The Smallpeice Trust

ENGINEERING @HOME

14

The Big String Challenge

#EngineeringAtHome

Suitable for ages:	Time needed:
8+	1hr+

smallpeice
Dare to imagine

Curriculum links: Maths – shapes, measurement; Science – moments, friction, balance; D&T – design, make, evaluate

Skills learnt: Design, building, testing, evaluation

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Dare to imagine

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

14

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

MOMENTS
https://bit.ly/2BDt7Ww

FRICTION
https://bit.ly/2AZu9MB

NEWTON'S LAWS
https://bit.ly/2VFhncc

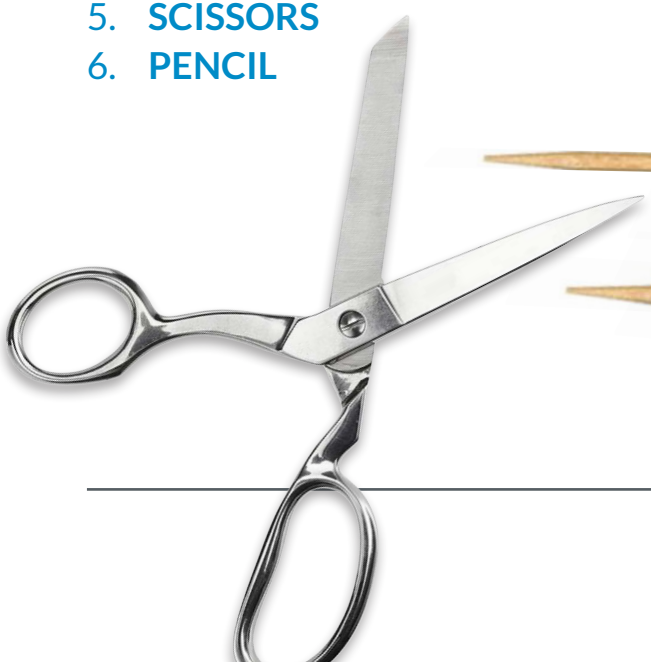
WHAT MATERIALS TO USE

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

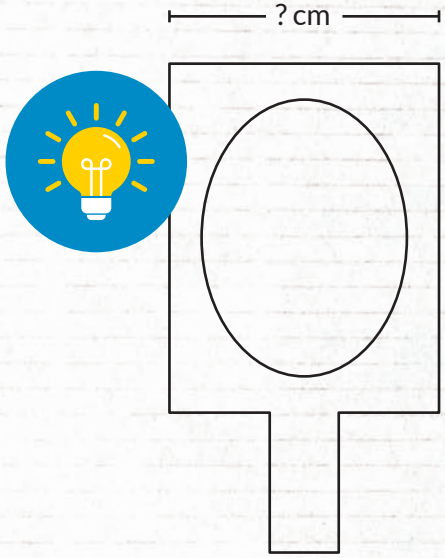
Try looking in your recycling box.

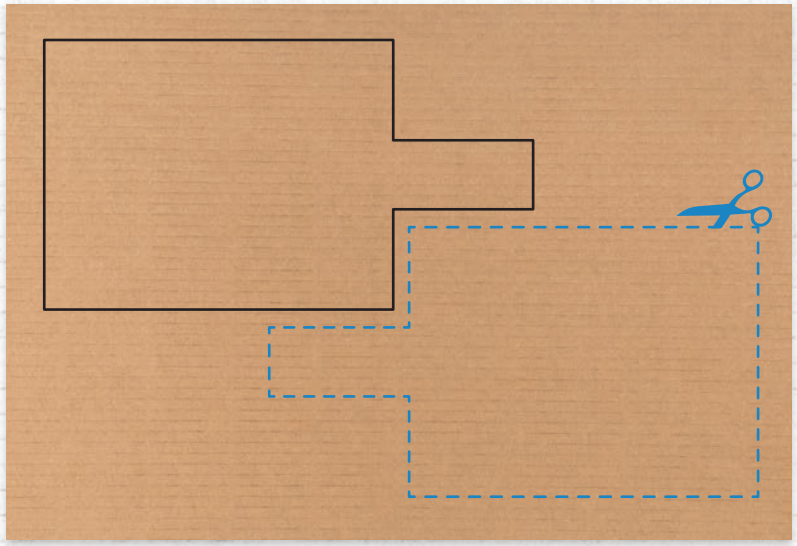
HERE'S WHAT WE USED:

1. CARDBOARD
2. STRING
3. SELLOTAPE
4. BAMBOO SKEWERS
5. SCISSORS
6. PENCIL



INSTRUCTIONS





1.

Decide on the shape and size of your racket.

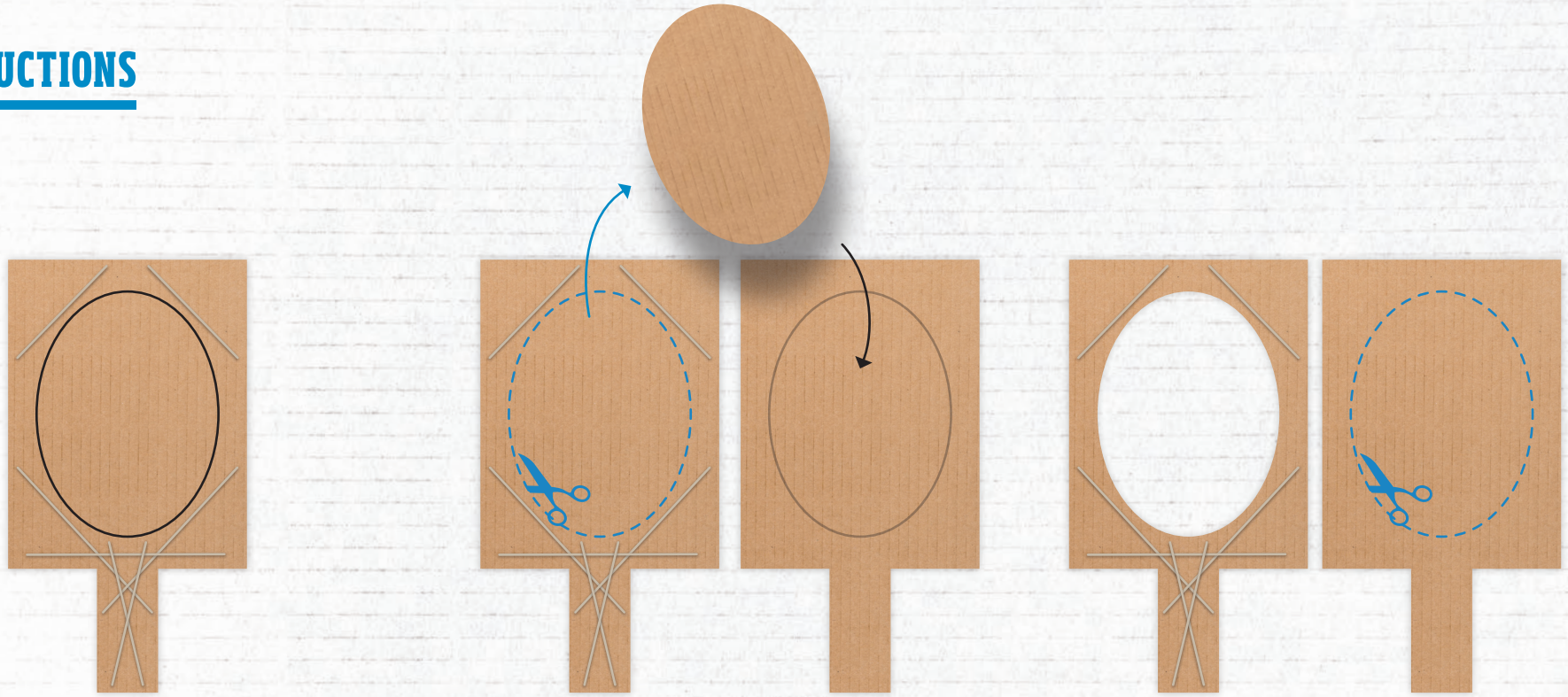
2.

Draw out on a large sheet of cardboard your tennis racket frame. You'll need two of these frames so make sure you have enough cardboard.

3.

Cut out two cardboard frames for your tennis racket.

INSTRUCTIONS



4.

On the inside of one of the frames, support the section where the handle joins the head of your racket with bamboo skewers (or anything else you think will add support).

5.

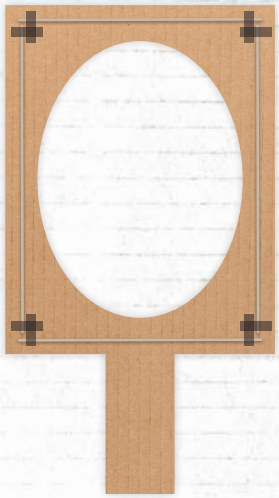
Inside the supports on your frame, draw the space for the net to go.

This should be a round hole.

6.

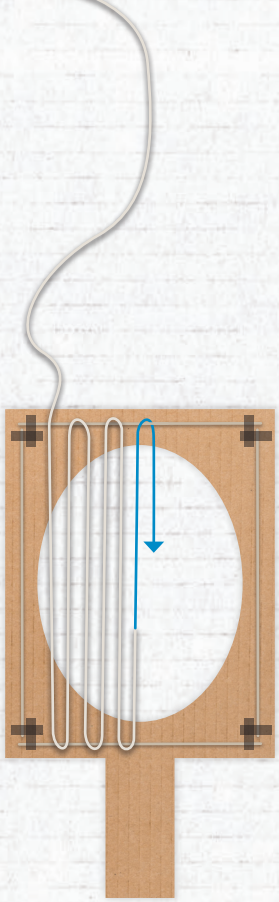
Then cut this out the same on both frames.

INSTRUCTIONS



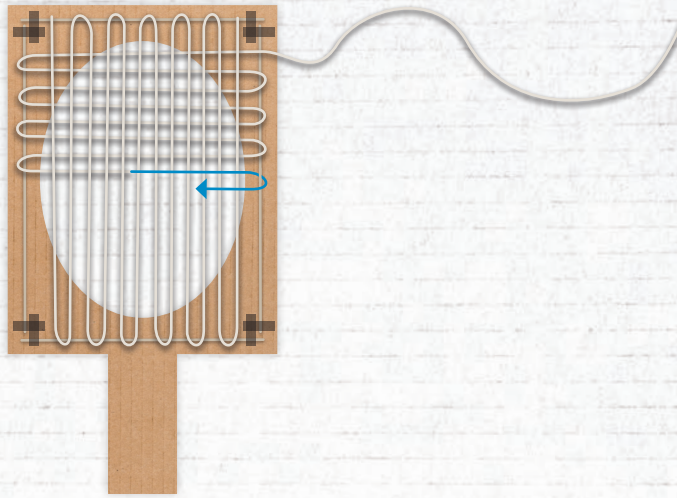
7.

On the inside of your second frame stick a bamboo skewer along each side, make sure you only stick it down at the ends so most of the skewer in the middle can come away from the cardboard.



8.

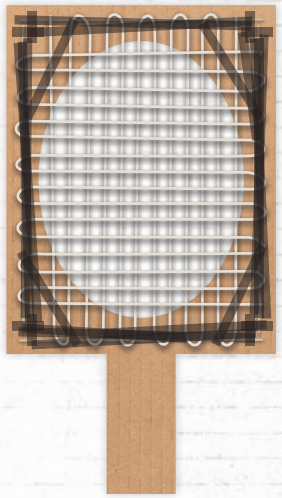
Take your string and thread it from side to side across the hole in your cardboard racket. Use the bamboo skewers along the each edge as a frame for the net.



9.

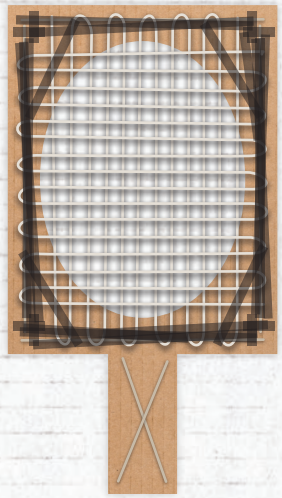
Once you have threaded string across the whole net in one direction, thread string back up and down your racket weaving in and out of the sideways string.

INSTRUCTIONS



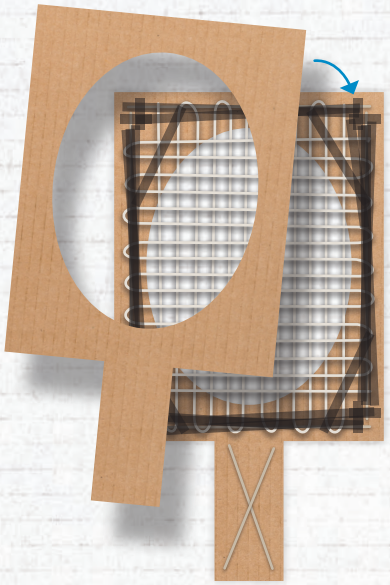
10.

You will need lots of Sellotape to secure the string net in place.



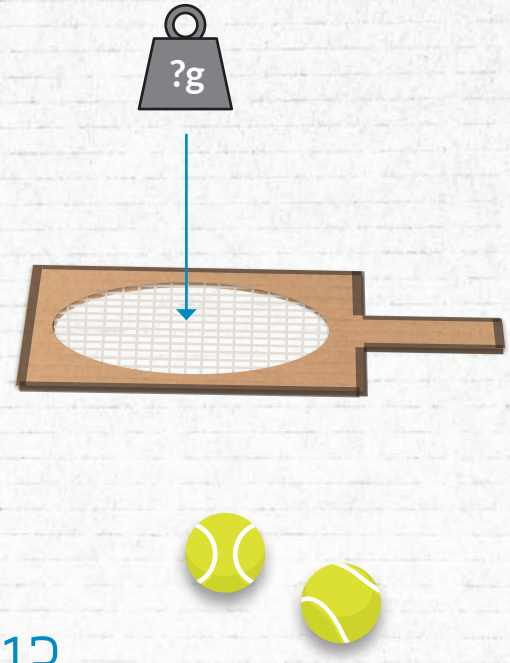
11.

Once your net is finished, add any additional structural support you think may be necessary.



12.

Stick your first cardboard frame on top of your second frame, sandwiching the net in the middle and you should have a finished tennis racket!



13.

Test the strength of your racket by seeing how much weight your net can support if you hold it by the handle!

Can it hold a tennis ball?

Can it hold more than one?

NEED A CHALLENGE?

If you complete your tennis racket and want to challenge yourself further:

1. **Try to put some objects on your tennis racket net and seeing how much weight it can hold.**
2. **Try using different techniques or materials to create the net to make it stronger.**
3. **Try creating some different shape and size frames and see if it makes a difference.**
4. **Decorate your racket and make it stand out.**
5. **Film a video and send it to us!**

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

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