



SUPERSTAR

Spinning Solutions

Organiser's Card



About the activity

This activity is designed to get children thinking about centrifugal force.

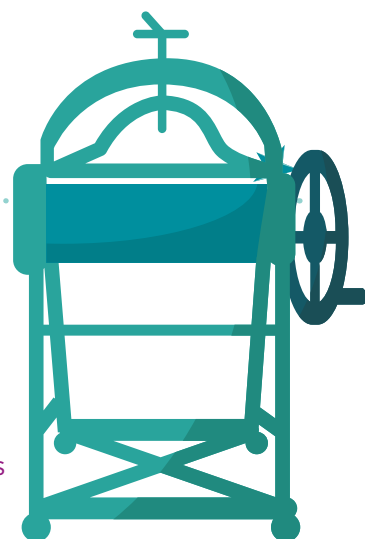
Richie from Urenco has been to the Startown History Museum and is fascinated by the mangle. Can the children help to find out how it works and what else spinning can be used for?

Through this activity you will support your group to:

- Design and make their own model washing machine drum and mangle
- Test different drum and mangle designs and record their results
- Present their findings to the group

Kit list

- Different-size containers with lids, so the smaller fits inside the larger container (polystyrene or paper cups work well)
- Plastic or canvas bags
- Absorbent fabric – e.g. dishcloths or flannels
- Rolling pins
- Flat boards
- Plastic trays
- Measuring jugs or cylinders



What to do

1. Introduce the activity using the story of Richie. Ask the children if they have helped to wash clothes before. Have they ever tried washing clothes by hand? Children may not know what a mangle is. Show them a picture or video. Can they explain how it works?
2. Give out activity cards and equipment to the children.
3. Explain that they will be using the equipment provided to make a model mangle and a model washing machine.
4. Encourage children to discuss their ideas and how to carry out their investigations. Prompt questions:
 - How does a washing machine work? What does the drum do?
 - Does the spin speed make a difference to how dry the clothes are?
 - How will they make sure their test is fair?
 - How will they record their results?
5. Support children to conduct their tests and make their own records of their results, groups may decide to vary size, number, distribution or even type of hole. When testing the washing machine drums children should spin the bags at their side in a big circle up past their ears and down past their knees. Ask children to compare the water measurements by pouring the water from each model into a measuring jug.
6. Ask the children to present their findings to the rest of the group. They can be as creative in their presentation as they want.

Things to think about

This is a great activity to do outside. Otherwise a large room (e.g. a hall) allows plenty of space for spinning.

The simplest way to make a centrifuge is with two lidded polystyrene or paper cups. Use a sharp pencil or compass, supervised if necessary, to make holes in the side of the smaller cup and place it inside the bigger one. Put wet fabric inside the smaller cup and put both lids on. One needs to fit inside the other. When spun round in a bag the water will gather in the bigger cup. The washing machine drums do not need to be spun very quickly for the investigation to be effective. Spinning in a larger, slower circle also works well.

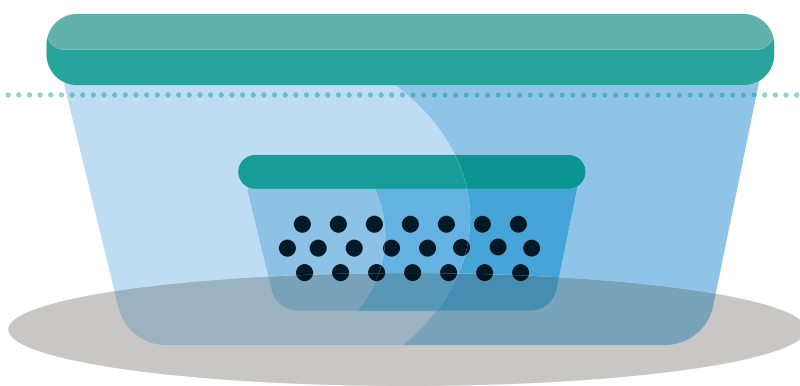
The simplest way to make a model mangle is to lean a flat board in a plastic tray so it is propped up on one end. Then use a rolling pin to roll the fabric. The water collects in the tray.

Mangles work by compressing fabric and squeezing the water out. Washing machines use centrifugal force as they spin to move the water to the outer container away from the fabric.

Centrifugal force causes the thing being spun to move away from the centre of the circle. A centrifuge spins rapidly so that heavier liquids or objects separate out from lighter ones. Lots of things can be separated in this way. They are used to analyse blood and to create nuclear fuel to make electricity.

Keywords

- Centrifuge
- Mangle
- Spinning
- Machines
- Liquids
- Volume



Watch out!

This activity should be done in an area where children have lots of space around them to spin their models safely.

Spilt water should be mopped up quickly to avoid accidents. Children should wear aprons or suitable clothing to avoid splashes.

Carefully consider group size due to physical nature of activity.

Find out more

Children can learn more about how centrifugal force can help to generate nuclear fuel for electricity by visiting www.learnwithrichie.com. Richie is a character who helps children learn about where electricity comes from.



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Activity Card

Richie has been to the Startown History Museum with his friends. They visited a display of inventions from the past. Richie's favourite invention was a mangle.



People used mangles to dry out clothes after they had been washed. The museum guide said now washing machines dry out clothes by spinning around really fast. My clothes are still wet when they come out of the washing machine. I think a mangle would be better. Can you help me find out which is best?

Your challenge

Help Richie find out the best way to separate water from his clothes.

You can make models to help you decide!

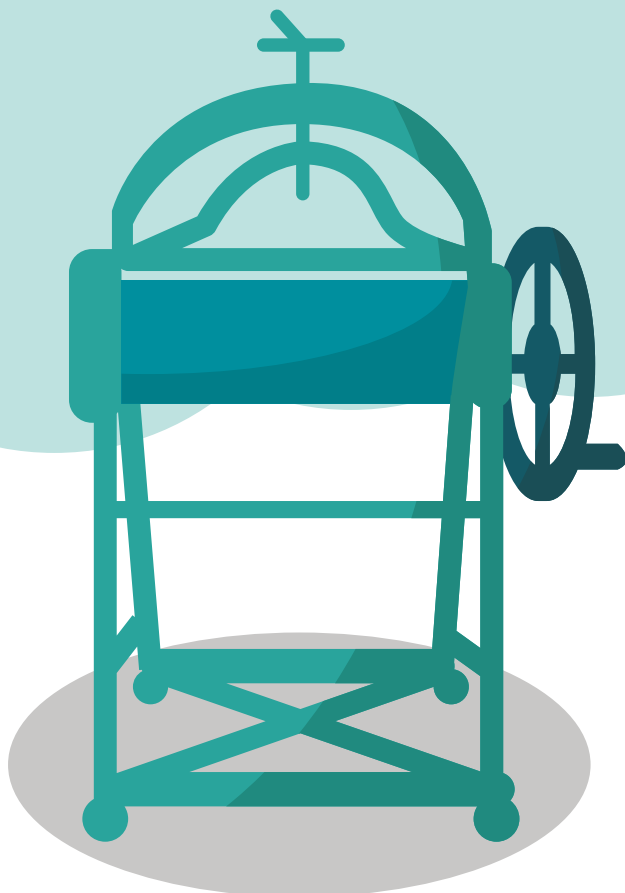
Discuss

Have you ever washed clothes by hand?

How do you get the water out of them?

How does a mangle work?

Why does a washing machine drum spin around really fast?



Getting started

Plan what you are going to do:

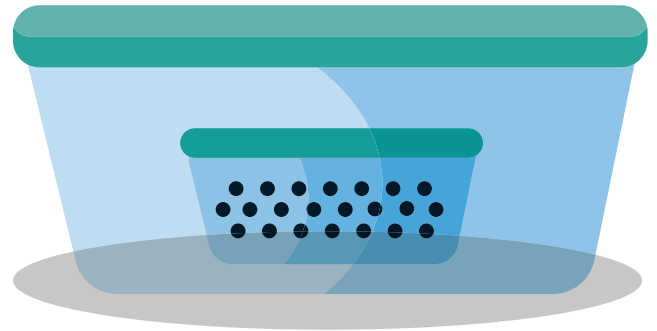
- Compare the amount of water you can separate from the fabric using a mangle and a washing machine drum. Think about how you can make this a fair test.
- Soak two pieces of the same fabric in water.
- Separate the water from one piece of fabric using your mangle and the other piece using your washing machine drum.

Make a model of a washing machine drum:

- First, make holes in a tub that has a lid.
- Next, put this inside a bigger tub with a lid to collect the water.
- Now you can spin this around at your side in a strong bag.
- Remember! Don't let go as you spin it.
- A washing machine can spin around more than 1000 times every minute to separate water from your clothes. How fast can you spin your drum?

Make a model mangle:

- A rolling pin is a good model of a mangle.
- Roll your fabric on a sloping surface.
- Remember to put something underneath to collect the water!



Test your ideas

You might like to record your results in a table like this one:

	How much water was removed from the fabric?
Mangle	
Washing machine drum spun slowly	
Washing machine drum spun fast	
Washing machine drum with lots of small holes	
Washing machine drum with a few small holes	
Washing machine drum with lots of big holes	
Washing machine drum with a few big holes	

Share your ideas

Were there any problems with your tests? Why?

How could you improve your tests?

Take photographs of your investigation and your models. Send your pictures to Richie to help him decide how to dry his clothes.

Extra things to do

Find out about other things that can be separated by spinning.

Find out how separating by spinning can help to generate electricity.

Find out how separating by spinning can help in medicine.