

Content of Lessons

Mechanics

MECHANICS

'Wind and Water'

Design/Experiment

Design a wind or water powered toy using recycled materials to help save our planet!

Lesson 1: Examine and discuss the design brief. Explore presentation on wind and water powered machines and toys. Look at designers, artist and inventors who harness wind and waterpower including Theo Jansen and William Kamkwamba. Play with some of the simple wind and water powered toys and discuss the mechanisms involved.

Lesson 2: Make a simple windmill from scrap materials.

Lesson 3: Design your own wind or water powered toy. Draw diagrams of the mechanical aspects. Consider scrap materials you want to find. Discuss your design with a partner.

Design Technology

Mechanics

‘Wind and Water’

Year 5

Half Term 3

Lesson 1

In Science we have been looking at movement and forces which make machines work. In History we have been looking at how Manchester changed due to the development of machinery and factories. In Geography we have begun to look at the impact of these changes to our environment and climate. Just as developing our understanding led to machines and factories which pollute our environment, our scientific understanding can also get us out of climate catastrophe. For thousands of years before the industrial revolution we harnessed the power of the wind and flowing water to create energy and make things move. We need to do this more now, so we stop burning oil, gas and coal to power our world. We are going to work as Designers to create toys which are powered by wind and water- we will also recycle and reuse scrap materials as this is another way, we can save energy.

Hello Year 5 Designers! A design brief tells you what you need to design and who it is for. Here is your design brief for your 2nd Design Technology project of Year 5.

Design Brief.

Design and make a moving mechanical toy that uses wind or water to power it.

Your toy needs to be made mostly from recycled and scrap materials .

The toy needs to move well and be attractive. It is intended to show other children that toys can be made rather than bought, and that they can move by harnessing natural resources like wind/air and water.

This half term, you will be learning about all sorts of ways we can make things move using 'mechanisms' We will make some different toys to help you learn about this. You will use what you have learnt to help you design and make the toy to teach little children about stopping spreading germs. Let's begin...



Inspiration: William Kamkwamba

When William Kamkwamba was 14 years old when he made a windmill that saved his family and village.

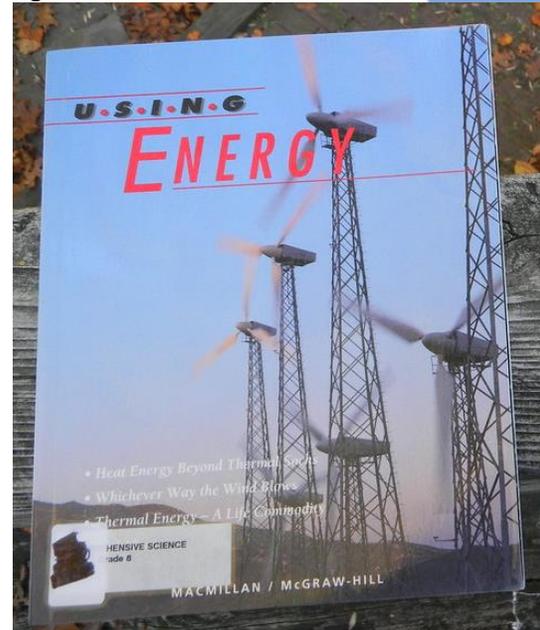
William made it by reading a book and finding scrap materials.

What could you be doing when you are 14 years old?!

Watch this film about William Kamkwamba (pronounced kam-k-wamba) and his windmills.

[Blowing in the Wind – YouTube](https://www.youtube.com/watch?v=YoIGMdUjUUM)

<https://www.youtube.com/watch?v=YoIGMdUjUUM>



Inspiration: Toy Maker

You must be very creative and inventive if you do not have money.

You need to use scrap materials and your imagination to build the things you want.

Watch this short film showing a toy car made by an 11-year-old boy in Kenya.

It is pushed along, not powered by the wind. It is still very clever and inventive though, as he created a way of steering the car.

Have a look....

[Kenya '11 - kid pushing handmade 'toy car' - YouTube](https://www.youtube.com/watch?v=0pPyyz0FNyl)

<https://www.youtube.com/watch?v=0pPyyz0FNyl>



Challenge 1: Make a pin wheel.

We are going to make a toy windmill out of scrap materials to celebrate the work of William Kamkwamba.

Watch this film for instructions. You can stop and start the film and make the pinwheel as you go along.
Or just watch it until the end and get making!

[Windmill-Pinwheel with recycled materials – YouTube](https://www.youtube.com/watch?v=7Lp9t0qqIw8)
<https://www.youtube.com/watch?v=7Lp9t0qqIw8>



End of Lesson

1.

Design Technology

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Year 5

Half Term 3

Lesson 2

Recap:

In our last lesson we looked at the brilliant work of William Kamkwamba. At the age of 14 he created a windmill to bring electricity and water to his village.



We then made a windmill also called a pin wheel as it is held together by a pin. We used recycled and environmentally friendly materials.



Inspiration: Theo Jansen

Theo Jansen is an artist from Holland.

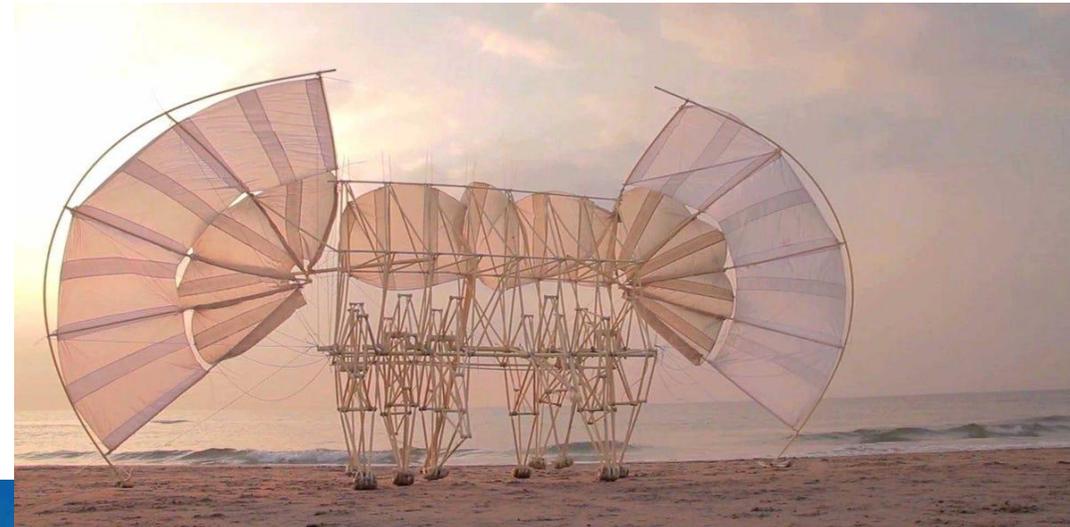
He is a Dutch artist who builds walking and moving sculptures powered by the wind.

He thinks they are like a new form of life which he calls his "Strandbeests". They walk along the beaches of Holland, powered by the wind.

They are beautiful to watch.

Watch this film about Theo Jansen's Strandbeests. As you watch try to remember that these are simply powered by the wind caught in their sails, because of Theo Jansen's incredibly clever designs.

William Kamkwamba (pronounced kam-k-wamba) windmill made from scrap was about helping people. But things can be made to harness wind or waterpower for pleasure, as well as practical things. As well as toys, wind and water has also been used to power the work of artists.



[Skeletal 'beests' walk the shoreline - BBC News - YouTube](https://www.youtube.com/watch?v=3ZePhxfXIns)

<https://www.youtube.com/watch?v=3ZePhxfXIns>

Challenge 1: Wind powered cars.

**We are not quite ready to make anything as complicated as Theo Jansen!
Instead, we are going to take inspiration from him to use sails which will capture wind. We will also look back at the young boy from Kanya who made his own car from scrap materials. Let's make some wind powered cars!**

Each pair will need....

10 polo mints, 12 straws, sticky tape, 3 sheets of scrap paper from magazine, 4 bamboo skewers, a small piece of scrap card. A small ball of whitetac and scissors.



**Watch this film to find out how to make 2 types of cars.
Make the 2 types and test drive them to see which works best!**

[Wind Powered Cars - YouTube](https://www.youtube.com/watch?v=CZOUOQxb_9E)

https://www.youtube.com/watch?v=CZOUOQxb_9E

End of Lesson

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Design Technology

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Year 5

Half Term 3

Lesson 3

Recap:

In lesson 2 we looked at the kinetic (moving) sculptures of Theo Jansen powered by the wind.

We also made some wind powered cars.



In our 3rd lesson we are going to look at water powered toys.



First, have a look at this film of water powered music. Look out for the water wheel powered by the stream of water. If you remember water wheels were used to power the early machines of the industrial revolution.

[TABANDA kinetic sculpture powered by water 1.MOV - YouTube](https://www.youtube.com/watch?v=KqFaXfwFa9g)

<https://www.youtube.com/watch?v=KqFaXfwFa9g>

Challenge 3: Water Powered boat.

You are going to build a boat out of junk, powered by a water wheel!

You will need...

A small plastic drink bottle with a lid,
2 lolly sticks, gaffa-tape,
2 small wooden or plastic spoons,
and 2 rubber bands.

Your teacher will need to have a glue
gun switched on and heating up.

Watch this film for instructions.

You can stop and start the film and make the
boat as you go along.

Or just watch it until the end and get making!

[Water Powered Boat - YouTube](https://www.youtube.com/watch?v=mMos5AvPzTk)

<https://www.youtube.com/watch?v=mMos5AvPzTk>



What Next?

Next half term you will be designing and making your own toy that uses wind/air or water to make it move.

There are lots of films on YouTube to give you ideas.

Do some research before next half term's design technology.

The more ideas and inspiration you collect the better.

Please also start collecting things like...

Bottle caps, small plastic bottles, yoghurt pots- give them a good wash and bring them into school.

You could have a box in the corner of your classroom labelled 'Scrap for Design Technology'.

Here are a few more films to get you thinking about wind and water powered toys you might want to watch during wet break times...

[How to Make a Car - Wind Car - Very Simple Toy – YouTube](https://www.youtube.com/watch?v=5aCzHGiH4rQ&t=24s)
<https://www.youtube.com/watch?v=5aCzHGiH4rQ&t=24s>

[How to Make Amazing Balloon Powered Car - Air Car – YouTube](https://www.youtube.com/watch?v=BD353qP2i78)

<https://www.youtube.com/watch?v=BD353qP2i78>

[WATER WHEEL Propelled CAR - diy projects – YouTube](https://www.youtube.com/watch?v=nBhMQS4IMdl)
<https://www.youtube.com/watch?v=nBhMQS4IMdl>

[Make water wheel Relaxation with Coca Cola cans and IceCream Stick, Free energy – YouTube](https://www.youtube.com/watch?v=u-fZtU-qbnQ)

<https://www.youtube.com/watch?v=u-fZtU-qbnQ>

You can also do your own research into wind and water powered toys anytime you like!

End of Lesson

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