

# Primary Science Quality Mark Outreach – Round 18



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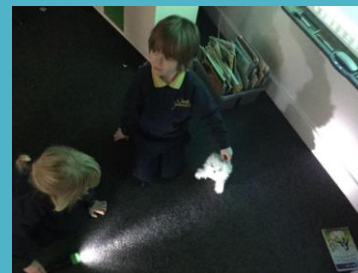
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Our principles in action

Staff quotes

Pupil quotes

Other contributors

Commentary



West Jesmond Primary School  
Newcastle-upon-Tyne



# Principles

Our portfolio will showcase how our principles have been applied across the school...


SL1, SL4, L1

## Year 2 – Books

<b>Staff:</b> It is relevant to the children, their life and wider world	<ul style="list-style-type: none"> <li>* Exciting Big Questions to bring in everyday science</li> <li>* Use of Science Capital poster with reflection</li> <li>- Could that be used in more lessons?</li> </ul>
It is hands on with lots of practical activities	<ul style="list-style-type: none"> <li>* Evidence of lots of practical work in Materials unit</li> </ul>
Children are engaged	<ul style="list-style-type: none"> <li>* Pictures from Materials unit</li> <li>* Quality of work and explanations</li> <li>* Use of different Investigation roles</li> </ul>
Staff are confident in their subject knowledge and ways to deliver it in well structured, stimulating lessons	<ul style="list-style-type: none"> <li>* Books very consistent across the year group</li> <li>* Pre knowledge grid used to start unit (Lego can, Lego is, Lego might)</li> <li>* Clear next steps</li> <li>* Stem sentences to aid conclusions</li> <li>-With electricity, circuit diagrams not needed til Y6 (try not to step ahead so new experiences in future units)</li> </ul>
Children make their own discoveries	<ul style="list-style-type: none"> <li>* Use of Concept cartoons as stimulus</li> <li>* Lego work</li> </ul>
<b>Children:</b> We do different types of experiments	<ul style="list-style-type: none"> <li>* Evidence of different investigation types</li> <li>* Use of Standing on Shoulders of Giants for Research</li> </ul>
We do projects outside	<ul style="list-style-type: none"> <li>- Next units will lend themselves for opportunities for this</li> </ul>
We answer Big Questions	<ul style="list-style-type: none"> <li>* We really liked the tile pages</li> <li>* LOs set as questions</li> <li>* 2E books had evidence of child initiated questions being used and answered</li> </ul>

Using the Principles as the focus for the book look was a really good way for us to see how well they had been applied across school. It also gave a real purpose for looking for things that really benefit the childrens' learning experiences. **Tom Jones and Alex Mackellar, Science Leads**

The Principles have been used to assist with planning but also formed the focus for the most recent book look. These are examples of feedback shared with all staff, including examples for the books.




Science at West Jesmond is good when...

**Staff:**

- \* It is hands on with lots of practical activities
- \* Children are engaged
- \* Staff are confident in their subject knowledge and how to deliver it in well structured, stimulating lessons
- \* It's relevant to the children, their life and wider world
- \* Children make their own discoveries

**Children:**

- \* We do projects outside
- \* We do different types of experiments
- \* We answer Big Questions



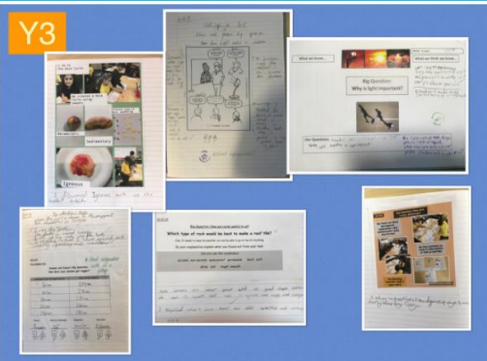
PIC-COLLAGE

The Staff Principles underpin what we are trying to achieve in our science teaching. I think they provide an important foundation that makes us think beyond a narrow curriculum to the core principles that we are working towards. Relating science to the real world and giving the children the chance to enjoy practical activities and make their own discoveries are key to really engaging the children in science and to making the learning relevant and exciting. **Tariq Farooqi Y4**

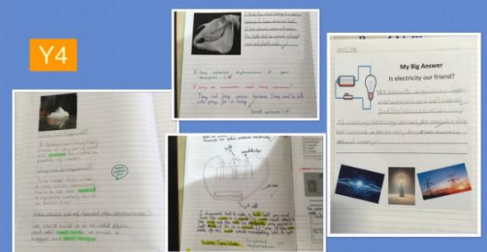
It was useful to create a cohesive staff vision for Science so that even though as an EYFS team, we work outside the Science curriculum (due to the EYFS Framework), we have a clear understanding of how we can lay the foundations for whole school progression in Science. **Liz Thompson R**

Children have enjoyed taking ownership of their science investigations through answering their own questions e.g. 'will my lego house be waterproof?' and 'how loud or faint can sound be?'. The children have been keen to find out how science is used in everyday life, for example, builders need to know about materials and their properties, musicians need to know about sound. **Ed Snelders Y2**

**Y3**



**Y4**



## Year 6 - Books

<b>Staff:</b> It is relevant to the children, their life and wider world	<ul style="list-style-type: none"> <li>* Links to Coding and health and safety</li> <li>* Electricity – real purpose to creating circuits for links to control with computing</li> <li>- Consider to incorporate this more in childrens reflections</li> </ul>
It is hands on with lots of practical activities	<ul style="list-style-type: none"> <li>* Evidence of a range of practical activities through both units</li> </ul>
Children are engaged	<ul style="list-style-type: none"> <li>* Pictures in books show this</li> <li>* Quality and presentation of work</li> <li>* Eye ball dissection</li> </ul>
Staff are confident in their subject knowledge and ways to deliver it in well structured, stimulating lessons	<ul style="list-style-type: none"> <li>* Work set at a very high expectation</li> <li>* Often taken beyond just the objective</li> <li>* Different ways for children to record eg diagrams and explanations</li> <li>- Are children applying maths skills?</li> </ul>
Children make their own discoveries	<ul style="list-style-type: none"> <li>* Use of concept cartoons</li> <li>* Explanations and conclusions show this</li> <li>- Some write ups were about what the children did – could this focus on what they learnt, what skills they used or what they concluded?</li> </ul>
<b>Children:</b> We do different types of experiments	<ul style="list-style-type: none"> <li>* Clear evidence of a range of investigations</li> <li>* Standing on the Shoulders of Giants used for research</li> <li>- Is the enquiry type clear to children?</li> </ul>
We do projects outside	<ul style="list-style-type: none"> <li>* Electrical safety walk</li> <li>- What other opportunities can you create?</li> </ul>
We answer Big Questions	<ul style="list-style-type: none"> <li>* Most titles are framed via a Questions</li> <li>- Do the children have the opportunity to ask and answer their own questions? How can you evidence this?</li> </ul>





# It is relevant to the children

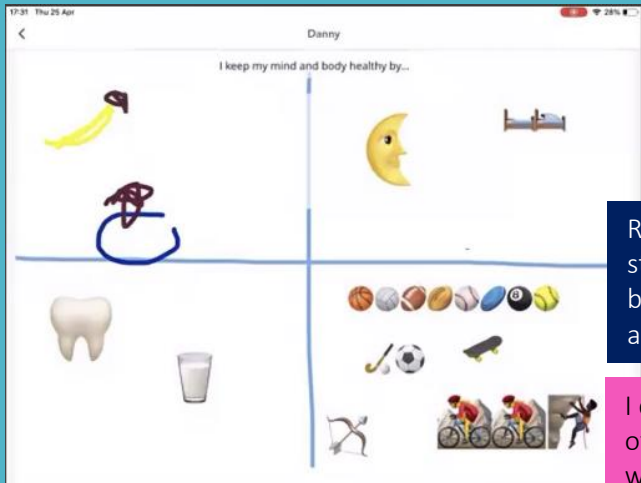
When planning science lessons and science events beyond the National Curriculum we aim to make work and experiences as relevant to the childrens' own lives .

In Y6, the children learnt CPR as part of their Animals topic which focuses on the circulatory system.



I really enjoyed the CPR because I learned what to do if someone was choking or had a heart attack. It's made me really want to learn more first aid. **Maya Y6**

SL2, T2, WO1, WO2



Reception made videos about staying healthy. This was shared by the Body Coach on Twitter and fed back to children.

I do lots and lots and lots and lots of sport and make sure I sleep well. **Danny Rec**

Each year our Y6s attend the Big Bang which allows the children to experience the range of careers available to them in the STEM industry in the North East.



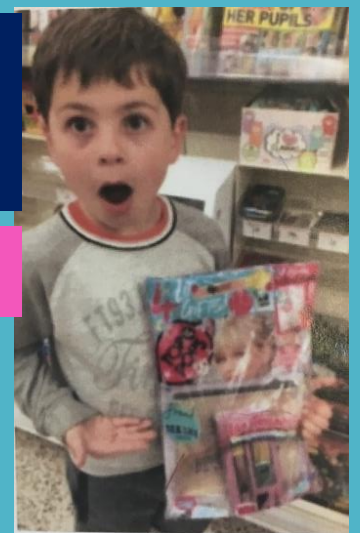
Our Y6's did a topic on Climate Change and groups made videos. Two lucky groups then won a competition to attend the Children's PSTT PSEC Conference in Edinburgh. We were the only school in England to attend. The groups got to showcase their videos to the other schools and the hundreds of adult delegates at the Conference

I was so pleased our video won! I enjoyed researching and then making the iMovie. The conference was really exciting. It was great to see what the other schools had done. **Dan, Y6**



As part of Green Day, for homework Y2 had to find products with excess plastic packaging. Finn was shocked at this magazine! On the day they made videos and Tweeted them to the companies.

There is no need for this amount of plastic. **Finn Y2**



For their Seasonal Change unit and Green Day Y1 met a bee keeper to understand how important bees are to plants and the environment.



My favourite part of the week was having my arm put in a cast by Finn's dad and seeing how it gets cut off! It was so much fun. **Helena, Y2**

In STEM Week 2019 a Doctor visited Y2 and put children's arms in plaster.





# It is relevant to the children: STEM Week – Science Capital

SL2, SL3, WO2

## STEM and Careers Week 2019: Raising Science Capital

(STEM)ational - Science, Technology, Engineering and Maths  
1<sup>st</sup> - 5<sup>th</sup> April

### Big Question: What does a scientist do?

**Aims:** Each child to develop and increase their Science Capital and awareness of STEM careers and share this with their friends and family.  
<https://www.youtube.com/watch?v=A070bwPD6Y>

**Assemblies**

- Launch assembly on Friday 29<sup>th</sup> March at 10.40
- End assembly: Friday 5<sup>th</sup> April – 10.40. Science ambassador to feedback on a scientist they have met and what they have learnt from them.

### Themes

#### MEET A SCIENTIST/CAREERS in STEM

- Children to gain an understanding of scientists and STEM in the wider world and the different careers available to them.
- Each class to have science/STEM visitors throughout the week to talk to class about their work and carry out a short activity - timetable to be confirmed next week
- Up to the teacher how you record this and how you want to follow this up - pic collage/quotes/poster?
- STEP into NHS resources/primary A-Z of careers with info- could be an additional ipad info gathering research activity?
- BBC Bitesize careers- Science in Action- lots of short videos to watch over the week highlighting careers. Other STEM careers videos too.

#### FIELDWORK & SKETCHBOOKS

- Each class to get outside for the day and be scientists
- Carry out a fieldwork task linked to an area of your year group's curriculum (ideas from TG) for one part of the day
- Other part of the day to be spent creating a Field Sketchbook (ideas from TG), suggested locations:

- o R: School Orchard / Forest School?
- o 1: Orchard / Forest School
- o 2: Exhibition Park
- o 3: **Jesmond** Dene - Pel's Corner
- o 4: **Jesmond** Dene- Waterfall
- o 5: Allotment
- o 6: Town Moor

Please sign up for slot on timetable in STEM Folder, so not too many first aiders are out at once. Please can you organise any parent helpers for additional adults.

#### WHIZZ POP BANG

- Over the week each class to take part in at least 2 or more hands on science activities – up to you what you do. (Ideas from Marvin and Milo and previous STEM/Science weeks)
- Follow up each activity with why that science is important and what jobs/careers it links to – this can be discussion or record on bags etc.
- One to be done with your buddy class – please find a mutually suitable time.

#### WOMEN IN SCIENCE

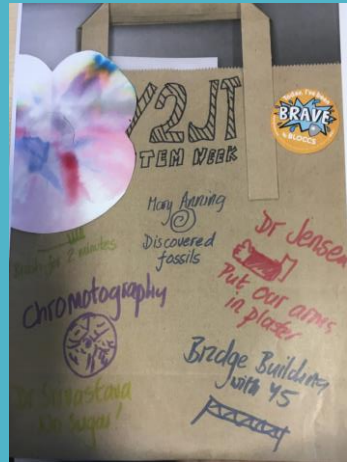
- Each year group to study a woman scientist - There is info in the Women in Science Book
- Do a reveal where children predict who it is and what they could have done
- Do a science investigation (could be research) about her
- Follow up work: English, art or maths based
- o R: Maria Sibylla **Merian** (Scientific Illustrator and Entomologist)
- o 1: Joan Beauchamp Procter (Zoologist)
- o 2: **Mary Anning** (Palaeontologist)
- o 3: **Annie Easley** (Rocket Scientist)
- o 4: **Marie Curie** (Physicist and Chemist)
- o 5: **Hertie Avron** (Engineer and Inventor – Electricity)
- o 6: Maria Sibylla **Merian** (Scientific Illustrator and Entomologist)

#### Outcomes

- Each child to be given a Science Capital bag
- At the end of each day or activity children to add a word and/or picture to summarise the activity/learning
- In one activity take and print an individual photo of pupil to take home in bags
- At end of week to take Science Capital bag home to share with family filled with outcomes of experiments, work etc.
- Any recorded work in Science books
- At start and end of week children to complete a sheet:
  - When you're older what would I like to be?

In 2019 our Science and Maths Leads with our Raising Aspirations Leader to plan a STEM Week focussing on Science Capital. Through the week the children met people from the STEM industry, many of whom were parents, looked at female scientist from the past and shared their work at home.

Each child had a Science Capital bag that they put anything they were given or created in. they also annotated their bag after each activity. This was taken home at the end of the week to share with their families.



When I'm older I want to be chemist because I have seen some experiments and it boosted my confidence.  
**Summaya Y5**

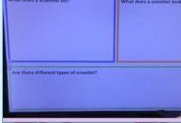
STEM week was a fantastic learning opportunity for children to have multiple encounters with work professionals in a wide range of STEM careers. They learnt about the skills needed for each of these jobs and skills that are valued in their workplace. It was truly an exciting, fun and engaging week which gave all children access to relevant career pathways.  
**Lucy Oades, Raising Aspirations Co-ordinator**

STEM Week  
Tuesday 2nd  
April 2019

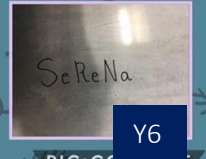
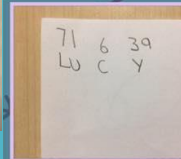
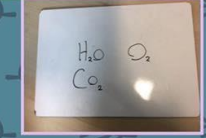
We had a visit from Lauren and Beth from Newcastle University who asked us to consider the role of scientists including the different types and what they might look like.



Both Beth and Lauren told us about their jobs and how they involve science. Beth works with technology and Lauren researches drug design for illnesses such as cancer.



They did some Science with us around molecules and the Periodic Table including how it is made up of elements. We wrote these using symbols e.g oxygen and beryllium. We then tried to use the table to write our names and become protons, neutrons and electrons.



Our homework competition was to find STEM that was important to the North East whilst the children were out and about in the holidays. They were then challenged to create a hashtag.

I would liked to be heart doctor now because I want to save lives. **Ahmad, Y2**

After this week I would like to be a physiotherapist because the people from the NHS seem so nice. **Emily Y5**

After looking at the work of Mary Anning, Y2 made their own fossils.







# It is relevant to the children: STEM Week – Ada Twist

STEM Week in February 2020 focussed on the Books from the Ada Twist series - Iggy Peck Architect and Rosie Revere Engineer. Each class spent the week helping to solve a problem for Iggy (building a bridge) or Rosie (a flying machine) linked to the story. Our Homework competition was based on looking for the science in their reading book – there was a winner from each year group who won an Iggy or Rosie project book.

SL2, SL3, T3, WO2

Y5 and Y6 created bridges. They had to be strong enough for a coded Edison robot to travel over in straight line.



Classes in Y3 and Y4 made spinners and changed materials and size to design a flying machine for Rosie.

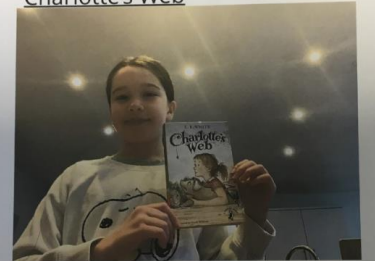
I enjoyed STEM Week because we got to use teamwork and got to build things. I would like to have a job that involves STEM when I'm older. **Max Y2**



Y1 and Y2 found which design of aeroplane can travel the furthest.

I learnt that it is ok for your plans not to work because you test them and change them. I enjoyed making and testing our flying machines and I feel inspired to become an engineer or an architect when I am older. **Olivia Y3**

## Science in stories Charlotte's Web



I chose the book "Charlotte's Web" because when Charlotte (the spider) weaves her web, she uses her spinneret to decide what type of silk glands she should use to spin Wilbur's web to save his life there for using her knowledge of strength and stability in science. It is also linked to STEM in the way that Charlotte uses maths to create the shape of the web because she has to think about vertices, parallel lines, perpendicular lines and angles.

Y6 Homework competition winner

### Rosie Revere Engineer

#### Create a flying machine for Grandma

#### BIG QUESTIONS

- R: Can you make something fly for Rosie revere?
- 1/2: What's the best design for an aeroplane? (Use "paper" aeroplane style)
- 3/4: What's the best design for a helicopter? (Use spinner template)
- 5/6: Which is the best vehicle to fly Rosie and Grandma to school? (Vehicle to use a frame, consider budgets and then a comparison of class designs)

### Iggy Peck Architect

#### Create a bridge for Iggy

#### BIG QUESTIONS

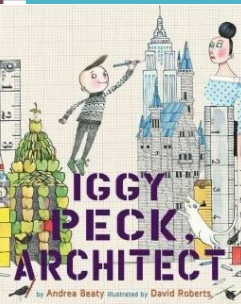
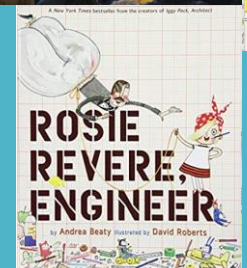
- R: Can you make a bridge for Iggy to get to school?
- 1/2: What's the best design for a free standing bridge? (Freestanding structures)
- 3/4: What's the best design for a bridge? (Joining techniques, compare styles and structures, load bearing)
- 5/6: What's the best structure for building a bridge? (Use a frame, consider different materials, work in budgets)

Each class was given a Big Question to investigate. It allowed children to create their own success criteria and creative designs whilst applying maths skills and gaining DT skills.

Using the Rosie Revere Engineer book was a great hook to engage the children and allowed us to explore different engineering roles and designs linked to our science capital work. Having a clear big question was great and we linked this with Rosie not giving up to encourage the children to test and redesign and improve their model planes to make them even better. **Clare Byatt Y1**



Through the week each class met and engineer or architect or student ambassador. We launched the week with Ian Dormer, MD of Rosh and Chair of PSTT, reading Ada Twist to the whole school.







# It is relevant to the children: STEM Week – Ada Twist

SL2, SL3, L3, O2

**Y5** Iterated Plan for Flying Machine

Big Question: Which is the best vehicle to fly Rosie and Grandma to school?

Length of time initial flying machine remained in air: 1:57 seconds  
Distance initial flying machine travelled: 72.41cm

**What Worked Well** – What elements of your structure worked? Why did these elements work? What elements of your machine would you definitely keep if you could design it again?  
We added an extra handle and that really helped when Matthew threw it. He would definitely keep the frame, as we had to do it again. It would have worked as well as we left the frame popping up. It looks really cool and it is very colourful. The box where Rosie and Grandma sat would sit helped with the balance of the parachute because it was in the middle, on the back.

**What Would Make it Even Better** – What elements of your structure did not work? Why did they not work? What changes would you need to make to your structure and flying machine if you were to make it again?  
We didn't use any of the joints on the front so it would be better if we did. We could have added an extra piece of wood on the frame.

Elements that have been changed and the reasons the changes have been made:  
We will now throw the glider from the back because our old handle was very good and it kept popping the glider up. We would like the glider to come away and be very quiet. Also, he will attach to more carefully and my really want to let the remaining part of the box with the joints in it will be glued to the back of the glider and that will be so that the top joints can't fall out like they did before.  
When we think things together we want to be very quiet when we are on.

List and Cost of Materials Needed

Item	Cost
1) Fabric	£50
2) string	£20
3) Thin black wood	£30
4) Card (white)	£15
5)	
6)	
7)	
8)	

Total £115

Scores: What scores would you give your designs out of 10  
Aesthetics: 10/10 Structure: 10/10 Teamwork: 8/10 Effectiveness: 9/10

The children all had the opportunity to test, redesign, retest and evaluate.

STEM Week made me want to be an engineer. I want to be a genetic engineer but STEM Week made me interested in civil engineering. I really enjoyed building flying machines because it was really challenging and exciting. **Cillian Y6**

Y5 have been busy testing their bridges for Iggy Peck using @EdisonRobotsUK. We think he'll get off the island @andreabeaty



I felt the children had great opportunities to follow their own interests and ideas. Our visitor supplemented the learning round architecture. **Laura Ward, Y6**

West Jesmond Primary School  
23 February at 17:46

It must have been windy up there this week!

Yasmin Wilson ▸ West Jesmond Primary School  
23 February at 17:30  
Olly and Georgia Wilson (Y4F and Y2H) completing their STEM week homework challenge by visiting Penshaw Monument to appreciate the engineering from 1844 before restoration works are carried out to regenerate the steps and monument itself. Both were very excited to see this as their Dad is supplying the stone to complete the 140 steps. They can't wait to go back and see it when it is finished!



Deepa Gibson ▸ West Jesmond Primary School  
26 February at 17:32  
Dylan Gibson Y1B - Science in Books  
Class paper aeroplane made yesterday reminded us of The Great Paper Caper by Oliver Jeffers.

We showcased our work on Social Media. We had great feedback from our visitors, parents and the author of the Iggy and Rosie Books.

You Retweeted  
**Ian Dormer CBE CDir** @Ian\_Dormer · Feb 24  
Delighted to meet so many inquiring minds

West Jesmond Primary @West\_Jes\_School · Feb 24  
Today we launched our STEM Week with @Benton\_Park\_PS with @Ian\_Dormer, MD of Rosh Engineering and Chair of @psst\_whyhow, reading @andreabeaty Ada Twist Scientist to inspire us to ask questions. Each class will be helping either Rosie Revere or Iggy Peck to solve a problem.

West Jesmond Primary @West\_Jes\_School  
Iggy Peck has inspired R1 to construct bridges out of a range of construction materials. @andreabeaty

5:48 PM · Feb 24, 2020 · Twitter for iPad

2 Retweets 8 Likes

RosieRevereEngineer @andreabeaty · Feb 24  
Replying to @West\_Jes\_School  
Love those bridges AND those hats. Safety First!

You Retweeted  
**Little Clem** @emma\_clem · 5h  
My STEM outreach last week! These kids were so bright & polite. Every year more and more of them already know about engineering, have specific questions about technology, and have even done this tower-building exercise before. It's great to see!

West Jesmond Primary @West\_Jes\_School · Feb 27  
Today Y3 worked with Emma from @UrbanForesight to create stable structures. Rosie Revere would be impressed! How did yours turn out @Benton\_Park\_PS?

The pupils loved testing out their ideas throughout the week. They were thoroughly engaged and excited about what each day would bring. **Helen Sykes, Y3**

I learnt there is more than one engineering job. **Oliver Y5**

**Emily Copeland Eave** My Girls are absolutely loving STEM week. Delilah was especially proud of presenting her electricity experiment. She'd been nervous about taking it in that morning and had a real sense of accomplishment having done it. Thanks!

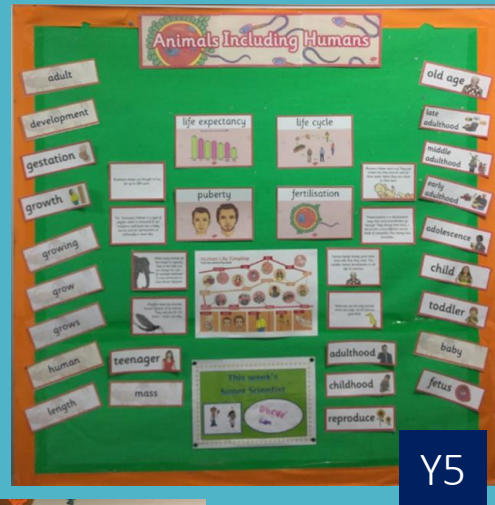
I loved STEM week - making planes was so much fun and testing them and making them fly better was super fun. **Avi Y1**







# It is relevant to the children: Displays



Each classroom has a science working wall to promote Big questions, vocabulary, children's questions and science capital.

Throughout our Materials topic the children regularly used the working wall to help with the vocabulary they needed to use. We also referred to the big question in it each week during our Science lesson.

In the first lesson the children wrote what they wanted to find out about materials – each week we looked at some of the questions to see if we had found out the answers in our lessons yet. Any we still didn't know at the end of the topic we investigated together.

**Bethany Condliffe, Y1**



Other displays around school promote science in other areas. For example, Rainforest in Y1, the homework project our Science Ambassadors did linked to an article in Whizz Pop Bang and nature work during our whole school Reading Week on The Lost Words project.





# It is hands on with lots of practical activities

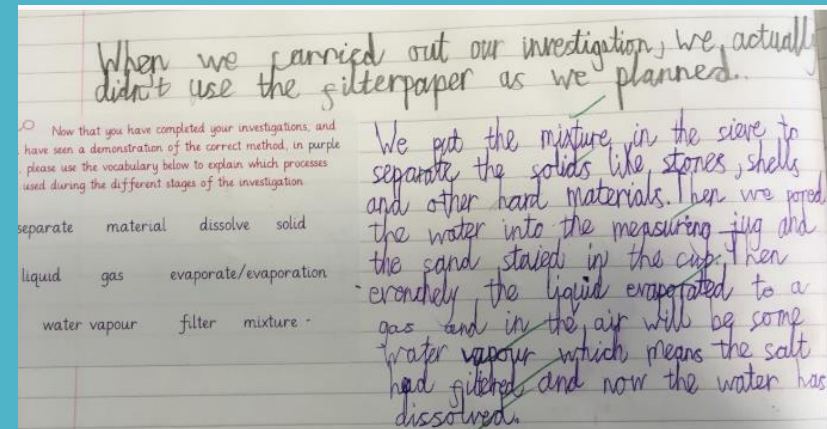
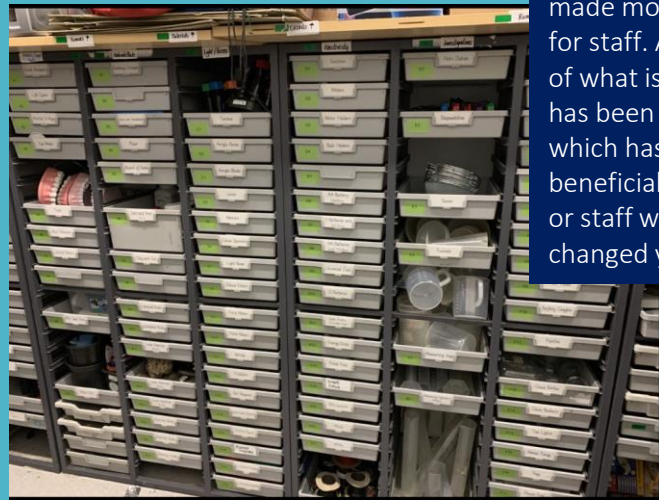
When teachers plan, they ensure all that all lessons have a Working Scientifically objective alongside the knowledge and understanding. This ensures that children are developing these skills throughout the year.

This year all our resources have been sorted, relabelled and made more accessible for staff. A catalogue of what is available has been created which has been very beneficial to new staff or staff who have changed year groups

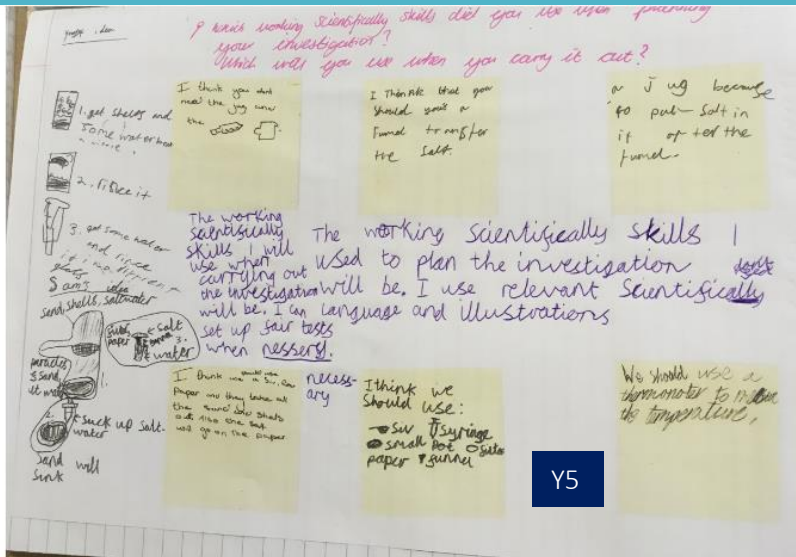
SL3, L1, T1, T3



Each child has the Phase appropriate Working Scientifically skills in the front of their science books so they can evaluate their learning against this.



The vast majority of written work is a follow up to practical work.



Y5

We dissected an eye in y6 for our Light topic. Beforehand we had to think how to do this safely, by handling the eye with care, wearing gloves and making sure all the parts went in a special bag afterwards. Wilf, Y6



The Y1 Learning Guarding has practical activities to enhance the knowledge taught in science lessons.



Y3 creating the rock cycle from sweets

Y2 created their own animal with adaptations to survive the desert



Y1 identifying body parts







# Children are engaged

The different hands on approaches to teaching and learning in science engage the children and make memorable learning experiences. Children talk positively about the subject.



Y3 studied herbivores, omnivores and carnivores and created poo that matched the animals diet.

Reception and Y2 are visited by Animal Antics to have a hands on experience looking at animal parts (R) and how animals are suited to their habitats (Y2).



Opportunities are made for the children to share their scientific knowledge with a wider audience. Replies for organisations are then shared with the classes.



SL3, L1, L3, T3



Y5 use Quizizz at the beginning of new Science units to assess where the children are and to see any misconceptions. This will complete the same quiz at the end of the unit and compare.



Answering Big Questions give children an outcome to work towards.

We use visits to enhance our units and to give children a wider experience of science.



Y3 Light workshop at the Centre for Life



Y2 at the Great North Museum in a bespoke session looking at artefacts to show animal adaptations.

We use Investigation badges for practical work so that all children are involved and engaged in the investigations.



Y5 investigating forces

We had to think about how to launch the spinners safely from a height. We had to make sure that they didn't land anywhere dangerous. James Y5







# Children are engaged: Dippy School



We applied and were selected to be a Dippy School to work for a year with the Great North Museum ahead of them history Dippy from the Natural History Museum. The project with schools and public was to encourage the public to engage more with the natural world.

The project was really successful in bringing our whole school community together and linking home and school learning. **Rebecca McVittie, Deputy Head.**

Each month the Museum's Education Team sent monthly challenges, which included weather, plants, spring, wildlife. We sent these as monthly family Challenge Homeworks so siblings and cousins could work together. There were a range of activities they could choose from. Children shared what they had done in class, parents posted to our Social Media and we had display to showcase examples in the entrance hall.



At the end of the project, when Dippy arrived, every child in the school visited the museum to see the dinosaur.

It was amazing – I had no idea how big it would be. I couldn't believe his tail was as long as our class lying down! **Delilah Y2**

I loved the Dippy Homeworks and being able to work with my child. He was so enthused and loved seeing his animations on Facebook. **Y4 Parent.**

It was great to get outside and do a joint homework with both my children. I was particularly impressed when they both wanted to litter pick in the local park. **Y2 and Y5 Parent.**

SL2, L3, WO2, O2



Our Science Ambassadors presented a range of the Dippy Homework projects to the public and other Dippy Schools at a special Dino Nite at the museum.

I love dinosaurs so loved the dinosaur homework. I made lots that month! I really enjoyed showing off what we had done on the Dino Nite! **Oli, Y2**

I really enjoyed leading the project and working with the museum. A particular highlight was the success of the Dippy Homeworks and showcasing these at the museum. **Tom Jones, Science Lead.**

West Jesmond Primary School 25 November 2018 · G

It's great to see how busy you've been with our Dippy School Family homework. Ena and Miguel have been busy planting apple seeds in their garden. Maisie has been collecting leaves on a lovely walk in the Dene while telling her mum about different trees. And siblings from Y2 and Y5 have been getting at one with nature by identifying different leaves. We hope you've been having this much fun too!



West Jesmond Primary School 3 February 2019 · G

Matilda Walters (3F) has had lots of fun making all different sorts of bird food and then watching lots of different birds come into the garden.



West Jesmond Primary School 25 March 2019 · G

For his Dippy School homework, Oliver in 2JT has been out searching for signs of spring around Newcastle.







# Staff are confident in their subject knowledge



Some of the children were interested in the concept of a shadow changing size which can be difficult to understand. This related to a GDS statement in the Light unit for Y1. We investigated how the size of shadows changes when the light source is moved. We allowed the children the opportunity to explore growing shadows using torches and challenged them to make the shadow of one of their favourite toys change in size. **Clare Byatt, Y1**



Staff are confident in delivering high quality and engaging science lessons. They use a range of approaches in order to teach tricky concepts successfully.

The Vitualitee app is used in Y2, 3 and 4 to investigate what's inside the body and the different systems.



SL3, T1, T2

Y3 created a model of an arm using rolled paper, split pins and elastic bands to model how muscles work in pairs to move bones.

30.4.19  
DNA Extraction

We completed an experiment to extract DNA from a strawberry.

1. We sealed the strawberry into a bag and squashed it.

2. We added a spoonful of clear washing up liquid.

3. We added a spoonful of salt.

4. We added 25ml of water. These three things worked together to create an extraction buffer to break open the cell.

5. We shook the bag containing the strawberry and the mixture for 30 seconds to make sure the DNA had been released.

6. We mixed the DNA with isopropyl alcohol because it is not soluble in it.

7. Next we filtered the mixture, using coffee filters, into a beaker. This separated the DNA from the bigger pieces of cell.

8. Because the DNA was not soluble in the isopropyl alcohol, it clumped together and floated to the top of the test tube.

9. We could then carefully extract the billions of cells that were all tangled together. We had the DNA from the strawberry!

As part of the Evolution unit, Y6 extracted DNA from a strawberry and taught how punnet squares can be used to see how traits can be passed on.

dd (light hair)  
(blue eyes)

D	d	d	d
(Dark hair) (Dark eyes)	Dd	dD	dd
d	Dd	dD	dd
d	Dd	dD	dd

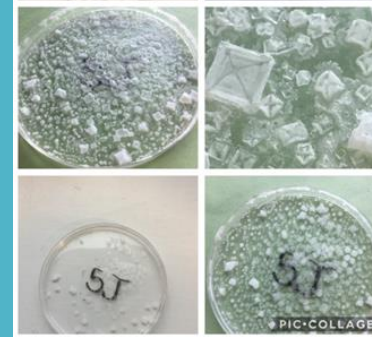
2 50% light hair  
+ 50% dark hair

2 50% dark hair  
+ 50% light hair

Reflection:  
Two siblings could end up with different eye colours because traits such as eye colour are inherited from your mother or father's genes. These genes can be dominant or recessive. If a mother had brown eyes (dominant phenotype) and a father had blue eyes (recessive phenotype) then their offspring will have a 50% chance of having brown eyes.

□ □ □

Y5 linked *Properties and Changes To Materials* with our study of Vikings in Humanities. The children extracted salt from Viking sea water and then used the salt to bake Viking bread.







# Staff are confident in their subject knowledge: supporting all learners

Lessons are planned in year group teams but adaptations are made to individual classes to support all learners.



Children work in groups with defined roles to support all learners and share expertise and skills.

For our Y6 Inheritance unit all children met a dog and its mother to see inheritable characteristics and also what the dog could instinctively. These experiences are particularly important given the range of backgrounds and languages of our children.

28.11.19  
Our shadow test

*\* Great independent work as a group*

Kwame and Dania's Big Question:  
How does your shadow get bigger?

Distance from the light source	Size of the shadow
5cm	23cm
10cm	27cm
15cm	28cm
20cm	26cm
25cm	19cm

Tester: Ewan Resource Manager: Oliver Measurer: Dania Recorder: Eshara

T3, WO1, WO2

Week1

Week2

Week3 it has a root

Week4 it's got a flower

It has open leaves

It is 13 centimeters and it has big leaves

Y2

Week 3	<p>LAST Task</p> <p>Bright Idea: Which animal skeleton do you think this is? Reveal.</p> <p>Show the Virtualitee App – recap bone info from last week. Look at human skeleton – which bones can we name? (Use one from Vault?)</p> <p>Using plastacine in pairs. Make skeleton of a fish. Giraffe. Which bones would be similar?</p>
Week 4	<p>LAST</p> <p>Bright Idea – Explorify video – what is happening?</p> <p>Big Q: Scarlotte: How do your arms move?</p> <p>Recap functions of the skeleton?</p> <p>Show video: <a href="https://www.bbc.co.uk/bitesize/topics/z9339j6/articles/zpbxb82">https://www.bbc.co.uk/bitesize/topics/z9339j6/articles/zpbxb82</a></p> <p>Cdn to feel biceps as they contract and relax. Try on leg muscles too.</p>

Big Q:

Reserach: Look at videos from BBC Bitesize <https://www.bbc.co.uk/bitesize/topics/z9339j6/articles/zqfdpbk>

Seesaw: Pic a picture from Seesaw – predict what animal the skeleton is from. Can you name any bones? What would their function be? Why have they got bones like that? What does it help them do?

D/N/Z – Work with DH on names of their own bones – Post it Bodies. Then add these names to animal skeleton on iPad

Diving deeper: Look at someone's human skeleton from last week. Can you offer constructive feedback on what is missing or shouldn't be there?

Plenary: Exoskeletons

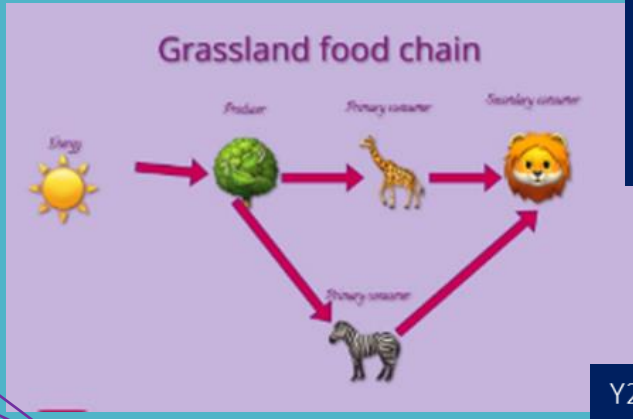
Show children how to build a model of an arm.

Just use one rolled up piece of paper for the forearm for ease. Tch model with balloons – cdn use elastic bands. <https://blog.sonlight.com/muscle-science-activity.html>

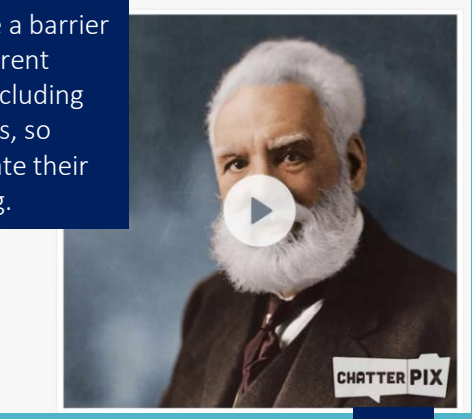
Cdn to represent this in books. Add labels or write an explanation. Work in MA pairs. Key vocab: bones, muscles, attach, move, contract, relax

DIVING DEEPER: Why is it important for you today that your arms move?

PLENARY: Can cdn answer any other their Qs from front sheet. Purple pen.



Where literacy skills are a barrier to learning we use different ways to record work, including voice recording on iPads, so children can demonstrate their scientific understanding.



We don't have set planning formats. This is an example from Y3 showing how slower graspers are supported and how Diving Deeper challenges are set to extend thinking.







# Staff are confident in their subject knowledge: Staff CPD

Staff have regular CPD throughout the year based on training the science leads attend and outcomes of learning walks and book looks.

Following an activity at the Newcastle Science Network meeting, staff looked at working scientifically skills across the school in a shared work look. The main targeted outcome was to make sure there was greater progression in conclusions.



Big Question: Do all materials conduct electricity?

We think that Lolly stick will be a conductor because it is soft and hard

Item	Material	Conductor or Insulator
Paper clip	metal	C
Ruler	plastic	I
Pencil sharpener	metal	C
Fork	metal	C
Rubber	rubber	C
Glove	Wool	I
Tissue	paper	I
Lolly stick	Wood	I
Water	water	C

What do you notice about the conductors?  
They are all made out of metal except water.

Y2

Condition bread was kept in:	Description of bread
Warm	<ul style="list-style-type: none"> <li>Hard on bottom</li> <li>Dark brown patches</li> <li>Very mould from condensation</li> <li>Some came off</li> </ul>
Cold	<ul style="list-style-type: none"> <li>Normal</li> <li>No mould</li> <li>No change</li> <li>Slightly hard/stale</li> </ul>
Damp	<ul style="list-style-type: none"> <li>Complete mould</li> <li>No bread</li> <li>No mould because of lack of bread</li> </ul>
Dry	<ul style="list-style-type: none"> <li>Lot of mould (bottom)</li> <li>Green mould (bottom)</li> <li>Full slice of bread</li> <li>Single spot of mould on top</li> </ul>
Dark	<ul style="list-style-type: none"> <li>Yellow-green mould</li> <li>kept shape</li> <li>soft</li> <li>mould on back side and bottom</li> </ul>
Light	<ul style="list-style-type: none"> <li>where light has been no mould on top</li> <li>on bottom dark green mould spot</li> <li>soapy</li> <li>light side not affected</li> </ul>

Y6

Conclusions  
 The most likely environments for mould to grow are dark, dry and warm. The conditions with the least mould were light and cold. The damp bread turned into mould. In conclusion, if you put bread in a fridge you are least likely to get mouldy bread. My prediction was partly correct because the damp bread was mostly eaten, it liquified.

30.1.20  
 Explain what I found out

**Scarlotte's Big Question: How do our arms move?**

Use diagram and explain how your model of the arm worked?

Can you use the vocabulary?  
 Bones muscles attach move contract relax

Your brain sends a signal to your muscles and your muscles are attached to your bones and your bones move. Muscles work in pairs and when one muscle is contracting the other one relaxes.

Y3



Using See Through Science within lessons has helped to engage children and has encouraged them to ask scientific questions. Y1 worked in pairs to think of questions which would help them find out what the mystery material was. **Bethany Condliffe, Y1**

SL2, SL3, SL4, SL5, T1, T2, L1, L2

Staff were introduced to See Through Science – using images to enhance observation skills and children asking questions.

Using pictures with the children has provided a valuable stimulus to their thinking. It encourages them to think creatively, to share and to discuss their ideas. The children soon realise that it is possible to have very different ideas about the same image. The zoomable images such as on Explorify are a great way to demonstrate how scientists have to adapt and refine their ideas as more evidence becomes available. **T Farooqi, Y4**

The images have helped children to construct more in depth questions, particularly at the beginning of a unit. **Karl McGrath, Y6**

What we know....  
 They are joining that is a sun. The sun is making a shadow, it is day time.

What we think we know...  
 They are there. The sun is floating at the top.

Big Question: Why is light important?

Our Questions:  
 Why are they jayging? is it very hot? what day and time is it?

An example from Y3 at the start of a unit. At the end children reflect on what they've learnt, address misconceptions and answer their questions.

Y6

FAMOUS SCIENTIST  
 Nikola Tesla

WHAT DID PEOPLE ALREADY KNOW?  
 They got their heat from coal and light from candles; they didn't know any different.

WHAT DID THE SCIENTIST NOTICE?  
 He noticed that the system they were using, candles and batteries, wasn't efficient.

WHAT QUESTION DO YOU THINK THE SCIENTIST ASKED?  
 Could we improve our source of energy? How can I make it easier for the people to improve technology?

WHAT DID THE SCIENTIST DO?  
 He invented the Tesla coil to make the transmission of electricity easier. He made a breakthrough in the transmission of AC which allowed electricity to travel long distances.

WHAT WOULD YOU DO NEXT?

WHAT DID THE SCIENTIST FIND OUT?  
 How to generate and distribute a more efficient power source.

WHAT DID OTHER SCIENTISTS DO NEXT?  
 Thomas Edison, Joseph Swan - light bulb  
 Alexander Graham Bell - telephone

Staff have also received training on the PSTT Standing on the Shoulder of Giants research resource.

In Y5, we have used Standing on the Shoulders of Giants resource to research into the work of Spencer Silver. We found out that he accidentally created a 'low-tack' adhesive which eventually resulted in the development of the Post-it Note. Then using the timeline of his life helped children use research skills and find out about the process of being a scientist. **David Mansfield, Y5**





# Staff are confident in their subject knowledge: Assessment

SL2, L2, T2, O1

Year 4	Unit: Living Things and their Habitats	Class:
Outcomes	<b>WTS</b>	<b>EXS</b>
	<ul style="list-style-type: none"> <li>Group living things and give reasons for their choice of grouping.</li> <li>Use a simple classification key to group, identify and name a variety of living things (plants, vertebrates, invertebrates)</li> <li>Recognise that environments can change i.e. rubbish/storms</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that living things can be grouped in a variety of ways</li> <li>Explore and use a classification key to group, identify and name a variety of living things in the local environment (plants, vertebrates, invertebrates – bones/boneless)</li> <li>Compare the classification of common plants and animals to living things found in a wider range of places (under the sea, prehistoric)</li> <li>Recognise that environments can change and this can sometimes pose a danger to living things (eg floods/droughts/urbanisation)</li> </ul>
	<b>GDS</b>	<ul style="list-style-type: none"> <li>Explain why living things have been grouped using a certain criteria</li> <li>Create a key to classify a group of living things in the local and wider environment (including vertebrate and invertebrates.)</li> <li>Understand the positive human impact that can be had on an environment i.e. nature preserves and ecologically prepared parks.</li> <li>Understand the sort of changes which can be hazardous to an environment and explain why these changes would damage an eco-system i.e. littering, deforestation etc.</li> </ul>

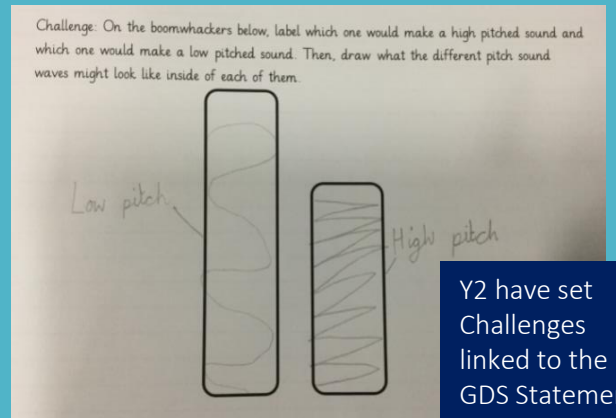
The updated GDS statements seem more in line with what we would expect from the children and also mean that there is more stretch and challenge for the more able pupils. **Karl McGrath, Y6**

The science leads from three schools in the Ouseburn Learning Trust worked together to redesign the Greater Depth Statements for each unit and streamline the Expected and Working Towards. This collaboration was very beneficial as we could use examples of work from a range of schools.

Working collaboratively really helped in terms of workload and also using expertise from throughout the Trust. It has enabled us to think more clearly about how a child working a Greater Depth would apply their knowledge and demonstrate a deep understanding. **Carl Luke, Hotspur Primary.**

From termly data analysis, the number of children achieving greater depth has increased within the vast majority of units compared to previous years. We feel this is a result of staff being able to explore core concepts in more details and children having opportunities to apply their knowledge to different scenarios rather than having to be taught "extra" knowledge with the previous statements. **Tom Jones and Alex Mackellar, Science Leads**

The new GDS statements have allowed the children to deepen their understanding of the concepts taught so far. They particularly enjoyed the pattern seeking involved when looking for relationships between the size of the boom whackers and the pitch they produce. They have also benefitted from the exposure to higher tier vocabulary for example, in the materials unit (rigid, opaque, flexible). **Lucy Edwards, Y2**



Y2 have set Challenges linked to the GDS Statements

We introduced LAST to the start of every science lesson to recap prior knowledge, especially knowledge that may be needed in that lesson, to aid with children retaining knowledge over time.

Y3

**Learning As Science Thinkers**

Last Week

What is the function of the skeleton?

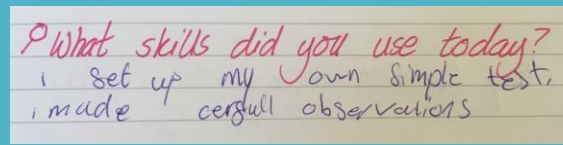
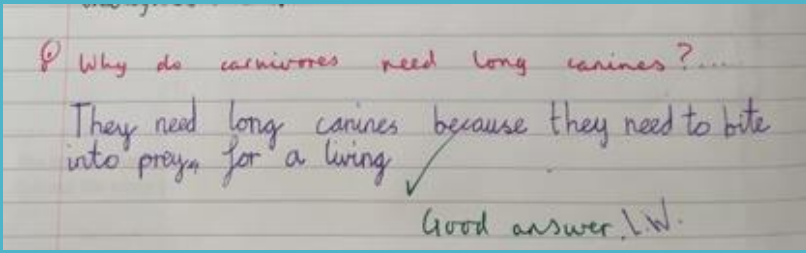
Last Unit

What happens to light when it hits an opaque object?

Last Year

What causes sounds to travel to your ear?

Year 6 used the rapid recall to discuss prior learning. It was lovely to see the children so engaged and so invested to share what they had remembered from our last unit on light - they surprised themselves with how much they could remember. It is a very useful assessment tool too. **Katharine Smith, Y6**



With our feedback policy children are encouraged to extend their thinking and reflect on their learning. This allows staff to gain a real insight into the children's understanding.

13



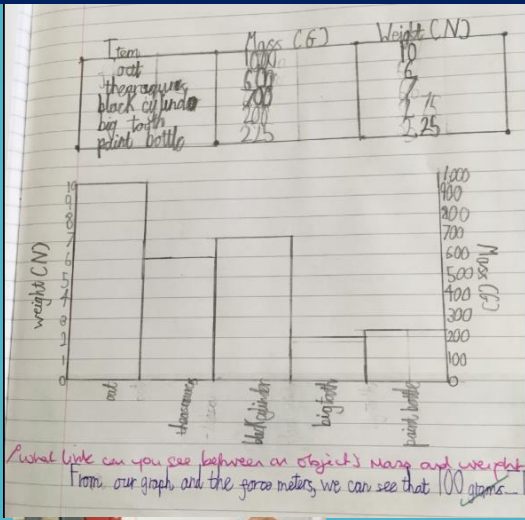


# Staff are confident in their subject knowledge: Curriculum links

SL3, L1, L2, WO1

Science knowledge taught within science lessons is also applied across the curriculum. Likewise, skills from other subjects, particularly maths, are also applied in science.

Y5 made a physical timeline to explore relationship between age and height, before measuring each other and collating into a scattergraph in their Animals Including Humans topic. They also used graphing when measuring Forces.



In Y1 the children consolidated data skills when they made 'rubber sandwiches' and tested which was more waterproof as part of the Standing on the Shoulder of Giants and investigation linked to MacIntosh.

Who is John Dunlop?

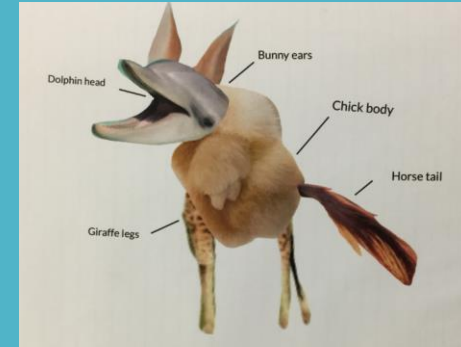
John noticed that his son was having a bumpy ride on his bike because of its thick tyres and the uneven road. When he saw this, what question do you think he would have asked?

How can I make the tyres better on my son's bike?

Ball	Prediction: Use red, yellow and green to show how good you think the ball will be at bouncing.	How far did it bounce back from the wall?
Rubber ball	X (Green)	170 cm
Foam ball	X (Red)	132 cm
Plastic with holes	O (Yellow)	46 cm
Leather ball	O (Green)	119 cm
Tennis ball	O (Red)	54 cm
Plastic hockey ball	O (Red)	39 cm

Would the ball that bounced the furthest make the best tyre? Why or why not?  
 Plastic ball 70 cm  
 Yes the rubber would be the best material because it is waterproof and doesn't make a bumpy ride.

Y2 used measuring skills with their history task linked to the Standing on the Shoulders of Giants research activity.



My animal is a mammal. I know this because it is warm blooded, has fur (or hair) and feeds young with milk. Also, it breathes with lungs, has a skeleton and doesn't lay eggs.

Y6 used computing skills to create a new animal and present their knowledge of classification.



Year 3 used the work on shadows to compliment their art work.



What can I do?

We are causing global warming, therefore, we need to prevent it. We can only do this with everyone's help. We can stop this disaster. Act now.

We have all heard of global warming, but what exactly is it? Global warming is the process of 4 main gases that are trapping the heat from the sun in the atmosphere. The 4 main gases are carbon dioxide, water vapor, methane and ozone, these are called greenhouse gases. There are many causes of global warming. One of them is burning fossil fuels. Throughout the past 150 years, industrialised countries have been burning fossil fuels like gas or oil. Another cause is farming. Believe it or not, cows actually cause some global warming. When cows eat, methane gas bubbles up inside them and comes out the other end. Deforestation also contributes to global warming. Trees take in carbon dioxide and stop it from going into the atmosphere, but when people cut down trees there are less trees to absorb it.

Y6 used scientific knowledge about the environment to write a persuasive text in geography.

During the whole school Take One Book each class studied the nature related vocabulary in The Lost Word and produced poetry and art linked to the book.

Black beedy eye is as black as coal.  
 Arriving like a silent wind, barn owl flies over the fence.  
 Rats run away like a water into a drain.  
 Night is dark like the owl black eye.  
 Owl flies to get food at night.  
 Wing as wide as a mans arms.  
 Loving chicks miss their mum.







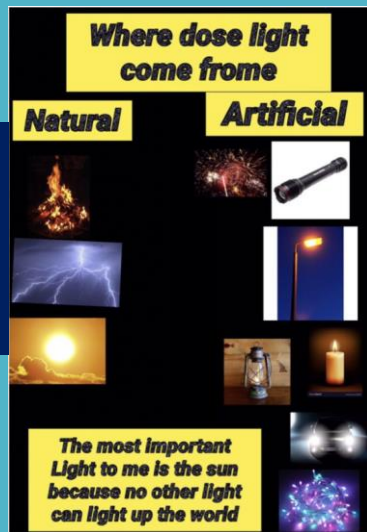
# Staff are confident in their subject knowledge: Science Capital Project

SL2, L1, L4, T1, T3, O2

In September 2019, the science leader started a joint project with University College London, the Institute of Education, the Primary Science Teaching Trust and the Ogden Trust to undertake research into raising science capital in primary aged children. The children in one Y3 class have also completed questionnaires and will be interviewed by researchers. 22 out of 30 children agreed to take part. The aim is to produce a guide to Science Capital teaching for the primary age range similar the secondary one.

Starting the project has really made me think differently about how to plan for science capital within my class and making it more relevant to the children and not just how science is important in the wider world. It has been an interesting process in trying things out – some have been more successful than others! They have loved the ownership of asking and answering their own questions. The children have had a great buy in from bringing in things from home and being able to take work or outcomes from experiments home. Using the elements of “play” with Year 3 has also been very beneficial and it’s been amazing the vocabulary the children have used. I’m looking forward to disseminating the project throughout the school next year.

Tom Jones, Science Lead

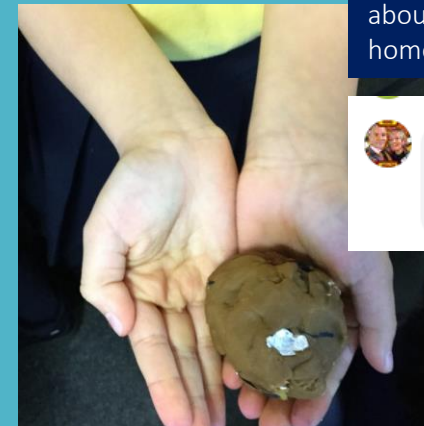


For homework the children researched light sources they saw in the holidays. They then downloaded images in our lesson, sorted them and then reflected which light source was most important to them.



Our science working wall includes examples of things from home to supplement our unit. Ie plaster casts and x-rays of the children from when they broke bones. We also add pictures of anything scientific they bring in for show and tell. It also has references to jobs and Science capital stem sentences.

When looking at diets of their pets, the children created poos of omnivores, carnivores and herbivores thinking about what would be in it. The children took their poo home to share their learning with family.

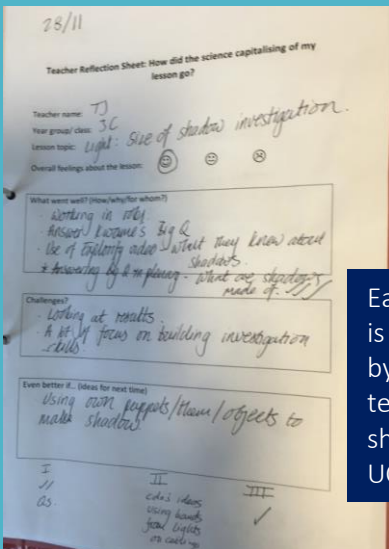


Nichola Parody I was presented very proudly with a very life like poo 🐛🐛 It's currently being dried out so she can play a trick on her dad tomorrow 🤪🤪🤪

Tom has been actively involved in the ‘Primary Science Capital’ research project, which is a two-year long research aimed at developing a science teaching focusing on issues of student engagement and social justice. Tom and West Jesmond Primary School has enthusiastically taken up the key ideas behind the project, and tried to include them both within the lessons and their school culture. I have personally visited the school and observed his lessons, where he has made ‘tweaks’ to his lessons to ensure that children who might typically not be as engaged in science can also be involved. In particular, he focuses on student discussions and pays attention to students’ voices during his lessons.

Meghna Nag Chowdhuri, University College London

Each lesson is reviewed by the teacher and shared with UCL.







# Children make their own discoveries

Staff try to ensure that children gain most of their scientific knowledge through investigations and child led discussions.

SL2, SL3, SL4, L1, T3



Y4 using Google Science Journal to measure sound.



Y2 Bridges workshop to support their work on materials and their Quayside topic.

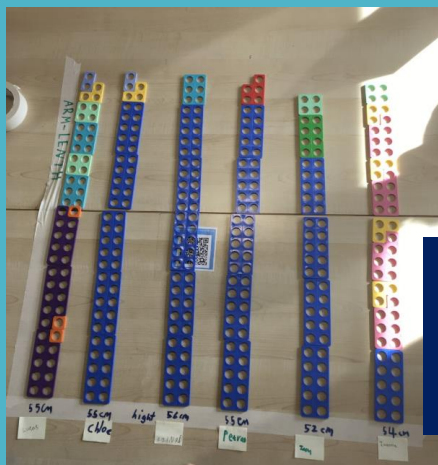


I loved the workshop, being an architect was fun! My favourite part was thinking about the eco features of the building and how it would look on the Quayside. **Jenson, Y2**

Y2 worked with RSPB to see what lived in the area surrounding the school.



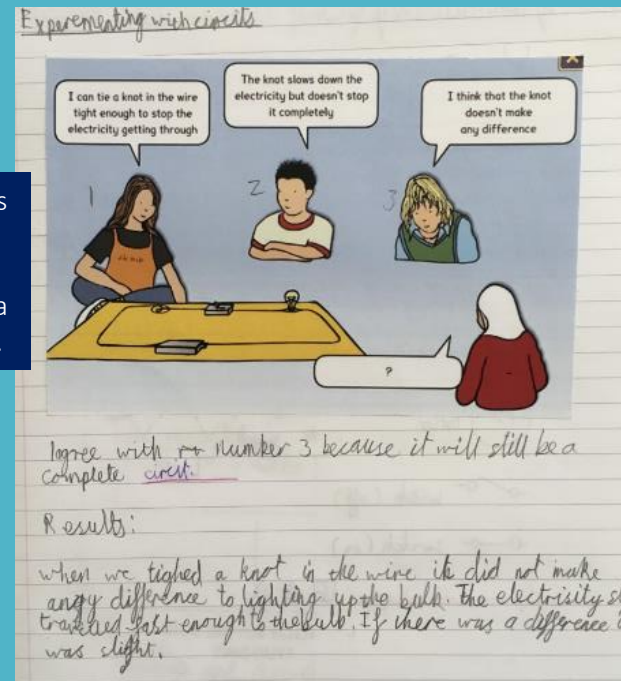
I had no idea there were so many living things in the Orchard. **Ahmed, Y2**



Y6 created circuits to prove or disprove the statements from a Concept Cartoon.

Do the tallest people have the longest arms?  
Y3 created graphs in groups to draw a conclusion.

It was such a fun lesson! **Olivia**



Reception testing the best material to protect an egg.

Y6 worked with a Doctor to find out about the circulatory system.



Y2 have Living Eggs hatch in their classroom as part of their lifecycle topic.







# We do different types of experiments

Following CPD on inquiry types the previous year, staff ensure all are covered throughout the academic year on their long term plans. Within a unit different inquiries will take place.

SL2, SL3, SL4, L1, T3

SCIENCE LONG TERM PLAN 2019-20						
Year 2	Term 1A	Term 1B	Term 2A	Term 2B	Term 3A	Term 3B
Unit:	Materials	Electricity	Sound	Plants	Animals Including Humans	Living Things and their Habitats
Big Question:	Could you live in a house made of lego?	How does a street light turn on?	Where do different sounds come from?	Who can grow the tallest plant? Growing from seed	Which came first the chicken or the egg? Chicks	Who lives here?
Observing Over Time						
Identifying & Classifying	Materials sort	Conductor or insulator				
Pattern Seeking		Conductive materials			Animal footprints	
Research	John Dunlop/Ole Kirk Christiansen	Creating circuits	Alexander Graham-Bell			Camels and cacti presentation
Comparative & Fair Testing	Test lego for different properties			Seeds watered with different liquids	Chick diet	
Outdoor Learning	Material walk			Orchard visit		Orchard
Trips or Visitors		Quayside trip	Discovery Museum		Living eggs	Animal Antics
Scientist	John Dunlop		Alexander Graham-Bell			



Fair testing waterproof materials in Y1



Observation over time in Y2 – seeing how chicks develop from hatching.

Example of Y2 long term plan

19.9.19  
Observe closely

**BIG QUESTION: How are rocks different?**  
What is the same and what is different?

They are different because the one on the right has little black bits that could be dirt in the rock and the one on the left doesn't have them. The rocks are different because the one on the left is a sandy colour but the one on the right is white and grey. They are different because the one on the left has little bits sticking up but the one on the right doesn't. The rocks are different because they are different shapes and sizes. They are the same because they are the same material. The rocks are the same because they are both rocks.

Identifying and classifying in Y3

Planning out the investigation types at the start of the year helps ensure we focus on each type. In our year group there are only certain units where we can do particularly enquiry types so this is useful.  
**Tory Tomlin, Y3**

FAMOUS SCIENTIST: Spencer Silver

**WHAT DID PEOPLE ALREADY KNOW?**  
There was already glue around made by gums and other materials.

**WHAT DID THE SCIENTIST NOTICE?**  
At that time glue was from cows, rabbits and produce a natural glue.

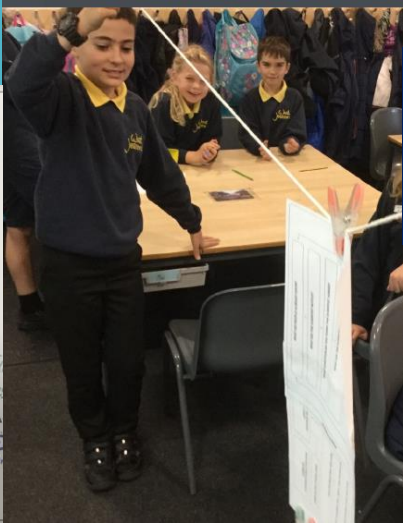
**WHAT QUESTION DO YOU THINK THE SCIENTIST ASKED?** *Robert Adams*  
How can I use this? How could I sell it? Why would people buy it? Be made.

**WHAT DID THE SCIENTIST DO?**  
They got the glue and what they did it on paper and used it to use as a book mark first then they made it in to a postal note.

**WHAT WOULD YOU DO NEXT?**  
I would add more stuff to it. I would use it to stick stuff together.

**WHAT DID THE SCIENTIST FIND OUT?**  
He discovered that the glue was reusable.

**WHAT DID OTHER SCIENTISTS DO NEXT?**  
Make stronger and better glue. With Kraft.



Research in Y5 using the Standing on the Shoulder of Giants resource about Spencer Silver. The children also carried out a comparative test of the strength of a glue mixture they created.





# We do projects outside

Although we have limited and urban outdoor space, we make use of the local allotments, Community Orchard and areas in the adjoining cemetery to our grounds.

In Y6 we went out to the look closely at insects and think about the study of entomology. They found many interesting things and were fascinated by the detail. **Katharine Smith, Y6**

Y4 and Y5 have a weekly session at a local allotment where they work with volunteers from the community to help maintain the plants and wildlife. Other year groups also visit through the year to enhance their topics.

"I loved going to the allotment. It was my best day. We did lots of digging and found lots of things under the ground. I liked digging the potatoes. The long green things had lots of hair on the bottom that suck water up from the ground. **Peter R**



Y1 visit the same tree at the orchard various points through the year as part of their Seasonal Change unit.

Leaves are change colour because Autumn is coming soon. **Seb Y1.** This tree has got apples...that happens in Autumn too. **Eesa Y1**

In Y4, we answered the children's question of how far sound could travel but using a large open space next to school. **Gemma Jordan, Y4**



L1, T3, WO2, O2



We made a volcano outside. I liked being outside because it was so fun. We made a crazy volcano, we made lava with hot water and we used a cup of special soda and red colouring. When we put it together, it exploded and it was huge. I loved it so much it was so fun. **Finley R**



Plans for our Memorial Garden which will be installed by the end of the academic year. This will increase the green space we have on site to support the science curriculum.





# We answer Big Questions

The Science Ambassadors have enjoyed answer Big Questions so much they wanted it as a principal. Staff plan an overarching Big Question on their long term plan for the unit which is answered at the end. Children are encouraged to ask questions at the start of the unit and these questions are matched to objectives and used instead of learning objectives.

Year 1	Term 1A	Term 1B	Term 2A	Term 2B	Term 3A	Term 3B
Unit:	Humans	Light	Materials	Animals	Forces	Plants
Big Question:	What makes me human?	Can a shadow grow?	What would an explorer wear?	Would a tiger make a good pet?	Is a push a pull?	Is a tree a plant?

Y2 – start of unit

I like how we have a Big Question and then have little questions to help us answer it. **Cydney Mac, Y2**

Know questions can be answered in different ways

**THE BIG QUESTION: COULD YOU LIVE IN A HOUSE MADE FROM LEGO?**

Prediction - What I first think...  
*I think no because it might fall down while you are sleeping.*

Lego is...	Lego can...	Lego might...
hard opaque strong Plastic	be built shiny	france talant big

My Question:  
*How would you build a window with Lego? How would you get the sun in with out heating the house? Is the floor strong enough to hold a bed?*  
*\* Let's find out!*

**Big Question: How forceful is the Air Force?**

What we know  
 Can you list all of the forces you know are used within the Air Force and explain how they are used?

*upthrust from wings pushing up*  
*drag from air resistance pulling plane back*  
*gravity from mass of aircraft pulling plane down to the ground/earth*  
*forward Thrust from propeller/engine pushing plane forward*

Y5 – end of unit

Y4 – end of unit

**My Big Answer**

**Is electricity our friend?**

*Yes because it gives us light entertainment and well cooked food. No because certain ways of making electricity pollutes the earth it's also bad because it can be really dangerous especially around water.*

SL3, L2, T1

Y1 – end of unit

Wc 3.2.19  
 L.O. To test materials

**The Big Answer**

*The best material to make a coat from is plastic because it is waterproof and it is flexible.*  
*safe and strong*

Challenge  
 Can you think of another property that would make a good coat?

Y3- mid unit

5.12.19

Set up a test  
 Eshan and petros' Big question:  
 How does Light make a shadow

*because when i put the torch very close to the table the light ting*

*7.2 Shadow Screen*

*brilliant explanations!*

Using Big Questions gives the children real ownership of their learning and gives them an aim to work to through the lesson or unit. **Laura Ward, Y6**





# Outreach: science leaders



As a Specialist Leader of Education in a National Teaching School, our Science Leader is regularly asked to support new or established Science leads in developing science in their schools. This involves visits to West Jesmond and their schools.



Our meet up was really helpful, especially for me being new to science subject leadership. It helped me identify our schools needs with regard to science and offered useful suggestions on how you identified and targeted similar issues in your school setting. Together we were able to identify and prioritise what should be implemented in my school setting. Whilst planning units for this half term, I have implemented "Big Questions" and working scientifically targets as opposed to learning intentions; we discussed that LI's often give away the knowledge that will be learned in the lesson instead of the working scientifically skill. At the beginning of each lesson, I have adopted the technique of long term memory tasks to focus on "stickability" and committing learning to long-term memory. Next on my agenda is staff CPD, sharing the expertise of yourself and others from science network meetings. **Hannah Owens, Stobhillgate First - Morpeth**

The meeting I had about science at West Jesmond Primary School was helpful and productive. He shared lots of useful material about how science was planned, taught and assessed.

I came away from the meeting with a clear list of actions to discuss and implement in my school as part of developing our science curriculum. In particular; reviewing science teaching across school to understand how children work scientifically across school, introducing I can statements from CIEC publication for children and teachers to assess and monitor progress and ideas for planning and teaching science linked to big questions and enquiry types.

**Faye Morris, Carr Hill Primary School - Gateshead**



Thank you so much for last week and your offer of further support. We thoroughly enjoyed visiting your school and picking your brains last week. it's very obvious you know your science! I'm just organising how I envision science to happen for us next year and will definitely be in touch again.

**Michelle Hindmarsh, Sugar Hill Primary - Northallerton**



As the new subject leader for science I was put in touch with Tom to look at the science curriculum and resources at Yewdale to advise on next steps. Initially we looked at the structure of the curriculum as it had previously been and noted that the emphasis on investigation was not strong enough. Together we looked at some resources that Tom provided across the full school curriculum that would encourage a greater involvement with science investigation. We also discussed how some of the longer term investigations over time, particularly seasonal change in KS1 could be best managed and looked at how that could be recorded and shared with children. Tom provided some useful resources that also looked at links between statistics in maths and the science curriculum. We looked also at key resources that would be needed to enable an investigation led approach to science. **David Fasham, Yewdale Primary - Carlisle**

SL4, O1

As part of our Teaching School remit we host the Newcastle Science Network Leaders meetings. This has extended to schools out of the Newcastle authority. Our science lead runs the sessions with Primary Science specialist, Rosemary Feasy, to share best practise, resources and the latest updates in primary science.

Really useful ideas for taking back to school. Very informative meetings and welcoming. Tom has always been approachable and supportive at replying to emails with questions.

**Rachel Shiel, Ravenswood Primary**



Network meetings are a great way to share best practice – presented with lots of enthusiasm. Termly science challenges are now a much loved fixture. **Alex Reid Milligan, Throckley Primary.**

The meetings have had a positive impact on the teaching of science within our school. I have used frames within investigations and graffiti walls. **Orla Burke, St Joseph's Primary**



They enable sharing of good practice, a chance to question and support colleagues and are always full of valid ideas and resources. Invaluable! Thank you!

**Theresa Simonson, St Michael's Primary**



They are a valuable resource for teachers, I have used PSTT resources introduced by Tom in my school. The children have engaged well with them.

**Lesley Panton, Stocksfield Avenue Primary**

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# Outreach: student and NQT support

T1, O1, O3

As part of our Teaching School remit we run a School Direct Initial teacher Training programme. Our Science Lead delivers the science teaching and learning sessions to this cohort and three other School Direct programmes in the North East. Students on placement at our school also have the opportunity to observe the Science Leads teach the subject.



Trainees using ReachOut CPD

As part of our NQT CPD programme in School, our NQTs meet with subject leads to gain an over view of how we approach the subject and observe the subject leader.

As an NQT it was very beneficial to receive additional training and guidance about how we do science at WJPS. The guidance has increased my confidence in being able to teach science effectively and ensured I have a thorough understanding of all the concepts to be taught. Furthermore, it has also enabled me to plan fun and practical lessons which have ensured pupils are engaged during lessons whilst still learning scientifically. **David Mansfield, Y5**

It was really useful looking at the different resources we could use for links into Science, for example Explorify and See Through Science, as well as exploring the Science Capital approach which has benefitted my working wall, as well as encouraging good Scientific talk and language in lessons. Watching Tom teach really shows the efficacy of contextualising scientific learning and questioning.

**Ben Collier, Y3**

	YES	NO	PARTIALLY	TOTAL
To provide an understanding of the Science National Curriculum	96.15% 25	0.00% 0	3.85% 1	26
To gain a range of teaching and learning strategies	100.00% 26	0.00% 0	0.00% 0	26
To gain strategies to promote the use of science vocabulary	100.00% 26	0.00% 0	0.00% 0	26
How to incorporate Working Scientifically across all science lessons	100.00% 26	0.00% 0	0.00% 0	26



Great ideas for varied lesson types, starters and universal tasks.

**James Carr, School Direct Ponteland Partnership**

The activities were really useful.

**Caspar – School Direct 3 Rivers**

It was a great lesson combining science and computing. It gave me an insight into how you can use computing to support the learning in science. I enjoyed the practical elements of the lesson which I will be able to use going forward. I liked the beginning of the lesson looking at 'last week, last unit and last year' which can be implemented across the curriculum. I'll certainly add that into some of my lessons.

**Ryan Redford, School Direct - QTA**

How will you utilise what you have learnt?

Answered: 10 Skipped: 0

RESPONSES (10) WORD CLOUD TAGS (0)

Apply to selected Filter by tag

Showing 10 responses

I will use explorify and concept cartoon  
11/12/2019 5:31 PM

The Quayside Teaching Alliance also provides NQT accreditation. As part of the NQT CPD offer, the teachers have Science training with the subject leaders from West Jesmond.

Utilising Ogden Trust overview of types of enquiry. Use of scientific Vocab mats to help pupils show understanding.  
11/12/2019 5:31 PM

Utilise In lessons  
11/12/2019 5:31 PM

I will take away resources and then implement them such as explorify.  
11/12/2019 5:31 PM

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# Outreach: CPD

Our science lead presented at the PSTT International Conference in Edinburgh running a very popular session on “Using technology to support teaching and learning in science.”

MaryJo Ellison  
@maryjo\_ellison

@West\_Jes\_School and @ProfessorTJones thank you for sharing your work and ideas. I'm looking forward to using them @ashwood\_spencer  
#STEM #PSEC2019



21:37 · 08/06/2019 · Twitter for Android

Andrew  
@andrewjsutton

Thank you for showing us your work! I can't wait to go and try some of your excellent ideas with my own class - you've set the standard really high... keep working hard for Mr Jones!!



An inspirational presentation with some useful ideas to engage and enthuse. **Vicki Sharkey, Dr Tomlinson, Rothbury**

Really inspiring to see how another school has used the museum as part of their curriculum, will definitely be stealing some of your ideas. **Vicky Carter, Moorside Primary**

Participating in the 'Transforming Learning in Science Through Collaboration with Museums' course at the Great North Museum has been a fantastic opportunity for CPD and the development of my own Science Leadership skills. Throughout the programme, I have been working closely with museum staff and colleagues to explore ways of improving children's scientific enquiry skills and increase Science and Cultural Capital through using the Museum's rich resource base. As part of this programme, I have trialled several activities with my class to improve their ability to ask relevant, scientific questions. I have also visited the Great North Museum on multiple occasions with my class to provide valuable learning experiences outside the classroom.  
**Alex Mackellar, Science Lead**

Our Science Lead presents sessions on the Great North Museum's Transforming Learning in Science Through Collaboration with Museums course, leading sessions on Science mastery and West Jesmond's experience of working with the museum. Our new Science Lead is also attending the course.

Tom is such an enthusiastic leader of Science, he never fails to inspire me to improve science learning outcomes in our school. **Judith Robertson, Knoplaw Primary**

Great ideas on how to incorporate science into other subjects and how to create a lot of learning from a single object. **Rob Howard, Simonside Primary**

Our science lead led Westgate Academy's January Training Day on Working Scientifically and assisted teams with planning their next units.

It was great, there were some fantastic ideas which we are starting to use in year 5 this afternoon. Loved the intro to each topic and the websites are good. Please pass on our thanks.  
**S. Ogilvie Y5**



I really valued the science CPD, especially the emphasis on 'investigation'. I think this is something that can be applied to all subject areas. For example, reading comprehension lessons should also have an element of investigation where the children investigate a text using the demonstrated reading skill. I found the range of activities fun and engaging, and enjoyed the 'pub quiz' style element to it! Low stakes competitions between tables is the way forward. It was great to see theory in action and demonstrated the need to try things out first before asking kids to do them. Thanks!  
**B. Davies Y6**

I found the training beneficial and practical. I liked how you modelled the skill of 'observing closely' through the cookie exercise, thought it was very engaging and could start to see how this can work in my year group. Also found it helpful how you shared examples of how specific features are taught within your own class and school, such as 'big question' and bright idea. **S.Uddin Y4**



SL4, O1, O3

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# Feedback to governors

SL1, SL2, SL5

As part of our Curriculum Governors Committee, the Science Leads presented how science is taught throughout the school and the research behind this. The Governors also had the opportunity to look at pupils' work and ask questions. They have requested that this is replicated at a Full Governing Body meeting later in the year.

The presentation at Curriculum Committee was inspirational although I felt a little sad that my children (now in their 20s) hadn't benefitted from such amazing provision! Science is clearly a well thought through and well embedded part of a child's experience at West Jesmond. It was obvious from the presentation that the content is appropriate for the different year groups and exciting. High quality science learning and vocabulary is being delivered through interesting projects with thought-provoking questioning and discussion. I was also pleased to see Alex starting to take on the leadership of science alongside Tom.

Jane Edminson, Chair of Governors

I'm proud of the depth of science we offer at West Jesmond. One of the best things I heard was how our pupils in Y7 at Jesmond Park are seen to have great scientific knowledge and understanding. This is testament to what and how they are taught here.

Laura Robb, Vice Chair of Governors

## Science at West Jesmond

- Curriculum aims:**
- Full coverage of the National Curriculum
  - "Working Scientifically" skills to be taught and applied throughout teaching and learning
  - Vocabulary taught and used
  - Promote Science Capital

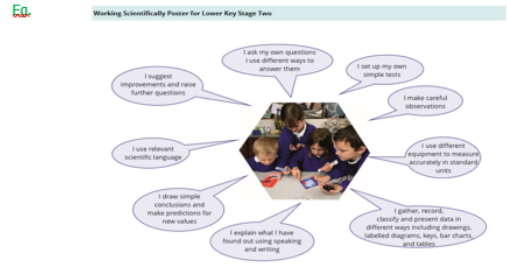
Our Science Principles (from Primary Science Quality Mark):

**Science at West Jesmond is good when....**

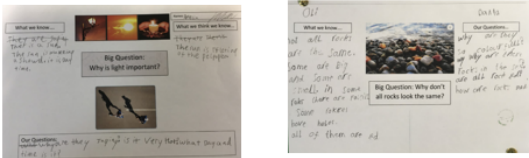
Staff	Children
<ul style="list-style-type: none"> <li>It is relevant to the children, their life and wider world</li> <li>It is hands on with lots of practical activities</li> <li>Children are engaged</li> <li>Staff are confident in their subject knowledge and ways to deliver it in well structured, stimulating lessons</li> <li>Children make their own discoveries</li> </ul>	<ul style="list-style-type: none"> <li>We do different types of experiments</li> <li>We do projects outside</li> <li>We answer Big Questions</li> </ul>

- Promoting Science in School:**
- Teachers wear lab coats
  - Science working wall /area in classroom to support unit and clearly display related vocabulary
  - Science roles to raise Science Capital displayed on Science working wall
  - At end of lesson child to be selected as Super Scientist – name to be displayed on certificate in classroom (Some teachers give own certificates, Dojos etc)
  - Use of outdoor spaces

- Planning and Lesson Design:**
- At least eight sessions per unit
  - Knowledge and Working Scientifically objectives to be included in each lesson plan. Working scientifically grids in the front of children's books which are referred to. This enables children to understand the skills they need to be a scientist.



- Vocabulary to be taught and referenced to – sent home as spellings
  - Each unit to have a Big Question to focus learning (this may be introduced mid unit)
- Eg.
- Reception: How can we protect a dragon's egg? (Materials, Understanding the World)  
 Year 1: Would a tiger make a good pet? (Animals)  
 Year 2: Could you live in a house made of Lego? (Materials)  
 Year 3: How do I stand up? (Animals)  
 Year 4: How can we stop a snowman melting? (Changing State)  
 Year 5: What makes the world go round? (Earth and Space)  
 Year 6: How does Mo Farrah run 4 minute miles? (Animals)
- Children to generate questions to be investigated through an activity at the start of unit. Eg From Y3



- Children's questions used to shape learning through the unit
- Links to Humanities topic where relevant
- Include links to industry, professionals and visits
- Regular reference to Science Capital.

- Science Capital Question Stems:**
- Who needs to know about ...?
  - Can anyone tell me about a TV programme they have seen that involved ...?
  - Does anyone know someone who uses this skill/knowledge in their daily lives?
  - Does anyone's family member work in a job where they need to know about ...?
  - Where have you seen something a bit like this before ...?
  - From you knowledge outside of school, how would you describe ...?



SCIENCE LONG TERM PLAN 2020-21

Year 2	Year 3A	Year 3B	Year 3C	Year 3D	Year 3E	Year 3F
Unit:	Materials	Electricity	Sound	Plants	Animals including Invertebrates	Living Things and their Habitats
Big Question:	Could you live in a house made of Lego?	How does a street light turn on?	Who is the greatest inventor?	Who can grow the tallest plant?	Which came first the chicken or the egg?	Who lives here?
Observing						
Classifying	Materials sort	Conductor or insulator				
Measuring						
Research	John Dunlop/Car Tyre	Creating circuits	Alexander Graham Bell		Animal footprints	Camels and cart presentation
Comparative & Fair Testing	Test eggs for different properties				Seeds sown with different liquids	Check diet
Outdoor	Material walk				Chickweed walk	Chickweed
Visitors		Quayside trip	Discovery Museum		Living eggs	Animal Antics
Scientist	John Dunlop		Alexander Graham Bell			

- Full coverage of enquiry types through the year – planned at start of year:

Example of pages of the document presented to Governors







# Pupil voice

L1, T2

I like working outside and finding out new things. **Cydney-Mac, Y2**

I like using the badges and bring the Recorder. In science I learn new things. **Betsy, Y2**

It is fun doing experiments. In STEM Week I enjoyed designing the bridges, having time to talk about how we could improve it then being able to make it again. I also loved learning about Valentina Tereshkova the first woman to fly in space. It has made me realise I could do that. **Sachi, Y3**

It's really good learning about science. I loved going to the Centre for Life. **Omer, Y3**

I like doing all the experiments. **Lara, Y3**

I love science because it's really interesting. The teachers make fun experiments for the class to do. **Thomas, Y4**

The best thing about science at West Jesmond is the fun experiments. I liked investigating plants outside. **Maddison, Y4**



This is what I like about science; experiments, understanding and the way it works, finding out the answers to see if I'm right or wrong, I learn from my mistakes, Big Questions, Big Answers, recording, diagrams, comments, challenges and picture questions! **Olly, Y4**

The best thing is the experiments and they very useful things that you use in real life. **Sarmed, Y5**

I love science, I have been the Ambassador two years in a row. I like experiments because they vary a lot within lessons. **Jessica, Y5**

I love everything about our lessons because science is my favourite subject. **Jacob, Y5**

I really like the way classification is taught in biology. **Cillian, Y6**

The best thing about science at West Jesmond is that every topic is clearly explained and we also do (or make) fun projects! The best thing was dissecting a pig's eye and making a periscope. **Priyanka, Y6**

My favourite thing we have done this year is our experiments with circuits and programming a robot. **Eli, Y6**



# Feedback from Staff

There is a real passion for promoting science across the school and there is a real sense of excitement from the children.

**Lauren Stenhouse, Rec**

There is a genuine enthusiasm from the children as part of the ethos developed over the years. We keep hearing children saying "I want to be a scientist." **Dianne Sanderson - Reception**

Science is given high priority in our school, compared to when I talk to my peers in other schools, which makes me proud to work at West Jesmond. We give the children regular opportunities to explore science in different ways, and provide many enhancements such as trips and visitors. Leadership are passionate about science within school and help to facilitate opportunities for children to encounter real scientists. **Glen Hopkins, Y2**

Tom has frequently shared ideas in which we can incorporate the different types of investigations into fulfilling the Y5 National Curriculum, such as pattern seeking in our recent Animals (Including Humans). We feel that we are able to share our own ideas and Tom helps refine them in conjunction with us. **Gemma Jordan, Y5**

I feel Science leadership and teaching at West Jesmond is highly engaging and helps to inspire young children to take interest in STEM subjects. Leadership are highly knowledgeable and passionate about Science and STEM subjects and this is mirrored in teaching across the school. Lessons are fun, engaging and support children to use scientific skills.

**Clare Byatt, Y1**



Science teaching and leadership in school is dynamic and the feedback we receive from book looks helps us to further improve and move forwards in the right direction.

**Karl McGrath, Y6**

Science teaching at West Jesmond has become more child focused, making it relevant to the child through exploration and discovery. Encouraging the children to ask the questions that they want answered and enabling them to discover how and why brings Science to life.

**Cath Laidler, Y3**

Science is rigorously monitored, and good constructive, detailed feedback is provided. There appears to be a very high standard across the school which is consistent in every year group. There are good opportunities to share work and look at what is happening in other year groups. **Liz Thomspson ,Rec**

The leadership of science drives innovative learning experiences in school and has helped increase the profile of the subject in school, encouraging a love for Science from the children. The children are encouraged to shape their own learning through use of Big Questions and are given opportunities to plan their own investigations.

**Mark Rimmer Y5**

Mr Jones came to this school with a plan to 'revolutionise science education' at West Jesmond and my goodness has he done that. In our work as a National Teaching School he has taken his transformative approach and created flourishing science teaching in many schools in the North East and Cumbria, alongside international outreach work with delegations of teachers from China, Iraq and the Netherlands. Over my 10 years of leadership of the school I think I am most proud of the development of science as a subject and how empowered staff in our school and elsewhere have become to fully engage with whole school STEM weeks, create pupil science ambassadors, explore a wide range of science based careers and develop an outlook where all children love science and see it passionately as an integral part of their learning and knowledge.

**Gary Wallis-Clarke, Executive Head Teacher**