

SparkLab, Sciencentre

Maker Space: *Take a seat*

The Challenge

Roll, cut, fold, join...How will you change cardboard to make a mini chair?

Explore the properties and possibilities of cardboard as a material, as well as how designers and engineers create new objects by creating a simple prototype chair

Learning Outcomes

- Explore the huge diversity of design possibilities in common objects by recognising that chairs can be used for a variety of purposes, made to suit the needs of different users and that the built environment can influence our daily lives.
- Develop understanding of different design characteristics of a chair (eg. form, purpose, place, user suitability) and the importance of planning for strength and stability.
- Gain practical understanding of the material properties of cardboard, as well as an appreciation of re-purposing 'waste materials' as a sustainable, low-cost resource for making.
- Increase confidence and understanding of testing and the design process; using toys/figures to decide sizing and test for strength, stability and suitability, identifying where a design could be improved, making changes and observing the impact of different solutions.
- Feel and recognise success in implementing creative solutions to real world challenges. Apply this approach in their everyday life.
- Experience success in implementing creative solutions to a real-world challenge by recognizing the needs and/or opportunities when (re)designing an everyday item.
- Express enjoyment in engaging in the challenge and sharing ideas and understandings.

Equipment

- Character/s
Toys or figures that are sitting or can be posed in a sitting position. They could be people or animals and will help with testing and deciding who will use the chair. Will it be a tall person, someone with a broken leg, a baby, a teddy bear, your pet or a superhero?
- scissors
- hole punch (optional)
- pencils (optional)
- ruler (optional)

Design Materials

- Re-purposed cardboard
Look around for clean pieces of cardboard like cereal cartons, packaging and stationery. Try to find a mix of different types (e.g. thick, thin, corrugated, mat board) to explore their various properties and ways to use them.
- masking tape

Optional materials

- string
- paper straws



Design process

This activity follows a design process. Below are some questions that will help at each stage of the process.

Think of some solutions

- Decide who will use the chair. What sort of chair do you think they might need or like?
- Have a look around for different kinds of chairs. What features do you like or find interesting? Where are they located and who uses them?
- What are the different parts of a chair? What do you think is the purpose of each part?
- What ideas do you have for a design? You might like to draw a picture of your idea to help you get started.

Make a prototype

- What repurposed cardboard materials can you find to build your chair? Look around for different pieces of clean cardboard like boxes, stationery and packaging
- Have a play with different types of cardboard to see what might be right for your design. How will you make use of the cardboard's different properties in your chair?
- How will you make sure your design is strong and can support the weight of the toy?
- Is it better for your design to be light or heavy? Do you need parts that are flexible or rigid?
- What part of your design are you finding tricky to build? Tell me about your idea and let's see if we can work out how to achieve it together

Test it out

- Test out your design with a person figure or animal toy. What did you notice?
- What part of your design worked really well?
- Does the chair meet the needs of the person who will use it? Is it the right size and shape to allow them to feel comfortable?
- Is the chair sturdy enough to support the toy appropriately, without them falling out or over the edges?

Improve your design

- How could you improve on your design? Is there anything else you would like to add that you think someone sitting in your chair would need or like?
- How could you improve the strength/stability of your chair? Does it need some extra reinforcement?
- What ideas could you incorporate from someone else's design? Talk to a friend or search online.
- If you started again, what would you do differently? What would you do the same? Create a record of your design to guide future projects.

Background Information

Chairs are common features of private and public spaces. Focusing on chair design offers a way to explore a variety of design parameters that are common to all aspects of our built/designed environment such as form, function, strength and stability. A prototype is a draft version of a product that allows visual communication of ideas, usability testing and exploration of alternative solutions before investing time and resources into scaling up. Engineers and designers create objects based on simple shapes that combine to make a strong and functional structure. When designing a chair, many factors need to be considered including the forces (pushes and pulls) that the chair might encounter and how these stresses may affect its function. Various shapes can be combined to form a chair, generally influenced by the function of the chair. Strong and stable shapes are ones that equally distribute a force along all sides.

Key Search Terms: Forces, shape, strength, design: prototype chair
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