

SparkLab, Sciencentre

Maker Space: *Move it!*

The Challenge

Design and create a device to pick something up and move it – without touching it with your hands!

Test your device by transporting objects from one place to another. What will you move and where will you move it?

Learning Outcomes

- Explore how devices are designed, constructed, tested and improved.
- Recognise how simple machines can be used and combined to perform different functions.
- Build an understanding of physical forces and how they can be applied to design solutions.
- Investigate how natural and processed materials have physical properties that can influence their use.
- Develop skills in manipulating materials to construct working prototypes.
- Increase participant's understanding of the design process.
- Build confidence in constructing and testing prototypes, identifying how designs can be improved, making changes and observing the impacts of these changes.
- Feel and recognise success in implementing creative solutions to a real-world challenge. Be able to apply this approach in their everyday life.
- Express enjoyment in engaging in the challenge, communicating ideas and sharing understandings.

Equipment

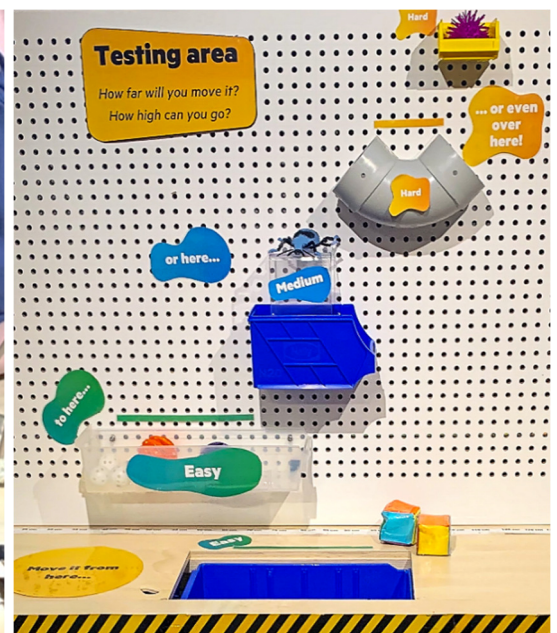
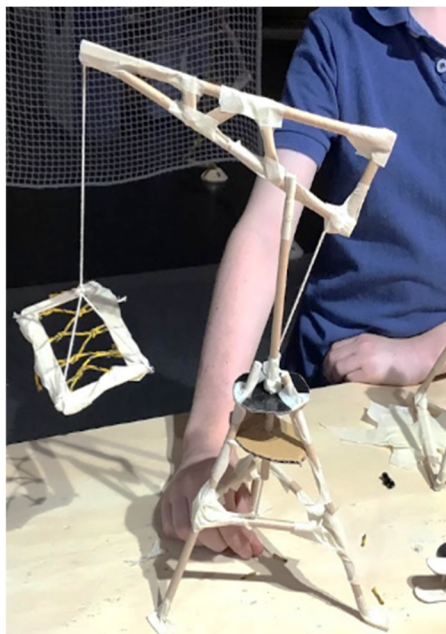
- Scissors
- Ruler
- Hole puncher
- Testing items
(What will you try to move?)

Design Materials

- Cardboard
- Cardboard straws
- Paddle pop sticks
- Wooden utensils
- Netting
- Plastic pieces (recycled)
- Masking tape
- String
- Pipe cleaners
- Rubber bands

Optional equipment

- Wildcard materials
- Testing area – set up containers in easy, medium and hard locations. Hard to reach containers might be up high, on an angle or have a narrow opening.



Design process

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

Think of some solutions

- What are some different ways to pick something up?
- What will your device be designed to move?
- Who might use this? What might they need or require?
- What real world examples have you seen that could give you ideas? Think of how machines, animals and even the human body move things!
- What ideas do you have for a design?

Make a prototype

- What materials will you use to create your device?
- How can you use the different properties of the materials in your design?
- How can you make parts that can move, bend or rotate?
- How can you change your materials to make them more useful?
- What parts of your design are you finding tricky to build?

Test it out

- Test out your device by trying to pick up (and move) an object! For an added challenge try to use your device to move the object to or from some hard-to-reach places.
- What did you observe when you tested your device?
- Does your device look and work the way you wanted it to? Has testing it given you any other ideas?
- What part of your design worked really well?

Improve your design

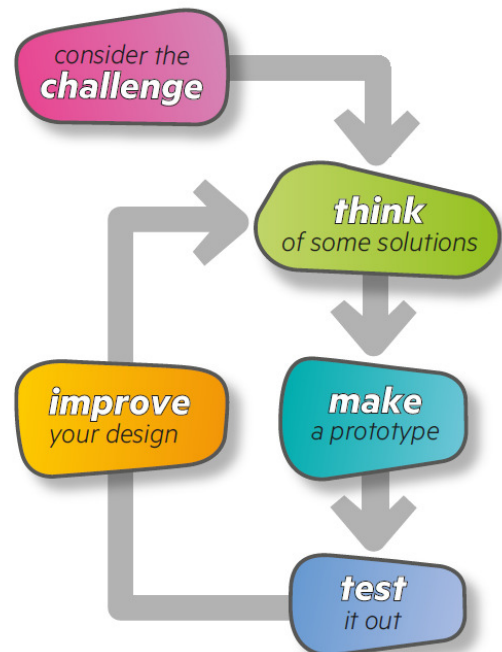
- How could you improve on your design?
- How can you change your design to move a different object?
- What would happen if you used different materials, added other features or a new part?
- What ideas could you incorporate from someone else's design? Talk to a friend or search online.
- If you started again, what would you do the same? What would you do differently? Create a record of your design to guide future projects.

Background science

Materials have a range of observable properties which influence how they can be used. These properties affect how materials can be modified and how they can be combined for particular purposes. When designing devices for 'Move it!' it is important to explore the physical properties of materials (such as strength, rigidity, flexibility, elasticity and texture), as well as the size, shape and properties of the object that you want to move.

'Move it!' can also be used to develop and apply an understanding of simple machines. These machines make tasks easier by changing the size or direction of a force. Examples of simple machines that could be incorporated into designs include levers, pulleys, inclined planes, wedges and wheels.

Key Search Terms: material properties, forces, simple machines



Links to Australian Curriculum:

Science Curriculum:

Year	Curriculum
F	Chemical sciences Objects are made of materials that have observable properties (ACSSU003).
1	Chemical sciences Everyday materials can be physically changed in a variety of ways (ACSSU018).
2	Chemical sciences Different materials can be combined for a particular purpose (ACSSU031). Physical sciences A push or a pull affects how an object moves or changes shape (ACSSU033).
4	Chemical sciences Natural and processed materials have a range of physical properties that can influence their use (ACSSU074). Physical sciences Forces can be exerted by one object on another through direct contact or from a distance (ACSSU076).
7	Physical sciences Change to an object's motion is caused by unbalanced forces, including Earth's gravitational attraction, acting on the object (ACSSU117). - Investigating the effect of forces through the application of simple machines

Design and Technologies Curriculum:

Year	Curriculum
F-2	Design and Technologies Explore the characteristics and properties of materials and components that are used to produce designed solutions. (ACTDEK004).
3-4	Design and Technologies Investigate how forces and the properties of materials affect the behaviour of a product or system (ACTDEK011). Evaluate design ideas, processes and solutions. (ACTDEP017)
5-6	Design and Technologies Investigate characteristics and properties of a range of materials, components and equipment and evaluate the impact of their use. (ACTDEK023).



