT WE USED:

1. **CARDBOARD**
2. **SELLOTAPE**
3. **SCISSORS**
4. **STRAWS**
5. **STRING**



INSTRUCTIONS



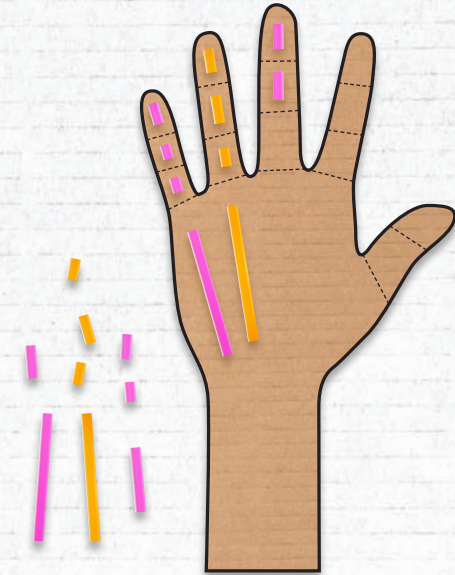
1.

Draw around your hand and cut it out, making sure each finger is separate.



2.

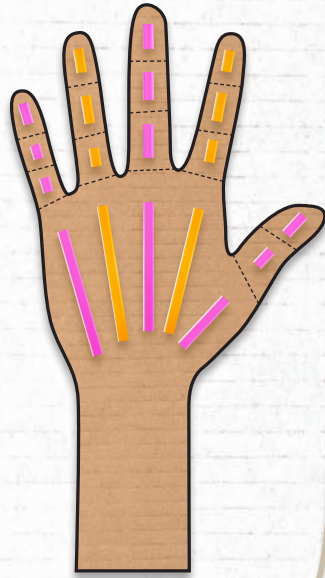
Create joints on your fingers by marking them with pencil and folding along the line so that they can bend easily.



3.

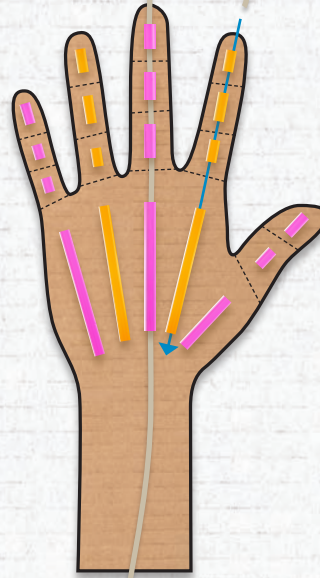
Cut a piece of straw for each section of the finger and stick them in place. Leave plenty of space between each straw for the finger to bend. You could use different coloured straws for each finger to help tell them apart.

INSTRUCTIONS



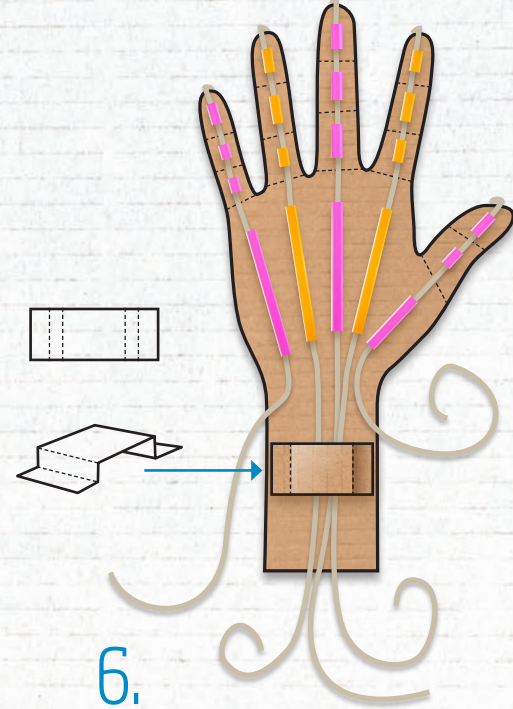
4.

Cut 5 pieces of string for each finger, they must be long enough to reach from the fingertip down to the bottom of the wrist with a lot left over.



5.

Thread the string through each straw piece on the finger. Repeat for all the fingers. Stick the top of the string to the back of the fingertips.

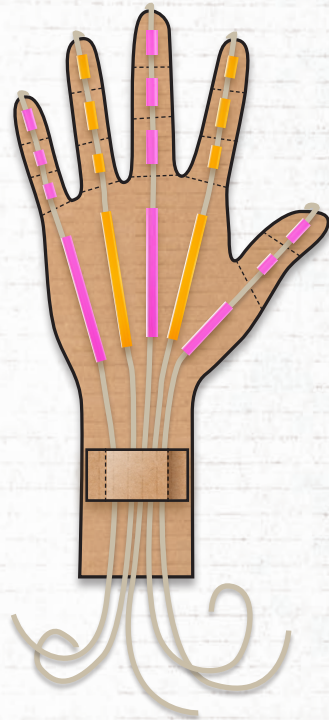


6.

Create a small bridge out of cardboard and stick it to the wrist on your hand.

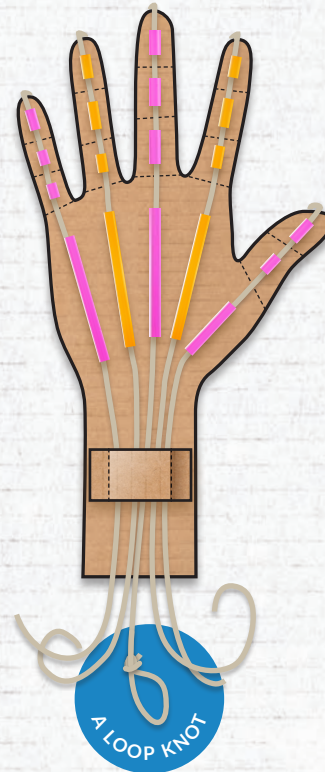
INSTRUCTIONS

7.



Thread all the strings through the tunnel under the bridge.

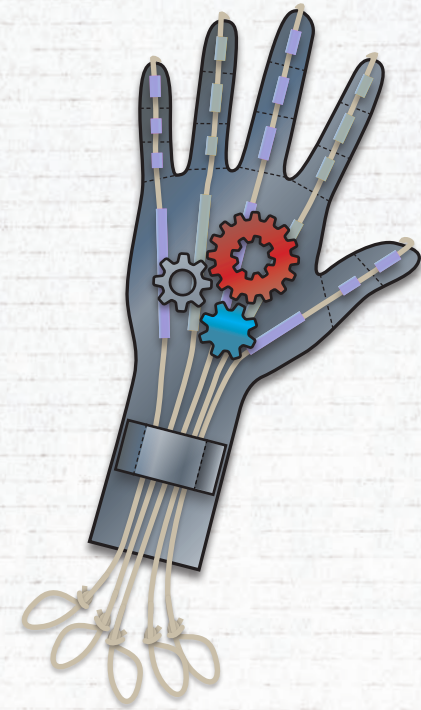
8.



Tie the end of the strings into a loop knot, with space for your fingers to go in at the end to control the mechanical hand. There are lots of ways to tie a loop knot,

If you're stuck watch this <https://bit.ly/2x7vyyF>

9.



Customise your prosthetic hand. Why not make it a robot hand, an extended grab arm, an animal's hand?

NEED A CHALLENGE?

If you complete your prosthetic hand and want to challenge yourself further:

1. Try to pick up some objects.
What is the heaviest object you can pick up?
2. Can you make it pour a liquid from one container to another?
3. Can you type a sentence on a keyboard?
4. Decorate your hand to make it stand out
5. Film a video and send it to us!

Once you've got your prosthetic hand performing at its optimum, film it in action and share your video on:



www.facebook.com/TheSmallpeiceTrust




www.twitter.com/SmallpeiceTrust
Use the hashtag **#EngineeringAtHome**



www.instagram.com/TheSmallpeiceTrust

STEM Day Risk Assessment

Risk Assessment for	Engineering at Home Projects
Assessment undertaken on	31/03/2020
Assessment undertaken by	Jessica Lee
Signed	

No.	Activity/area being assessed	Associated risk	Who is at risk?	Existing control measures in place?	Level of risk (low, medium, high)	Responsibility
1	General Activity and Workspace	Slips, trips and falls: Injury due to tripping over items	Students and adults	Activity supervised by adult supervisor. Deliverer reminds students about safety in video introduction.	M	Students and adults
2	Use of Materials: paper/card, plastic containers	Injuries: Injury due to paper cuts, cuts from sharp edges Injuries: Injury due to misuse	Students and adults	Activity supervised by adult supervisor.	L	Students and adults
3	Use of materials: elastic bands, sellotape, glue stick, blu-tack, small toys, paper fasteners, LEGO pieces, nuts & bolts or equivalent.	Injuries: Injury due to use as a missile Slips, trips and falls: Injury due to slipping on dropped items Injuries: Ingestion risk of choking.	Students and adults Students and adults Students and adults	Activity supervised by adult supervisor. Activity supervised by adult supervisor. Activity supervised by adult supervisor.	L	Students and adults
4	Use of materials: plastic, corrugated cardboard	Injuries: Cuts from sharp edges	Students and adults	Activity supervised by adult supervisor.	L	Students and adults

No.	Activity/area being assessed	Associated risk	Who is at risk?	Existing control measures in place?	Level of risk (low, medium, high)	Responsibility
5	Use of sharp tools: Scissors, craft knives	<p>Injuries: Cut to self</p> <p>Behaviour: Cut to others</p> <p>Behaviour: Vandalism of property</p>	<p>Students</p> <p>Students and adults</p> <p>School or home</p>	<p>Activity supervised by adult supervisor.</p> <p>Activity supervised by adult supervisor.</p> <p>Activity supervised by adult supervisor.</p>	<p>M</p> <p>L</p> <p>L</p>	<p>Students and adults</p> <p>Students and adults</p> <p>Students and adults</p>
6	Testing of projects: bathtub, drop from height, items on floor	<p>Spillage of water on floor: damage and injury due to slip</p> <p>Slip, trip or fall: Injury due to falling from testing area, tripping over items in testing space</p>	<p>Students and adults</p> <p>Students and adults</p>	<p>Activity supervised by adult supervisor.</p> <p>Activity supervised by adult supervisor.</p>	<p>L</p> <p>L</p>	<p>Students and adults</p> <p>Students and adults</p>