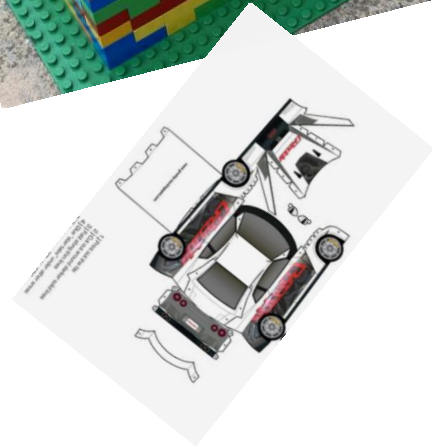
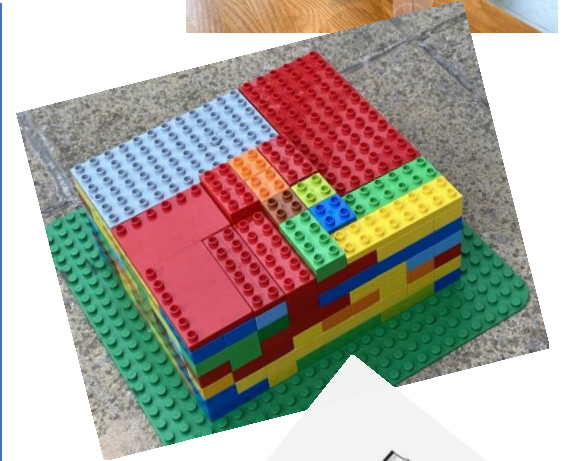




# Science Challenge

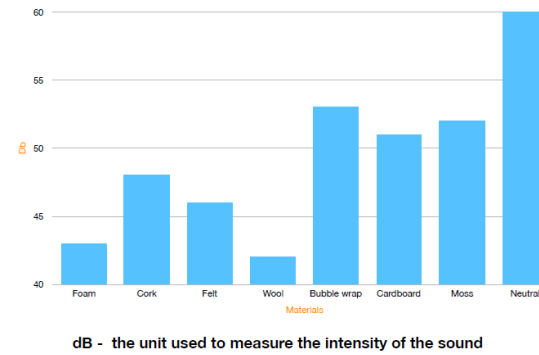
Over the last few weeks, Year 4, 5 and 6 have taken part in our 'Science Challenge'! Each class was set a different scientific task from their teacher and asked to produce a presentation showing their methods and results.



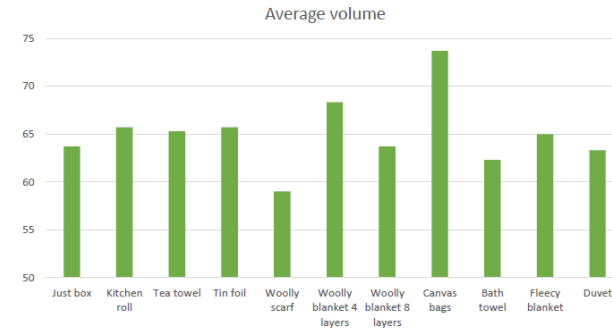
# Year 4

Year 4 were asked to find the best material to sound proof a recording studio. They had to test different materials and measure the sound that could be heard.

We chose the materials we wanted to test, downloaded a decibel meter app and got to work! We made predictions about which material we thought would be the best at sound proofing.



Graph of average decibels



We presented our results using tables and graphs. Some of us made PowerPoints, some made posters and some produced videos!

Name of the product used	Average of decibel	Max decibel
Only Box	106	136
Newspaper	98	123
Wrapping paper	95	117
Cotton	93	108
Tin Foil	91	104
Sponge	84	100
Bubble Wrap	82	97

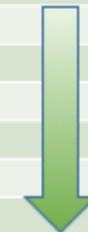


## My Predictions!

### Material (in ascending order of sound proofing)

Kitchen Roll  
Foam Sheet  
Oling Film  
Bubble wrap  
Leather  
Muslin  
Aluminium Foil

LEAST



1. So to take the noise away you have to find a material that keeps the noise from being heard. The cardboard box already takes some noise away.

2. Now finding the actual material. So the material I have chosen is I chose this because it

3. We also tried a few other things such as but didn't work as it wasn't the right material to hold the sound in.

TRY IT AT HOME TOO

Step 1. We played dancing queen from ABB & played it for 10 seconds.

Step 2. The decibel meter told us that the speaker on its own was 74 decibels

Step 3. Then we played it again but with the cardboard box and speaker inside it and was 69 decibels.

Step 4. Finally, we did the same thing that we did for the 1st step but trying different materials around the cardboard box and seeing if they would hold the sound in. We found that some of them actually held all of the sound, but they all made a difference. Look at the bottom to see the pictures and changes.

TIPS

- Make sure it is in the same place each time you try the experiment.
- Make sure the volume of the speaker is the same each time.
- Make sure the sound proofing is in the same place each time.

Things you might need

- SPEAKER
- BOX (THAT CLOSES)
- SOME MATERIALS

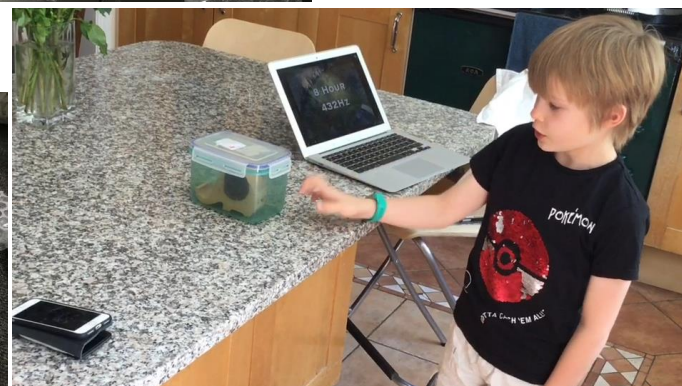
SOUND READER (THE APP DECIBEL METER IS GREAT)

Have fun!

SCIENCE COMP

74 DEBIBELS   69 DEBIBELS   67 DEBIBELS   65 DEBIBELS   63 DEBIBELS

PHO-COLLAGES





## Year 5

Year 5 pupils were challenged to set up investigations at home that would test the pH levels of household products.



Did you know red cabbage water contains a chemical which can help show what the pH level of a liquid is? It is called ANTHOCYANIN.



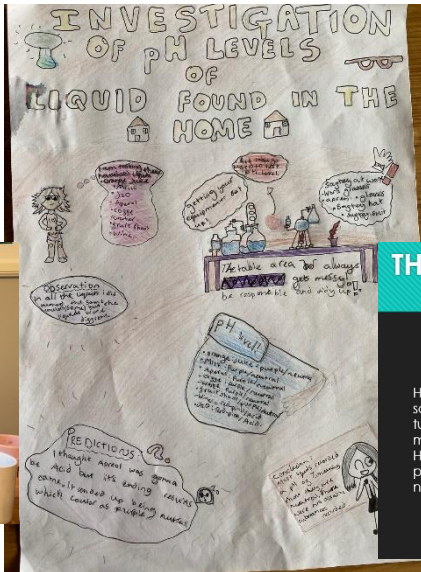
The children chose different ways to present their investigations. They made videos, PowerPoint presentations, posters and even Scratch games!



As this science experiment had to be conducted at home the children had to find an indicator which would help demonstrate pH levels.



Summary



### VARIABLES I KEPT THE SAME

- I KEPT THE TEMPERATURE THE SAME. MY EXPERIMENT WAS IN ONE ROOM. I MADE SURE THAT THE GLASSES WERE THE SAME TEMPERATURE.
- I KEPT THE GLASSES, THE SCOOP AND THE SPOON CLEAN AND DRY SO NOTHING ELSE COULD AFFECT MY EXPERIMENT
- I USED THE SAME SCOOP TO MEASURE THE 3 VARIABLES
- I USED WHITE PAPER AND CLEAR GLASSES SO THE COLOUR WAS THE SAME COLOUR TO OUR EYES.
- I MADE ONE BOWL OF RED CABBAGE LIQUID SO THAT THE ANTHOCYANIN WAS THE SAME STRENGTH FOR EACH TEST.
- I USED THE SAME AMOUNT OF LIQUID IN EACH TEST

### THE RESULTS

Here are the results. The baking soda and the dish soap both turned out to be pH=7 which means they are neutral. However, the vinegar turned pH=2 (red) my predictions were not correct but it was a fun task.



### RED CABBAGE AS AN INDICATOR

We cut the cabbage and then boiled it as shown below.

Red Cabbage contains pigment molecules called anthocyanins which change colour when they are in contact with an acid or base. When we boil the red cabbage, it leaves extracts anthocyanins into the solution. These are responsible for many of the beautiful red and purple colours of flowers.



The children had to make red cabbage water and then combine it with different household liquids to show what the pH level was.

All the products I tested were acids. The Red Cabbage Juice worked and I now know roughly what the pH level of each product is.



The children had to make predictions of the pH levels before carrying out the experiment. They also decided a method, the variables that should stay the same or change and how to present the results.





# Year 6

Year 6 had the challenge of researching and designing moving cars. Children were asked to look at what is currently on the market as inspiration for shell designs, and considered materials logos for their cars. They had to show understanding of scientific circuits which would ensure a car could move using a motor and represent this as a diagram using the correct symbols. They also had to consider pitfalls that may occur and how to overcome them.

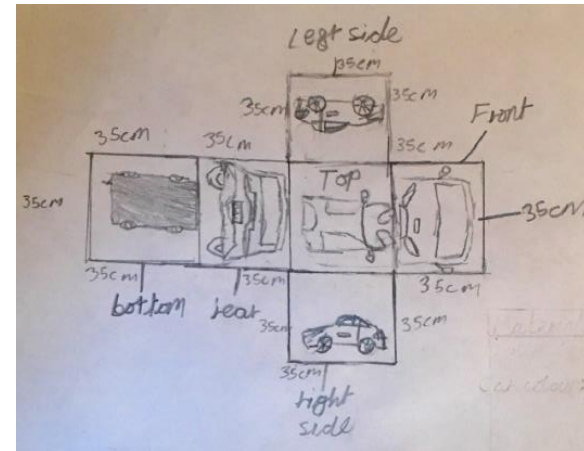
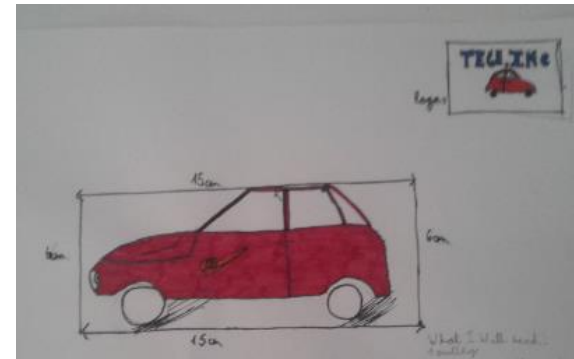
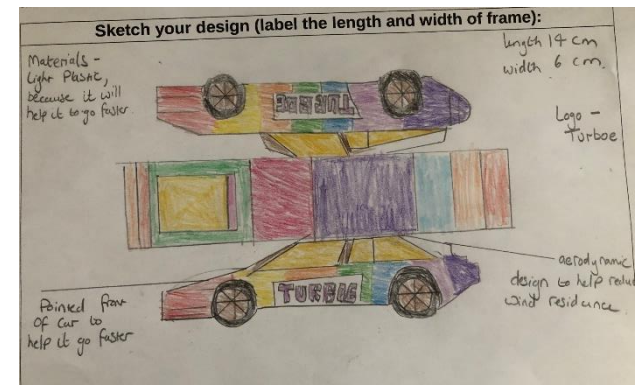
## Paper Prototype Model



## THE SLICER Tech Specs

<p>Name three electrical parts:</p> <p>Draw your circuit using these circuit symbols, and using lines to represent the wires. Label the components.</p>	<p>Motor: Switch, Battery.</p> <p>Balance</p> <p>Switch</p> <p>Motor</p>	<p>Why do the wheels need to be a tight fit on the axles?</p> <p>So they don't roll off.</p>
<p>If your buggy goes backwards what can you change to make it go forwards?</p> <p>Which goes faster, a buggy with a larger pulley or one with a smaller pulley?</p> <p>Which goes up steeper slopes, a buggy with a larger pulley or one with a smaller pulley?</p>	<p>The motor.</p> <p>Slower.</p> <p>Faster.</p>	<p>Why do the wheels need to be a tight fit on the axles?</p> <p>So they don't roll off.</p>
<p>Is metal an insulator or a conductor?</p> <p>Is plastic an insulator or a conductor?</p> <p>What could happen if you short circuit your battery?</p> <p>What will happen if you leave the circuit switched on for a long time?</p> <p>If you measure the time it takes to travel a known distance (5m) how do you calculate the average speed?</p> <p>What if your team are acting on levers?</p>	<p>Conductor.</p> <p>Insulator.</p> <p>It could heat itself.</p> <p>It will get very hot.</p> <p>Speed = distance / time</p> <p>Accelerating</p>	<p>Why do the wheels need to be a tight fit on the axles?</p> <p>So they don't roll off.</p>
<p>Why does the pulley need to be a tight fit on the axle?</p> <p>Why do cars have rubber tyres?</p> <p>If you were cycling up a steep hill would you choose a gear which gives you the most and high torque (turning force) or high speed and low torque?</p> <p>Explain why the size of the pulley affects the hill climbing ability of your buggy.</p> <p>Explain why the size of the pulley affects the speed of your buggy.</p>	<p>Balance</p> <p>Switch</p> <p>Motor</p> <p>Speed = distance / time</p> <p>Accelerating</p>	<p>Why do the wheels need to be a tight fit on the axles?</p> <p>So they don't roll off.</p>

Year 6 had to use their knowledge about belt and pulley systems from their work in Year 5 when they made moving fairground rides.

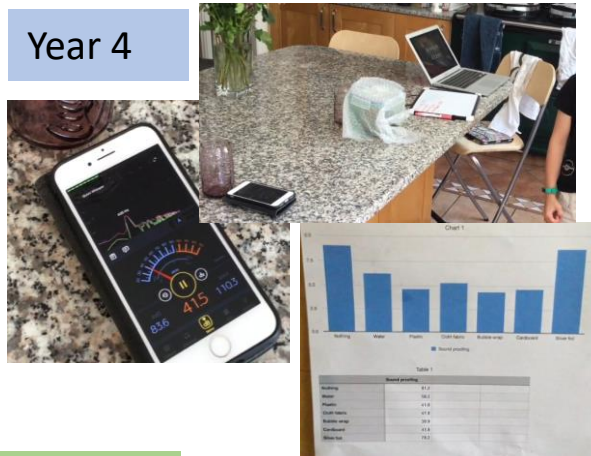


Why do the wheels need to be a tight fit on the axles?	It won't go otherwise, and the wheels will come off.
If your buggy goes backwards what can you change to make it go forwards?	The motor needs to go the other way. Change the wires.
Which goes faster, a buggy with a larger pulley or one with a smaller pulley?	A buggy with a smaller pulley.
Which goes up steeper slopes, a buggy with a larger pulley or one with a smaller pulley?	A buggy with a larger pulley.
<b>Extension questions</b>	
Why do cars have rubber tyres?	They keep the car on the road, by stopping it slipping.
If you were cycling up a steep hill would you choose a gear which gives you low speed and high torque (turning force) or high speed and low torque?	High speed and low torque. Low speed and high torque.
Explain why the size of the pulley affects the hill climbing ability of your buggy.	If the pulley is bigger then it can give greater force to the wheels with help the wheels overcome the force of gravity going up a hill.
Explain why the size of the pulley affects the speed of your buggy.	A smaller pulley goes round more times than a larger pulley compared to the pulley on the motor.
<p>5 turns of motor shaft &amp; pulley (5mm dia)</p> <p>1 turn of large pulley (20mm dia)</p> <p>1 turn of rubber band</p>	
<p>6 turns of motor shaft &amp; pulley (5mm dia)</p> <p>1.5 turns of smaller pulley (20mm dia)</p> <p>1.5 turns of rubber band</p>	

# And the winners are...

Miss Brenta, Mrs Manning-Bennett, Miss Parsons and Miss Melling had a VERY tough decision to make!

## Year 4



Our winner is Zachary! Zachary produced a video of his investigation which he edited and added effects to. Zachary highlighted that it was important to keep the recording device at the same distance from the speaker and he also found that using a constant noise instead of a song gave a more precise decibel measurement. Zachary presented his results in a clear bar graph and found that in his investigation, bubble wrap was the best sound insulator.



## Method

1. Turn the bluetooth speaker on to maximum volume. I will keep the volume at maximum through out the experiment to make sure the test is the same for each material tested so that it is fair.
2. I downloaded an app called Decibel Meter to record the decibels  
*A decibel is the unit used to measure the intensity of a sound*
3. I will also use the same song each time I take a measurement
4. Before I test the sound proofing materials I will test the decibel level of the speaker at full volume without any covering.
5. Then I will put the speaker in a cardboard box "the studio" and I will then wrap each sound proofing material around the box once and measure the sound using the decibel meter.
6. I will play the song for 30 seconds for each material and take the highest decibel measurement recorded on the decibel meter for each.

Our runners up are Ilia and Max. Ilia got creative and tested moss for its soundproofing qualities and Max carefully considered which variables he needed to keep the same to ensure his results were accurate.

## Year 5



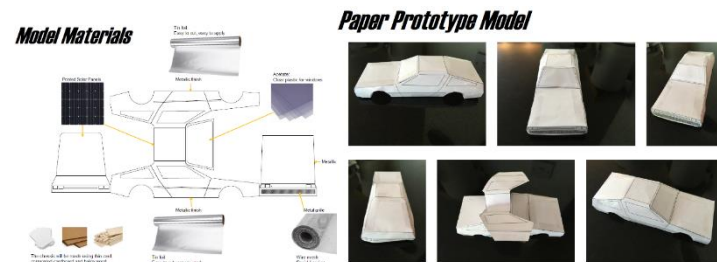
Our winner is Danny H! Danny's presentation was very impressive. He clearly showed his predictions, his method and his results. Danny created his own pH testing paper using the red cabbage water and also recognised he needed to keep the amount of household product the same for each test. He displayed lots of scientific skills. Once Danny had completed his initial investigation, his results encouraged him to create his own enquiry question. Danny went on to investigate what would happen when he mixed an acid with an alkali. His presentation was clear, very well researched and easy to understand.

Our runners up are Seb and Daisy. Seb's investigation was very impressive. Not only did Seb carry out the investigation thoroughly at home, he then produced his presentation as an interactive Scratch game that he wrote all the code for. Daisy's investigation was very thorough and her presentation was eye catching, informative and clear. Her conclusion was very clear and showed her understanding of pH levels and sliding scale that all liquids will appear on.

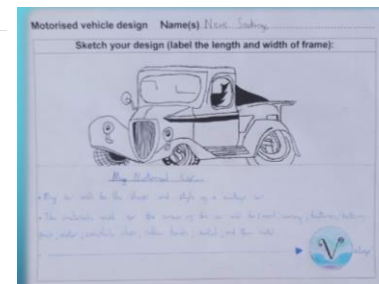
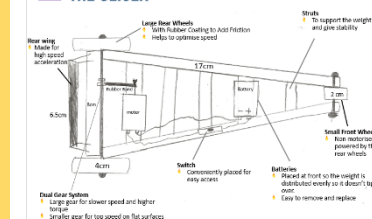
## Year 6

Our winner is Oliver! Your overall presentation is fantastic and you have thought of EVERYTHING! You have cleverly made prototypes for your shell before deciding your final design, have considered different materials that you may use and drawn many of your ideas from inspiration of what is currently available on the market today. An outstanding collection of work!

Our runners up are Neve and Beckett. We loved your vintage shell design, Neve. It is so unique! Beckett we love the name 'The Slicer' and your diagram is drawn and labelled clearly.



## THE SLICER





It was really tough to decide winners and runners up in every class. Well done to everyone who took part and thank you for the effort you put into your presentations. We were all very impressed and hope you enjoyed taking part!

By taking part you showed lots of working scientifically skills!



Special mentions to...

Elianah in Year 6 for a very well-planned presentation. You considered the pitfalls carefully and thought of ways to overcome any challenges you might face!

Imogen in Year 5 for combining your science and computing knowledge to create a clever presentation using Scratch!

Agnes in Year 4 for carefully considering lots of ways to ensure your results were accurate. You thought of everything!

If you are a winner or runner up, Miss Brenta will be in touch soon!

Explain why the size of the pulley affects the hill climbing ability of your buggy.

smaller pulley      larger pulley

Explain why the size of the pulley affects the speed of your buggy.

6 turns of motor shaft & pulley (5mm dia)      1 turn of large pulley (50mm dia)

6 turns of motor shaft & pulley (5mm dia)      1.5 turns of smaller pulley (20mm dia)

**VARIABLES I KEPT THE SAME**

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My Predictions!

Material (in ascending order of sound proofing)	
Kitchen Roll	LEAST
Foam Sheet	
Oling Film	
Bubble wrap	
Leather	
Muslin	
Aluminium Foil	

