



would like to present  
our Log of Evidence for  
an Award of  
Science & Maths Excellence

April 2020

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# Ballymoney National School

## Contents:

### Step 1: Science

- Four hands-on science investigations, covered by all class levels.
- Curriculum strands explored: living things, energy and forces, materials, and environmental awareness and care.
- A visit from Ann Foulds, Schools Outreach Officer for Plastic Free 4 Schools.
- The Senior Room attended Bandon Grammar School's Science Week event to see some of their science experiments.

### Step 2: Technology

- The Junior Room explored sequencing, programming, control and problem-solving using a floor robot called Bee-Bot.
- The Senior Room explored robotics using Lego Education WeDo 2.0.

### Step 3: Engineering

- A pupil in the Junior Room designed and made bird feeders for our school garden, in hope of attracting robins, great tits and goldfinches.
- Virtual school tour to the International Space Station.

### Step 4: Maths

- All classes took part in Maths Week 2019.
- Both rooms participated in a maths trail around the school.

### Step 5: Stem Showcase

- We had a science evening on Thursday, 13th February which was open to everybody to attend.

## Step 1: Science

# Strand: Materials

By: the Junior Classes

## Experiment: Material

## for a Lifejacket

In this experiment, the children decided to test out various materials for making a lifejacket.

**What you will need:** 10 small heavy plastic figures, polystyrene, newspaper, cotton wool, eraser, corks, sponge, pom-poms, bottle caps, balloon, elastic bands, basin of water and some towels.



Prior knowledge: we knew that things which are lighter than water float and things which are heavier than water sink.

Trigger: our small plastic figures sink in the water, even when we change their shape. How can we make them float?

**Answer:** attach something light to them! Just like how we can float in the water when we use swimming aids such as armbands, woggles or floats.



**Predictions:** we made our own predictions on what would be the most suitable materials for making a lifejacket. We recorded these on a piece of paper.



**Activity:** we attached the different materials to each of the plastic figures using elastic bands. We left one figure without any material. One at a time, we placed them into the basin of water and watched what happened. Our aim was to find out which materials helped the figures to float in the water the best.

#### **Material for a Lifejacket**

Put in order from best to worst the materials you think would make the best life jacket. Why do you think that?

	Material	Reason
Best ↓	1.	
	2.	
	3.	
	4.	
	5.	
Worst	6.	

**The Results:** we discovered that the best materials for the lifejacket were the polystyrene, the pom-poms, the balloon and the corks. All of the other figures sank to the bottom of the basin.



# Strand: Energy and Forces

## Investigating the Importance of Wearing a Seatbelt in a Moving Vehicle

An investigation carried out by the Junior Room

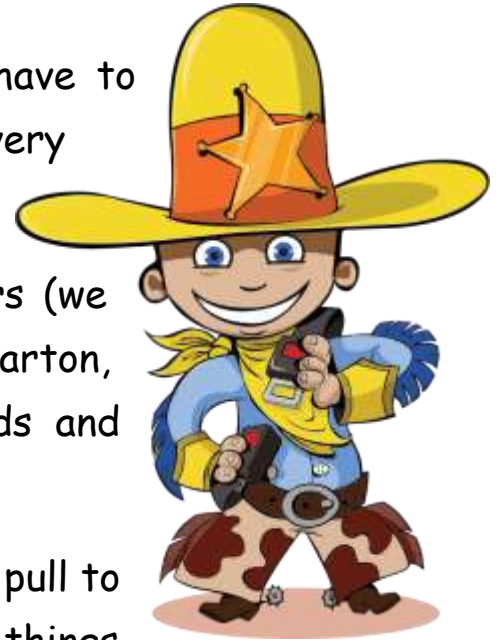
**Trigger:** the Seatbelt Sheriff told us that we have to "buckle up!" and we wanted to investigate his very important road safety message.

**Here's what you need:** a selection of plastic cars (we also made some from Lego and Mobilo), an egg carton, barbecue skewers, milk carton tops, elastic bands and some plastic figures.

**Prior knowledge:** we knew that it takes a push or a pull to make something move or stop. We also knew that things will stay still if they are not moving.

**Trigger:** what will happen if someone doesn't follow the Sheriff's safety message and doesn't 'buckle up' in a moving vehicle? Let's find out...

**Prediction:** we recorded our predictions on a piece of paper and gave reasons for our theories.



### **The Importance of Wearing a Seat Belt in a Moving Vehicle**

What do you think will happen to the person with the seatbelt and the person without the seatbelt when the car hits the wall? Why?

	What will happen and why?
Person with seatbelt	
Person without seatbelt	

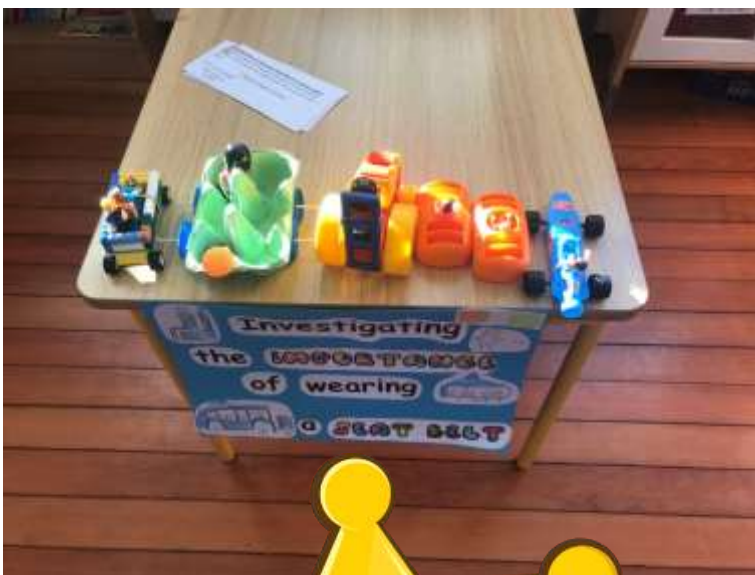


**Activity:** we sourced some plastic cars and also made our own. We placed the plastic figures inside and seat belted some of them in with elastic bands. The rest were not seat belted in and were loose or free. We then raced the cars against a wall and watched the results.



**What we learned:** the figures that were wearing a safety belt remained safely inside the car. Those who were not wearing a seat belt were thrown around the car and on some occasions were thrown out of the car.

**Why is this?:** well, we discovered that things like to keep moving if they are already moving. This explains why the figures that were not wearing a safety belt continued to move when the car stopped suddenly.



# Strand: Living things

## Plants and Pollinators

By: the Senior Room

In this experiment, the Senior Room decided to construct a model of a bee and a flower to show the relationship between plants and their pollinators.

**Trigger:** Irish bee populations are decreasing. We want to demonstrate the important role they play in plant reproduction.

**What you will need:** Lego Education WeDo 2.0 Core Set, programming app, information books about bees, pupil designed poster showing the parts of a flower.

**Prior knowledge:** we knew that bees, birds, bats, butterflies and moths are good pollinators. We also knew that the wind plays a vital role in the pollination process.

**Prediction:** by building a model of a bee flying around a flower that's full of pollen, we hope to show the life cycle and reproduction process of a flowering plant based on the bee's search for nectar.

**Activity:** we created and programmed a model of a bee and a flower using the Lego Education WeDo 2.0 core set, building instructions and the app. The flower has a motion sensor which can detect when the bee is on top of it. When the bee is detected on top of the flower, the motor stops and the bee sound is played. This allows the bee to stop at the flower to collect some pollen. We also designed a poster to show the different parts





of a flower e.g. anther, stigma, stamen, style, ovary, filament, petal. We brought in some real lily flowers to show the external parts of a flower.

**Result:** our model showed that bees are extremely important in how they help plants to reproduce. Nearly all flowering plants rely on pollinating animals to transfer pollen from one flower to the next.

**What we learned:** we need to do more to save our bee population in Ireland. We will ensure that there are lots of bee friendly flowers available in our school garden during the spring and summer months.



## Pollinator-friendly plants for YOUR GARDEN

Our pollinating insects are in decline. One third of our 99 bee species are at risk of extinction. By choosing pollen-rich flowers for your garden, you will help provide much-needed food our Bumblebees and other pollinating insects as well as creating a beautiful colourful garden. There are lots of pollinator-friendly plants to choose from.

To learn more about the All-Ireland Pollinator Plan, see [www.pollinators.ie](http://www.pollinators.ie)

 Grape hyacinth	 Wallflower	 Lungwort	 Berberis	 Spring
 Broom	 Rosemary	 Borage	 Comfrey	
 Allium	 Foxglove	 Catmint	 Calamint	
 Bellflower	 Scabious	 Lamb's-ear	 Globe thistle	
 Stonecrop	 Verbena	 Lavender	 Sneezeweed	 Summer



# Strand: Environmental awareness and care

## Investigating Packed Lunchboxes

### A comparison carried out by the Senior Classes

In this experiment, the Senior Room decided to research and compare the price of a child's daily lunch box needs.

**Trigger:** How can we save money and the environment by making a few simple changes to our daily lunch boxes?

**What you will need:**

Lunchboxes, raisins, yogurts, cheese, water bottles.

**Prior knowledge:** Everyone knows that it takes a long time for plastic and wrappers to decompose. If you swap Cheestrings for a slice of cheese you will save on money and packaging.

**Prediction:** Individually packaged items e.g. a 6 pack of yogurts cost more than buying a larger version of the same product e.g. a large pot of yogurt in the long run.

**Activity:** the Senior Room made comparisons between a big bag of raisins and a packet containing small boxes of raisins, individual pots of yogurt with a large pot of yogurt, Cheestrings with a small block of cheese and a bottle of water with a refillable water bottle.

**Result:** Over a full school year (183 days), you would save €163.36 per year by buying the lunch without packaging. Over eight years in primary school, you would save €1,306.88! Tin foil takes 200-500 years to decompose, a plastic bottle takes 450-1,000 years to decompose and a yogurt pot takes 450-1,000 years to decompose.

**What we learned:** We should encourage everyone to buy a lunchbox with sections and a reusable drink bottle.



# Plastic Free 4 Schools

On Wednesday, 26th February, Ann Foulds from the Plastic Free 4 Schools initiative came to do a workshop in our school. She spoke to us about becoming 'plastic free' ambassadors by using less plastic in our daily lives, starting with our lunchboxes. Ann encouraged us to spread the word to our parents, friends, neighbours and anyone else we come across. We explored the meaning of the '3 Rs' ...Reduce...Reuse...and...Recycle. Ann asked us to think about what type of drink bottle we should bring to school...or to the beach. She said that a re-usable drink bottle is better than a plastic disposable bottle, simply because it can be used again and again. Ann then got us to think about coffee cups...these cannot be recycled and have to go into the general



waste bin. We came up with the idea of using re-usable cups instead.

We were then introduced to Penny Penguin (...and lots of other animals too...). Penny likes to eat fish but recently some strange things have turned up in her tummy, including a plastic knife and fork, a straw, a plastic bag and a few other things like that. ☹️ We must remember that we SHARE the planet with animals and that we should take more care with our rubbish.

Ann then got us to sort some rubbish and



we learned that we can recycle hard plastic, newspaper, cardboard, etc. Ann left us with the idea of bringing a 'litter less' lunch to school, by having no packaging and therefore having no waste when we have finished eating. We are going to try really hard and improve our lunchboxes.





During Science Week 2019, the Senior Room went to visit Bandon Grammar School to look at some of their science investigations. The day kicked off with a welcome from the transition year pupils and a briefing of what was ahead of us. There were several other schools present, all eager to begin our experience of secondary school science. We were each given a notebook to write down our observations throughout the day.

We began with a hand washing workshop, delivered by the school nurse. The pupils applied a special gel to their hands, representing everyday dirt and grime and examined it under ultraviolet light. Then the challenge was to wash their hands and re-examine them, which showed us that most people were not using effective hand washing techniques at all! The nurse showed us the correct way to systematically wash our hands and the results under ultraviolet light were far better than before.

We moved on to the science labs and each pupil got to wear a white lab coat. Here we were able to move around several stations where the students had set up various experiments for us to see and try out. We watched an iodine snake, tried an 'acid versus base' experiment and were



amazed when one of the pupils created flames and held them on his palm. We also had to chance to test our nerves by dissecting an eyeball, brain, heart and lungs. It was all very interesting, especially for those future doctors and vets among us!

The last part of the trip was held in the sports hall. We squeezed into an inflatable planetarium and sat back (or lay down) to watch an astronomy presentation. It was a wonderful experience and we were amazed by how huge the galaxies are and how small our earth is among them.

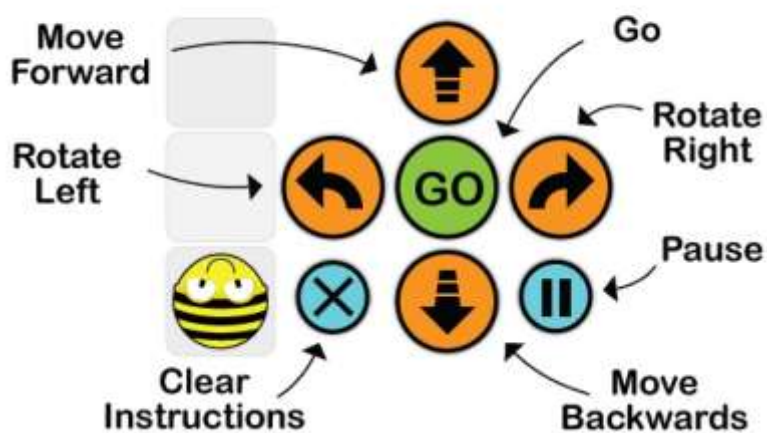
Our tour ended with a debriefing in the auditorium where we gave feedback on our experiences and were delighted when Katie and Noah were chosen as some of the top scientists of the day.

## Step 2: Technology

# Bee-Bot

The Junior Room have been busy using a floor robot called Bee-Bot. Bee-Bot can be given different commands using its basic controls. Bee-Bot can move forwards, backwards, rotate left and rotate right.

### How to play Basic Controls



Bee-Bot has helped us to learn our directions. Bee-Bot has also allowed us to think about how to get it from one place to another. It's trickier than you think and requires lots of practice!

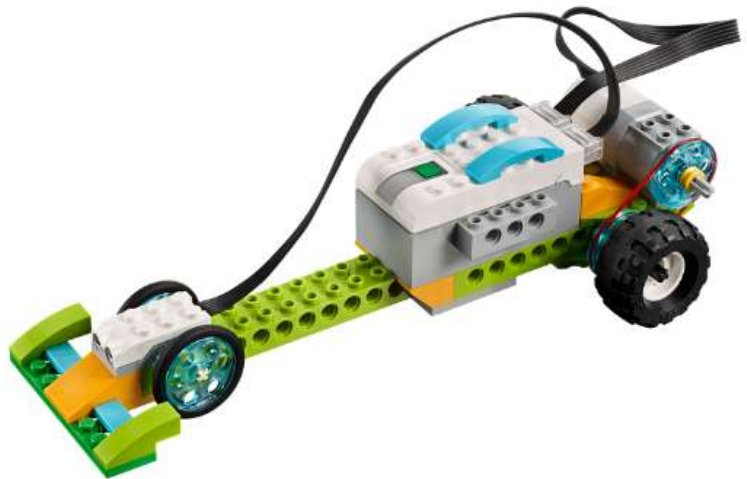
In this picture, we decided to dress up Bee-Bot as a witch for Halloween. We had to help her collect some ingredients for her magical potions: earwax, unicorn breath, toenails, rainbow spice and frog tears to name a few. We really had to think about where we wanted Bee-Bot to go and had to get it to come all the way back to the cauldron at the end.





# Robotics and Lego Education WeDo 2.0

The Senior Room have been using the Lego Education WeDo 2.0 core set and programming app to investigate what things can make a race car go faster. We considered all the different elements that can influence the speed of a car e.g. size of wheels and tyres, gears, weight. We learned that the bigger the tyres, the faster the car will travel a specific distance if everything else is kept the same. We built the race car following the building instructions. The car uses a pulley system to make it go. We then programmed it so that the motor would turn on and off at the appropriate times. We tested the car with big wheels and small wheels to see what differences it would create.



### Step 3: Engineering

# Design and Make a Bird Feeder

**Trigger:** we have some bird enthusiasts in our school so we decided to make some bird feeders for the school garden. We hope to attract small garden birds, including the robin, blue tit and goldfinch. We also realise that the birds need our help in the colder months as it is much harder for them to find worms, insects, berries and seeds.

**What you will need:** empty milk cartons, empty plastic bottles, scissors, twine, wooden dowels, bird seed, pine cones, bird information books.

**Create a plan:** the best thing to do is to sketch a drawing of your idea. This will help you when you begin to create the bird feeder. Research some books about native birds.

**Activity:** create the bird feeder according to your sketched design. Think about having a perch for the birds, an opening where the birds can access the seeds and some string to hang the feeder from the bird table or tree. It is also quite handy to have a funnel for topping up the seeds.

Bird	
	Robin
	Magpie
	Sparrow
	Blackbird
	Blue tit
	Goldfinch







This pupil also created some wonderful pine cone bird feeders. It's really useful to have binoculars or a monocular when you are bird spotting.





## *Virtual School Tour to the International Space Station*

On 31st May 2020, SpaceX visited the International Space Station. On that occasion, SpaceX was briefly visible from Earth as it orbited the Earth. We decided to find out more about the International Space Station. On 2nd June, the senior classroom went on a virtual school tour to the International Space Station. Commander Suni Williams showed us where she slept, how the toilets worked, where they exercised and how they ate. We got to see the view of the Earth from the International Space Station. She Spent 322 days there and she made this virtual tour shortly before she returned to Earth. It was a fascinating virtual tour and we really enjoyed it.



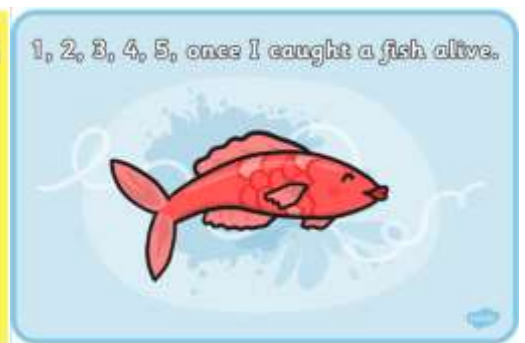
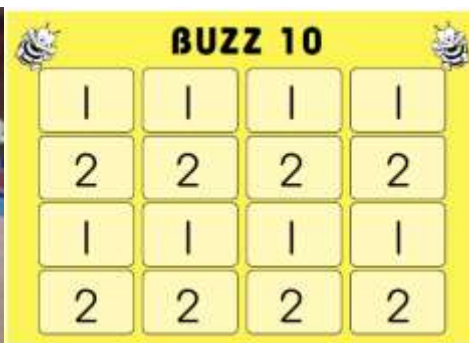
## Step 4: Maths

# Maths Week 2019

The whole school took part in Maths Week, October 2019.

### Junior Classroom

- In the Junior Room, we had a maths competition every day.
- These included: 'How many sweeties in the jar?',  
'How long is the piece of string?',  
'How heavy is the box?',  
'How much money in the purse?'
- We took home a maths game for homework each night.
- We did counting rhymes each day.
- We joined up with the Senior Room on the Friday and we completed a maths trail around the school.



### Senior Classroom

- In the Senior Room, the pupils entered the Mangahigh Maths Challenge competition.
- They had a class chess competition.

# maths trail around the school

We all went on a maths trail around the school on the Friday of Maths Week. The Senior Room joined up with the Junior Room and everyone had a really good time.





Step 5:

# STEM SHOWCASE

On Thursday, 13th February, we had a Science Evening which was open to the parents and the public to attend. It was very successful.

## Which Ball is the Bounciest?



## Fruity Sweets Colour Mixing



# Investigating Slopes

13/02/2020

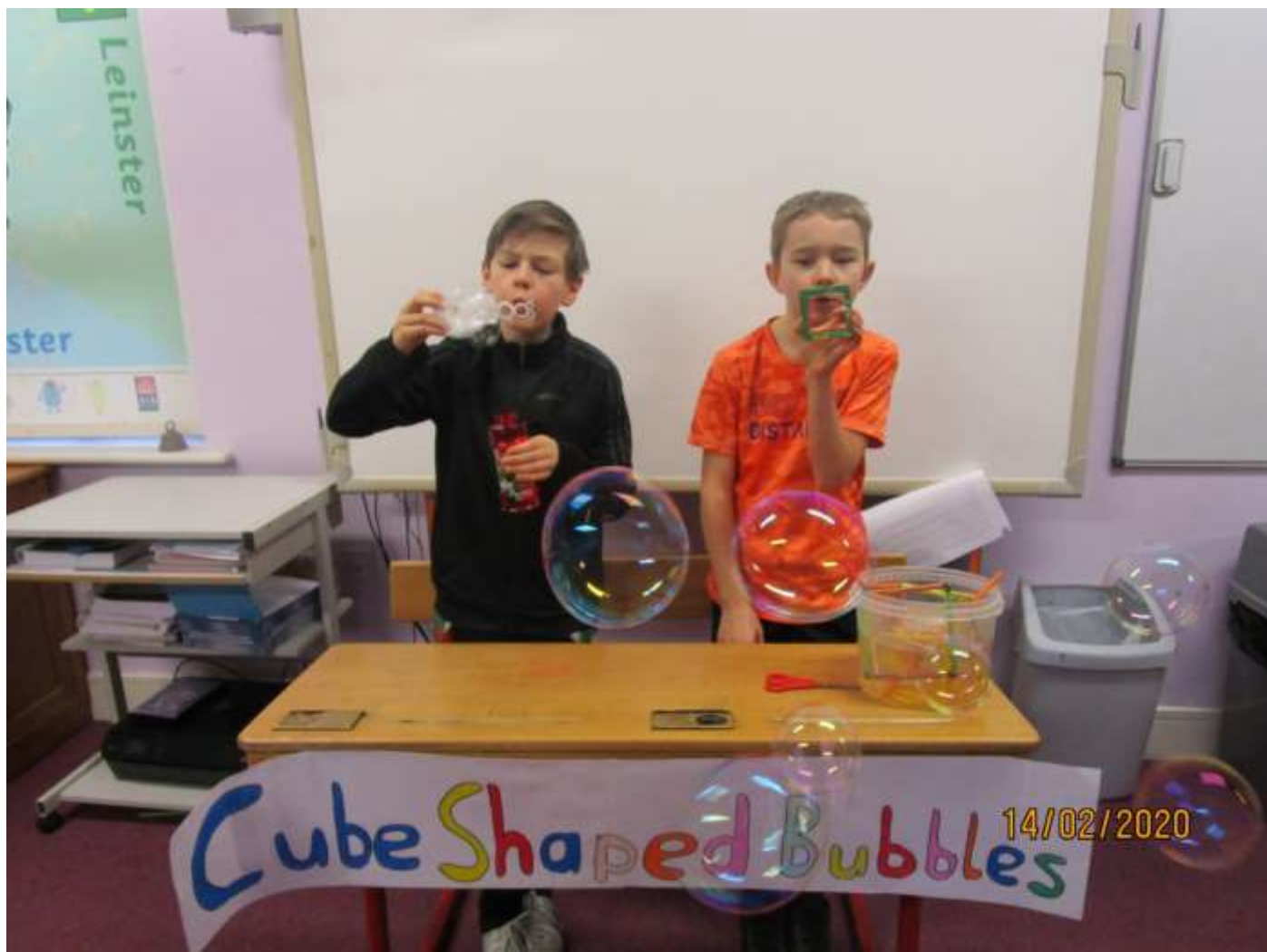














# Churning Butter



14/02/2020



We would like to thank  
all 30 pupils  
of

Ballymoney National School

who participated in  
this DPSM project.

We hope you enjoyed reading it.

