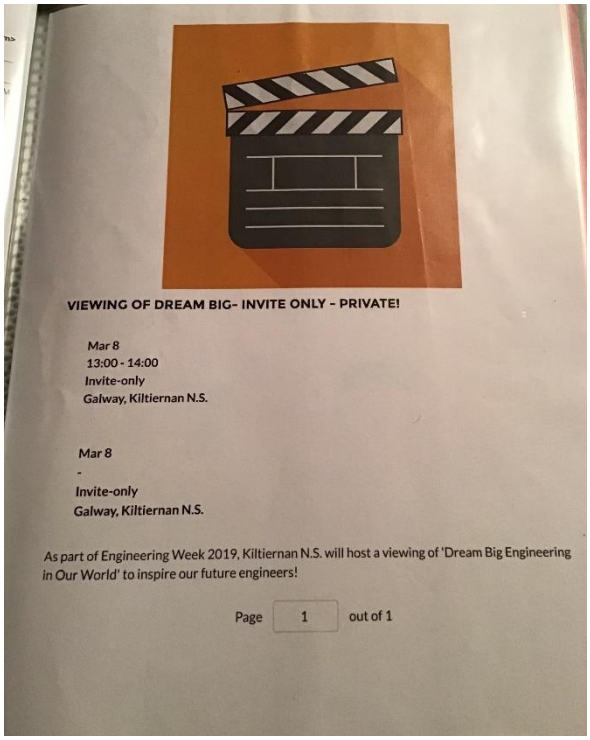
Engineers Week Event

Engineer Week took place on 2nd-8th March this year.

For Engineers week we registered an event with engineersweek.ie- 'A Viewing of Dream Big' Engineering Our World. This was open to the school community. We had a great discussion following the viewing. Many children were inspired by the great work of engineers and they learned a lot of new engineering terminology.

The children completed an event survey. We received positive feedback from every child.



VIEWING OF DREAM BIG- INVITE ONLY - PRIVATE!

Mar 8
13:00 - 14:00
Invite-only
Galway, Kiltiernan N.S.

Mar 8
-
Invite-only
Galway, Kiltiernan N.S.

As part of Engineering Week 2019, Kiltiernan N.S. will host a viewing of 'Dream Big Engineering in Our World' to inspire our future engineers!

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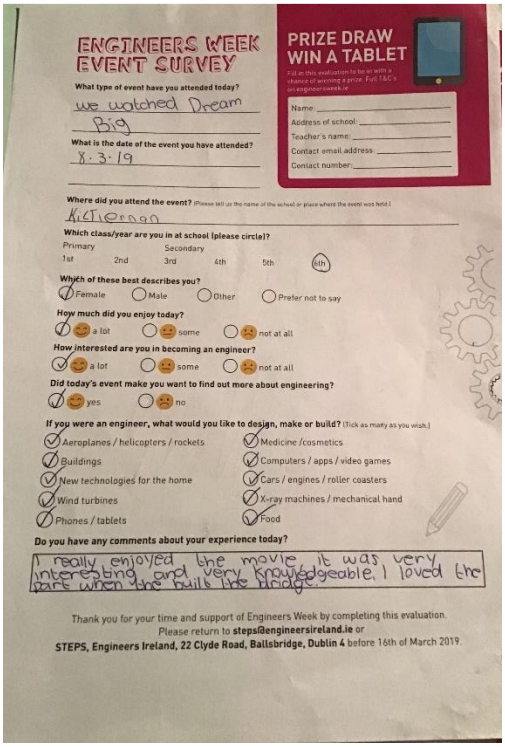


ENGINEERS WEEK EVENT SURVEY

PRIZE DRAW WIN A TABLET

What type of event have you attended today? we watched Dream Big

What is the date of the event you have attended? 8.3.19

Where did you attend the event? Kiltiernan

Which class/year are you in at school (please circle)?
Primary: 1st 2nd 3rd 4th 5th 6th
Secondary

Which of these best describes you? Female Male Other Prefer not to say

How much did you enjoy today? a lot some not at all

How interested are you in becoming an engineer? a lot some not at all

Did today's event make you want to find out more about engineering? yes no

If you were an engineer, what would you like to design, make or build? (Tick as many as you wish.)
Aeroplanes / helicopters / rockets
Buildings
New technologies for the home
Wind turbines
Phones / tablets
Medicine /cosmetics
Computers / apps / video games
Cars / engines / roller coasters
X-ray machines / mechanical hand
Food

Do you have any comments about your experience today? I really enjoyed the movie it was very interesting and very knowledgeable. I loved the part when they built the bridge.

Thank you for your time and support of Engineers Week by completing this evaluation.
Please return to steps@engineersireland.ie or
STEPS, Engineers Ireland, 22 Clyde Road, Ballsbridge, Dublin 4 before 16th of March 2019.

Engineers Week Classroom Pack

We continued Engineers Week by carrying out hands-on engineering activities based on the film Dream Big. These activities were supplied by the Engineer Week Website under the 'Dream Big' tab.

We designed 'Slender Towers/ Skyscrapers and Wind Resistant Towers'.

Wind Resistance Tower

Design Challenge: Build a tower that can withstand lateral force.

3rd -6th class took part in this challenge.

Criteria:

- ✓ Measure the resistance to a lateral force from 3m away, 2m, 1m.
- ✓ Must stand and bear weight of 50g.
- ✓ Cannot slide.

New Terminology:

- ❖ **Lateral Force**
- ❖ **Wind Tunnel Testing**
- ❖ **Wind Load**

Fair Test

Factors kept the same:

✓ *The distance, Lateral Force (i.e. hairdryer) remained same, weight, materials used.*

Variable:

✓ The design of towers.

Below are samples of the children's accounts of this activity.

Wind Resistance Tower

Equipment: Every group got 4 pieces of paper and 2 metres of tape. We used a fan to test the towers.

Rules and Conditions: Each team was only allowed to use four A4 sheets of paper and two metres of duck tape to create a wind resistant tower. It had to be 30_{cm} or taller.

Using a fan, we put our towers on the ground beside pieces of paper indicating the distance between the fan and the tower. Whoever was able to put their tower closest to the fan and it not falling or sliding for 10 seconds wins.

For the test we had to put a small weight 50g on the highest point of the tower to add more weight so that it wouldn't fall as easily.

Method:

1. We got into groups and discussed what our design would look like before we got the materials.
2. Using our **STEM** booklets, sketch your ideas.
3. Once you get the four pieces of paper and the two metres of tape, you can begin constructing your tower.

   The beauty of this activity is that you can make it however you want as long as it is 30cm's high.

You could do whatever type of design you would like, and there are no bad ideas!

Outcome: Our group decided to have our tower in a triangular prism shape. Pointed the right way, this would make the wind from the fan split and flow on the sides of it instead of making the structure fall back. This is called **aerodynamics.**

Our design worked well. We were able to put it one metre away from the fan without it falling for 7 seconds!

Rating: I would give this very enjoyable lesson a...

Wind Resistant Tower Experiment

Equipment Needed: A4 paper (max. 4 sheets)
Tape (Max. 1 ½ metres)
50g weight
Hairdryer

Aim: Create a wind resistant tower that is at least 30cm tall, fit for a weight to be placed on top and to stay standing while lateral force is applied.

Method:

1. In your group, create a plan for your structure.

2. Start building, keeping in mind that it has to be at least 30cm tall and has to be able to hold a 50g weight.

3. When you are happy with your design, transport it to your 'testing area'.

4. Place the 50g weight on top of each structure then test them from a distance of 3m using the hairdryer and making sure that it is a 'fair test'.

5. If the structure survives for 10 seconds at 3m without falling over, move it closer to the hairdryer and so on until you find the structure that is the strongest.

Outcome: Our group's structure stayed standing at 3m, swayed a little bit at 2m but ended up falling over at 1m after lasting for 8 out of 10 seconds.

Rating: I would rate this experiment 4.5 out of 5 stars as it was an enjoyable, hands on learning experience!

Wind Resistance Tower

Equipment allowed:

- 4 sheets of paper
- 2m of tape

Method:

- Make a tower so that when a hair dryer is aimed at it it will not fall down
- Testing from 3m away, 2m away and finally 1m away
- There may be varying towers as we in groups designed different towers

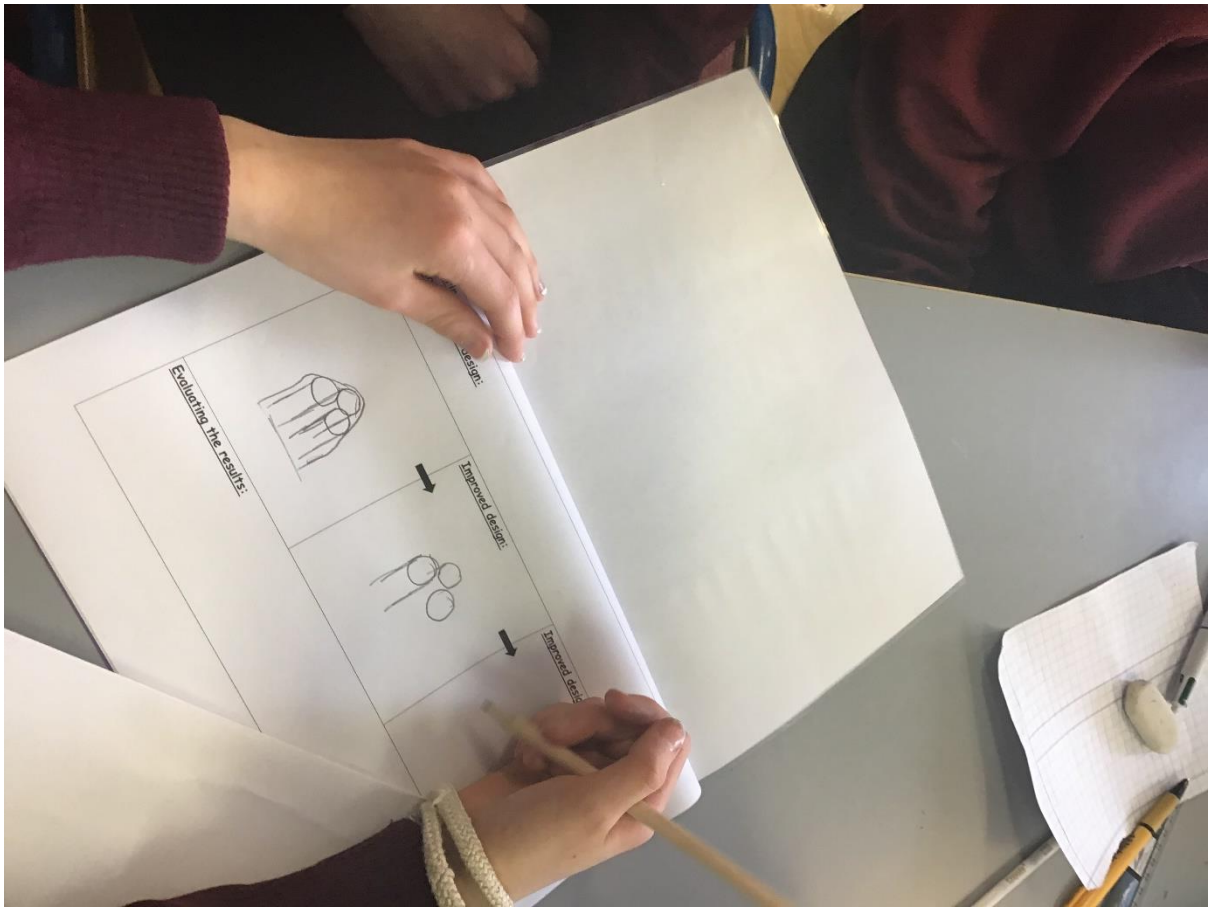
Outcome:

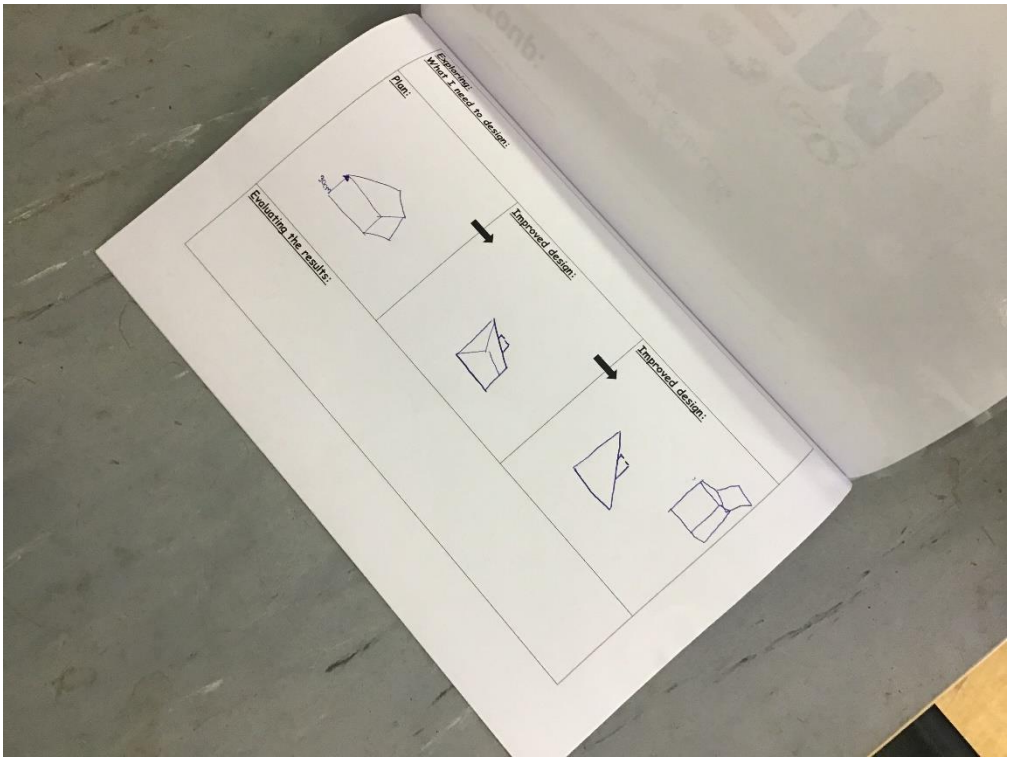
- When we put the towers on the ground to test most of them stayed to 2m a few went to 1m. Ours stayed up at 1m but it slid off the mark of 1m.

Fair Testing:

- When we tested our designs we talked about doing a fair test. A fair test is when you are testing more than 1 thing there is only 1 variable: the design. Everything has to be the same so when we were doing ours we had to make sure that:
  - Each tower was placed in the same place
  - The hair dryer was on the same setting

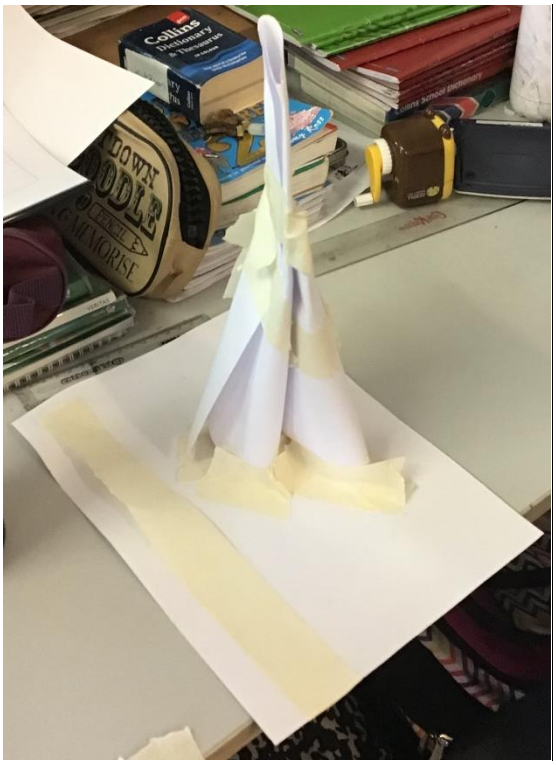
Erin O'Sullivan
6th Class





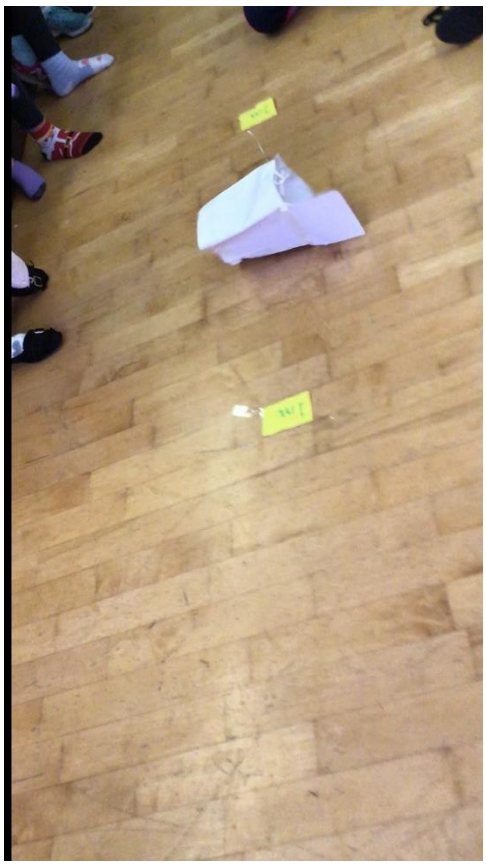
Sketching their design plan in their STEM Booklet.

It can hold the 50g weight but can it withstand a strong lateral force?



Interesting designs

Testing their designs against the lateral force (hairdryer) from a 3m, 2m, 1m mark.



Unfortunately, some towers could withstand the lateral force…

Slender Tower Challenge

Design Challenge: Build the tallest tower with the smallest footprint.

1st class- 6th class took part in this challenge.

Criteria:

- ✓ Must be 1m tall and free standing.
- ✓ Each team got 10 sheets of paper, 1 roll of tape and 1 pair of scissors.
- ✓ Each tower was measured for height and width at the base. (Slenderness Ratio). 5th and 6th class were involved in calculating their slenderness ratio.

New Terminology:

- ❖ **Footprint**
- ❖ **Slenderness Ratio.**

Some of the children that designed this fantastic slender tower.

Height measured 100 cm, Width of base= 21cm and so their Slenderness Ratio was 1: 4.8

Slender Tower

STEM

With Miss Forde and Miss Leech we made a slender tower out of paper. The word slender means tall and skinny

1. Materials: All you need is sellotape and paper, but if you want to make it a challenge you can ONLY use 10 sheets of paper. The building has to be 1 metre tall.
2. Method: Firstly when you get your 10 sheets of paper and your sellotape. You work on getting the cylinder shape in the paper and it has to be tall to reach the 1 metre mark. After that you have to make the base. If you want it can be one sheet at the bottom of the tower to keep it standing and steady or you can get 2 sheets and fold up the sides so it catches wind.

I would rate this a

Because it was quite hard in my opinion.

By Meádbh Costello 5th class

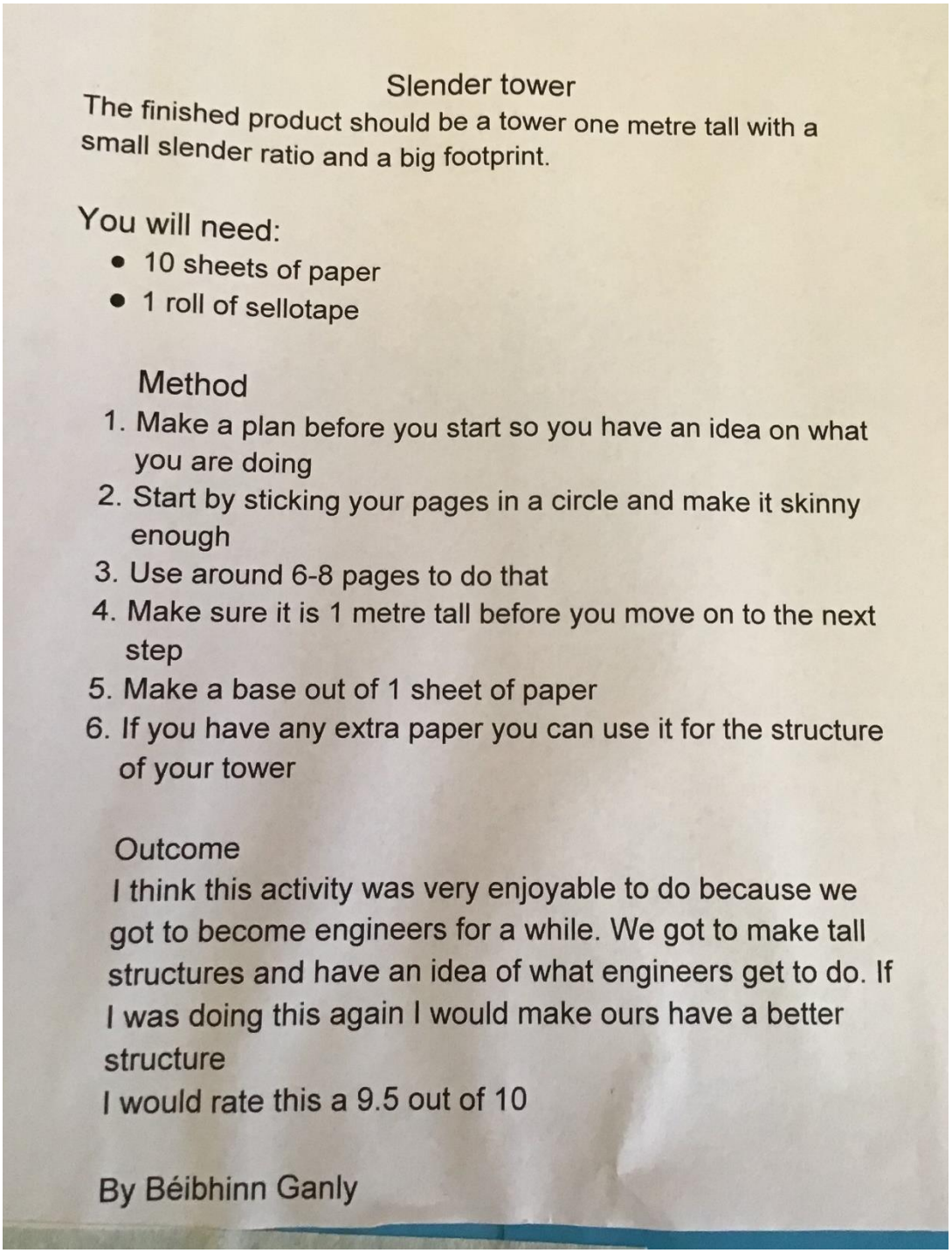
How to make a Slender tower

What the rules are:

1. You can only have ten pieces of paper.
2. Your structure has to be one metre tall.
3. The width of your tower has to be the size of your foot.

1. Place your foot on the ground. Work your way up to one metre tall with paper
2. When you have got two sheets of paper you can sellotape them together.[tip if you want to spare some paper cut them up]
3. To balance your structure get a flat sheet of paper and fold the sides
4. Work your way up with your paper. When your structure is done put it in place and let go! If your structure falls down you can investigate the problems and fix them.

Sophia D'Arcy.



Slender tower

The finished product should be a tower one metre tall with a small slender ratio and a big footprint.

You will need:

- 10 sheets of paper
- 1 roll of sellotape

Method

1. Make a plan before you start so you have an idea on what you are doing
2. Start by sticking your pages in a circle and make it skinny enough
3. Use around 6-8 pages to do that
4. Make sure it is 1 metre tall before you move on to the next step
5. Make a base out of 1 sheet of paper
6. If you have any extra paper you can use it for the structure of your tower

Outcome

I think this activity was very enjoyable to do because we got to become engineers for a while. We got to make tall structures and have an idea of what engineers get to do. If I was doing this again I would make ours have a better structure

I would rate this a 9.5 out of 10

By Béibhinn Ganly

Design and Make Activities

We Designed Wells (Junior Infants- 2nd Class)

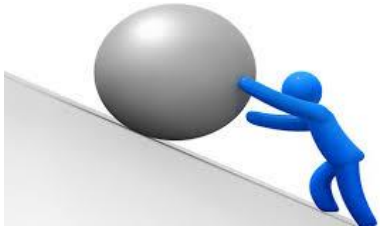
We made our own pulleys and levers in school. We went together in groups. We decided what we needed to make our well and each person in each group had to bring in materials to build our wells.

In our groups, we all worked together to plan and make our wells which had to have a working pulley and lever system. Each well had to have a rope and a bucket.

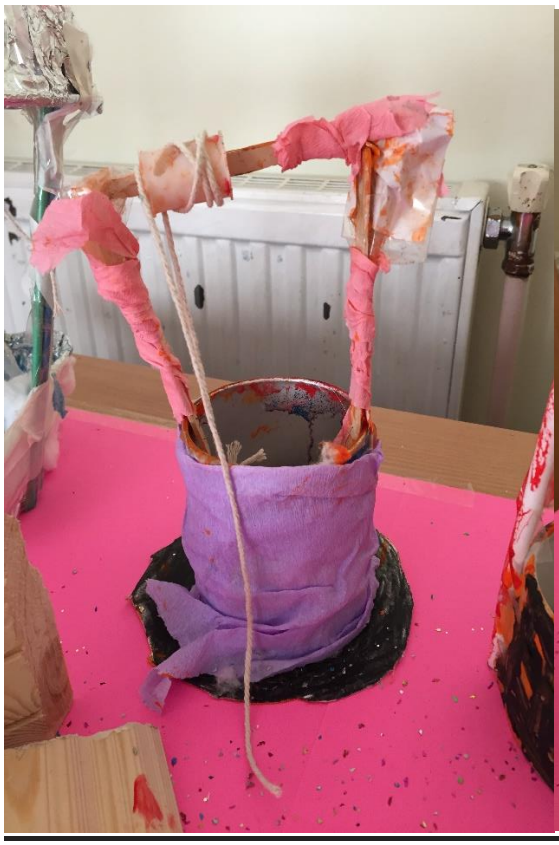
What we Found Challenging

It was difficult to get the rope on the pulley. We found that if we pulled on it, it fell off easily. We fixed that by securing the rope to the side of the well and that helped. Putting the top of the well on was difficult because when we put it on it was wobbly and if we pushed it down low, the pulley wouldn't work. We fixed it by using double tape which made it stronger.

Later, we enjoyed decorating and presenting our wells so that they looked amazing! We drew lines which made it look like bricks on the outside. We learned a lot about how things are built and what works best.



Here are our wells:



Geodesic Domes (Junior Infants- 2nd Class)

How we made our geodesic structures

We wanted to design geodesic structures in groups. We used cocktail sticks and jellies to attach the sticks together.

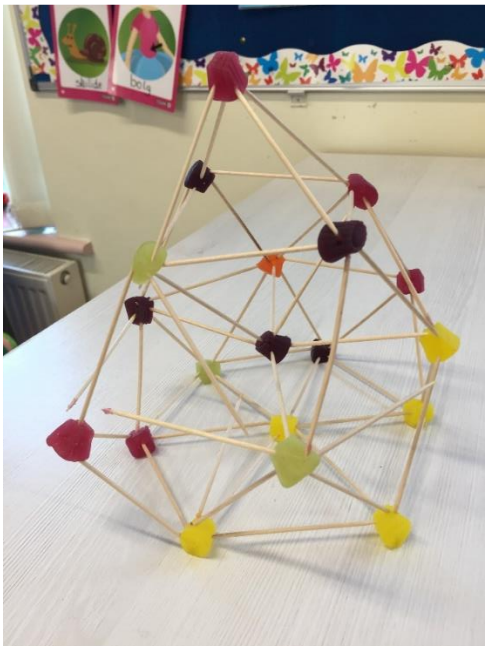
What we found difficult?

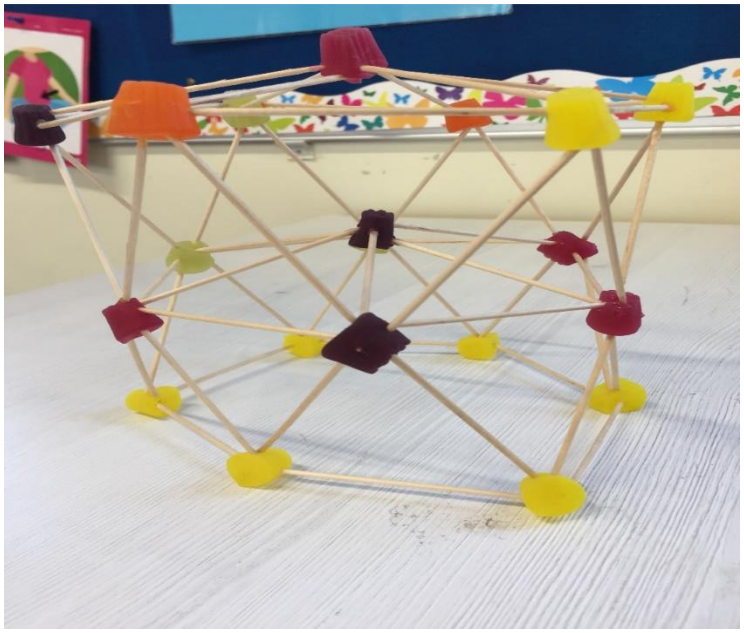
We found it difficult not to eat the sweets!! We planned the shape first then tried to build it. The shape of the dome was a bit of a challenge because the sticks are straight, not curved.

How they turned out…..

We were delighted with the results and they may be used for future playground designs!

Here are our designs.





Egg Drop Challenge (3rd- 6th Class)

Step 1:

1. Build a carriage/ device that protects an egg when dropped from 2m.

Step 2:

1. Build a carriage/ device that protects an egg when dropped from 2m.
2. Must create design without using cotton wool and balloons.

Fair Test

Factors kept the same:

✓ *The time given to plan designs & construct towers, same materials provided to all, dropping height remained the same (2m)*

Variable:

✓ The design of carriages.

The Egg Drop Challenge

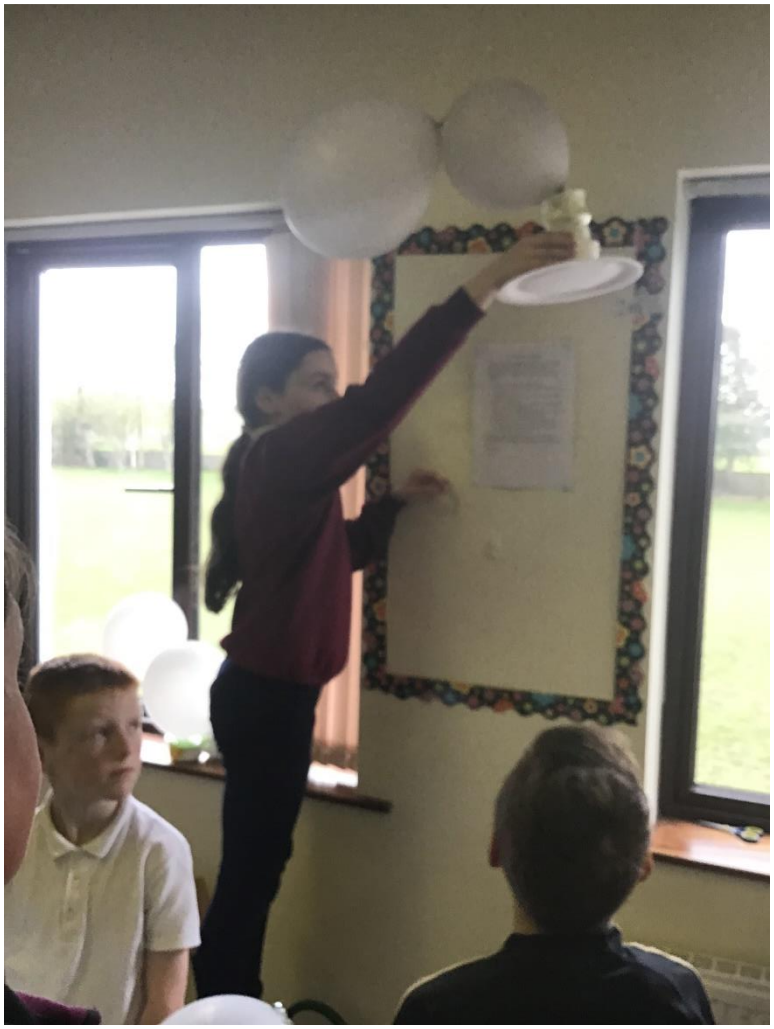
Our experiment was the Egg Drop Challenge. We had to design a carriage from crashing to the floor and breaking open. The equipment we used was: 1 balloon, some cotton wool, straws, 3 eggs, an empty container and some sticky tape. The method we used was:

1. Make a plan and find the materials needed.
2. Put some of the cotton wool into the container and tuck the egg in nice and safely.
3. Click on the lid and make sure that the lid won't somehow fall/slip of during testing.
4. Blow up the balloon and tear of a piece of sticky tape so that you can tape the balloon to the lid.
5. Just in case, check over everything to make sure that there's nothing loose that can come off during testing.
6. Drop the carriage from a certain point (we dropped ours from 2 metres). As soon as the carriage has landed, go and pick it up. Before you open it, you can estimate whether it has broken or it is still in great shape.

I really enjoyed this experiment. The outcome of our carriage was that the egg didn't crack open. I wouldn't change a single thing about our carriage.

By Sarah Divilly

3rd class



With the first design, the children used balloons as a 'parachute' to slow down the rate at which the carriage dropped. They also used cotton wool to reduce the force when the egg hit the ground.

For their next design, they had to be more creative. They were allowed to use balloons/ cotton wool. Here is an egg carriage design by one of the groups.

Here is a link to a video of the children carrying out this activity.
https://drive.google.com/file/d/1rDvw4lAv7o7fs2WEANCotIgNLd8tgoES/view?usp=sharing

Lighthouses

Design Challenge: Design a Lighthouse with a hidden circuit and switch.

3rd class- 6th class took part in this challenge.

Criteria:

- ✓ Must include a complete circuit with a switch.
- ✓ Circuit must be attached to a bulb that lights when the switch is connected.

Here are samples of the children's research on Lighthouses.

Loophead Lighthouse

Loophead lighthouse is located in the Loophead peninsula. It is near Kilbaha in Co Clare. The lighthouse was built in 1670. You can still see part of the old cottage on the site that the lighthouse keeper lived in. It is one of the most famous lighthouses in Ireland. In 2013, Loop Head was named the "Best Place to Holiday in Ireland" by The Irish Times.

Hook Head

Hook Head lighthouse is located in Co. Wexford. It was erected in the early 13th century by William Marshall, with assistance from the monks of the nearby monastery. They built the lighthouse to guide merchant ships sailing in and out of his newly founded town New Ross. It was built 800 years ago making it the oldest operating lighthouse in Ireland and the second oldest in the world. Hook is 35m high and looks down on a lovely beach front. Since 2001 it has been open to the public. Now you can go and visit. The lighthouse keeper's house is now refurnished into a café and gift shop.

Did you know –

1. The lighthouse walls are up to four metres thick.
2. Humpback and fin whales often visit the waters around Hook Peninsula for feeding during the winter months.
3. The phrase 'by hook or by crook' is said to have originated here.
4. Lightkeepers and their families lived at the lighthouse until 1987

Here's a link to a video of the children working on their Lighthouses.

https://drive.google.com/file/d/12W2DDBZBWjC09cFd0LhpoV-knunfHwmP/view?usp=sharing

Wind Farm

Design Challenge: Design a Wind Turbine that can lift a weight

3rd class- 6th class took part in this challenge.

Criteria:

- ✓ Must design a turbine that will rotate continuously to generate mechanical energy (lifting a weight in a cup)
- ✓ Must attach their turbine to a piece of cork on a skewer.

Here is a link to the children carrying out this investigation.

https://drive.google.com/file/d/1a83RvuGL1-Baz20z15tQztY-n8PLpsMV/view?usp=sharing

The children's finished wind farm.

The pupils also engaged in an Engineering Workshop at the Atlantaquarium, SFI Centre, where they designed flood barriers. (See Step 1: Science-Visit to a SFI Centre)