

Developing Speaking and Listening in Science in Year 5

Emily Tunstall-Behrens

Our school is a two form entry primary school in the north of the borough of Westminster. It serves an estate with a significant level of social deprivation – 57.3 % of our children are entitled to free school meals and 84.8% are bilingual.

In the two year 5 classes there are 60 children, 49 of whom are bilingual, with 12 in the early stages of learning English as an additional language. In addition, 28 are on the SEN register and 1 child has a statement.

Following disappointing science results in the previous year, and the appointment of a new, dynamic science co-ordinator, there was a whole school focus on the development of Science for the year. Additional support was made available to us from the LA Language and Ethnic Minority Achievement Service.

At the start of this project, the majority of children in our year 5 classes had been identified as underachieving in Science. We share one experienced classroom assistant this year and we had a good working relationship, though neither of us had worked with year 5, nor had we worked in partnership together before.

The focus for the project was to reintroduce practical and language-based activities to the normal science provision, to ensure that all children were involved and to develop speaking and listening with a view to supporting the development of writing in science.

At the beginning of the year it was difficult to do practical investigations in the classroom because:

- the children didn't particularly enjoy science or look forward to their lessons
- they found it difficult to work co-operatively in small groups
- their behaviour was challenging
- they didn't see themselves as scientists

After analysis of existing provision and conversations about the work the classes needed to

cover over the term and the year, it became clear what the problems were.

Firstly, we weren't setting clear expectations of behaviour during the lesson. We were also not setting clear learning objectives at the beginning of each investigation. As a result, the children were not taking the practical work seriously.

At the beginning of the autumn term, when we were testing to prove that air has weight using balloons and coat-hangers, many of the children with more challenging behaviour started playing around with the balloons. When we analysed what had happened later, we realised the groups had not been carefully balanced to include higher ability, more responsible children to help keep the group on task. In hindsight, this was partly due to lack of familiarity with the children in the class, but it was also partly due to unclear expectations.

In other groups, the children placed the balloons randomly on the coat-hangers because they did not have a 'picture' of weighing scales in their minds' eye. The activity had not been clearly modelled or explained.

At this stage, we were not using visual images on the interactive whiteboard (IWB) or in other ways to introduce the new concepts. We were expecting the children to work it out through practical experience – the optimistic approach!

Our planning did not clearly show how the lesson should progress. At the beginning of the year, we didn't take into consideration the short attention span of some of the children. Improvements began when we realised that the lessons needed to be divided into manageable 'chunks' of about 7-10 minutes, whether in speaking and listening sessions, activity-based investigations or recording. We also felt that the key vocabulary was not sufficiently highlighted and defined at the beginning of each lesson. Thus the children did not have good 'tools' to use during their own investigations and discussions. Overall, the teaching and consequently the learning, was unfocused and therefore joyless!

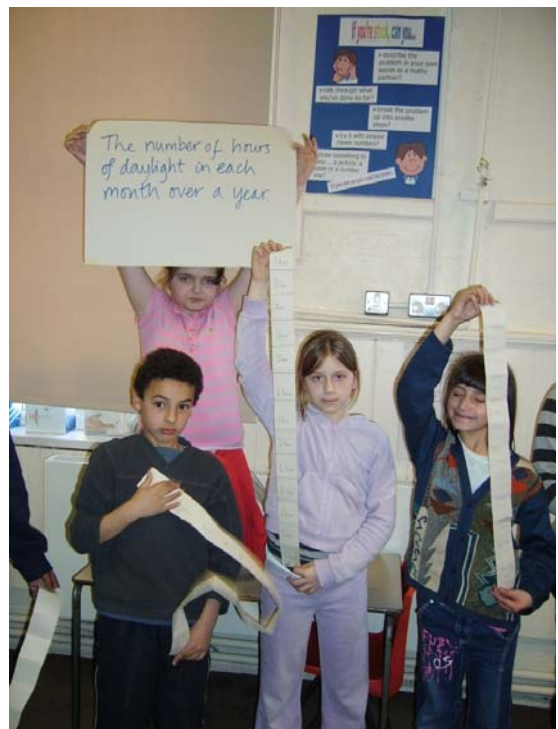
Here is an example of our planning at the beginning of the autumn term, showing what we intended to do in two lessons.

Subject	Learning objective	Main teaching activity	Key vocab	Lang function	LA	MA	HA	Plenary
Science Gases Around Us QCA 5C	Consolidate understanding that air is all around us & has weight Know that powders & sponges are solid materials with air in the 'gaps' in between particles	Use Powerpoint to support investigation about the weight of air. Ensure children predict accurately and have a clear understanding. Use Powerpoint to show the solids that are in small particles. Ask: What is between particles? How can we prove that air is there? Show pictures of sponge & soil. <i>Resources: sponge, soil, water</i>	Solids Air Particles Gaps Evidence Sponge Bubbles Speculate Gas Powder	Describing Questioning Explaining Hypothesising Predicting	Ch draw diagram of investigation, label (LA) in detail & predict outcome (MA) and write conclusion giving other examples that prove that air has weight (HA). Sheet with boxes to fill w pictures of sponge & soil, one sentence per box (LA). Three bullet points to describe each process (MA). As MA plus answer question: What would happen with a bowl of glass beads? (HA)			How do we use air to help us in everyday life? Use Power point to reinforce that careful observation is necessary & repeating an investigation ensures accuracy.

LA - lower ability, MA, medium and HA, higher ability

As part of the whole-school science focus, the new science co-ordinator led an INSET during the autumn term explaining the advantage of using key questions instead of learning objectives – the children get ‘hooked’ into answering the question and thus more involved in the lesson - and of using ‘The Seven Elements’ (devised by Robert Helliwell Education Services). Each element should be included, in whatever order seems appropriate, in a week of science teaching.

His recommendation was that each week one lesson should be practical and the other recording-based. With this new format we found that our teaching became more focused and the lessons fell naturally into ‘chunks’ that were more manageable and enjoyable for the children.



Here is an example of the new style of planning:

Week 5a & 5b Science Planning

Elements	Teaching/learning objective
Lesson 5a	germination, fertilisation, pollination, dispersal, reproduce, stage, life cycle, human, plant
1 – key pupils into development from last lesson to this 3 – review of language	Why do living things reproduce? Make link with last week’s lessons (germination of seeds) and broaden to other living things. Ch. talk in pairs and feed back. Why do living things reproduce? Review vocab of plant life cycle – see concept map. Ch. discuss in pairs and give explanations for key words, then fill out life cycle sheet (Dev Sci p26) independently at own level (8 mins).
2 – check on what pupils already know 5 – practical investigation carried out independently	How does the plant’s life cycle relate to other living things? What are 1 st stages in growth & development of humans? Ch talk in pairs (2 mins), then volunteer names of stages - babyhood, childhood, adolescence, adulthood. Add these words to vocab list on board once the children have defined them (5 mins). In table groups, chn. sort a collection of photos of people (male, female, baby to elderly) into sets. Clear expectation that children must agree on how to sort and display them on large sheets of paper. They must be able to justify why they have grouped pictures to define babyhood, childhood, adolescence, adulthood (child-bearing age, middle age, old age). (10 mins) Ext: what is gestation ?
7 – revision & review	Plenary: IWB – look at human life cycles. Consolidate image with named stage in life cycle. Discussion.
Lesson 5b	babyhood, childhood, adolescence, adulthood, growth, developmental stage
4 – clear explanation of the science to be taught	K.Q. What are 1st stages in growth & development of humans? T models use of timeline from birth to death on IWB. Chn. come up and place images of developmental stages accurately for whole class to see. Camera.
6 – careful diagrams & written records are made	K.Q. What are 1st stages in growth & development of humans? Use p27 from Developing Science to record stages of development on timeline. LA – bullet points with sentence starters: Babyhood is.... Childhood is.... Adolescence is....
3 – review of language	Plenary: Children add new words to concept map in new coloured pencil with definitions and date.

The focus on language at the beginning or end of a lesson (Element 3), using unit concept maps that are continually updated by adding new words and definitions in a new colour each week, or modifying previous definitions with improved understanding, has helped the children to learn the scientific vocabulary and use it accurately in investigations. Repeated usage and checking of understanding of the vocabulary has developed confidence in the children at all stages of language development.

The box format has helped us to structure the ‘chunks’ of each lesson, encouraging regular consolidation of what is being taught (Elements 1 & 4). The children benefit from regular reference to the key questions.

In the lesson above, the children were given a manageable and open-ended sorting investigation (Element 5), which was clearly explained, with behaviour expectations planned in. They worked well in mixed ability groups and came to similar conclusions when sorting the human images, and in the process they had to justify and agree on their choices as a group, which ensured much discussion, using scientific vocabulary, and co-operative behaviour.

In a second science inset during the spring term, the co-ordinator noted that he found that children in year 6 were struggling to draw and interpret graphs efficiently. He suggested, in order to get children to engage better with this weak area of their learning

at an earlier stage, that all teachers should introduce them to 'human graphs'. He added the footnote that whilst the children may not all understand clearly what they are doing at the time – recreating x and y axes and bars by holding various labels - they will enjoy the action-packed lesson (Element 5), which can be referred back to when it comes to the recording stage



(Element 6). “You remember when Anna was lying on the floor, well she was The Months of the Year on the x axis.”

In fact, we ‘performed’ our graph entitled ‘The Number of Hours of Daylight in Each Month Over a Year’ in a sharing assembly. Not all members of the audience, ranging from Reception to Year 6, grasped the concept, but the year 5 children knew exactly what they represented as they held their label for the axes or a strip of concertina-ed paper (each fold representing one hour of daylight) for January to December. Thus the January child held one of the shortest strips and the July child one of the longest.

It was very satisfying to see the children (the ‘months of the year’) being questioned by the other class teachers and to see what facts they could confidently supply in front of half of the school!

I can happily say that we all, teachers and children, now approach science lessons with enthusiasm. The children have become more independent and are actively involved in their own learning, behaviour has improved significantly and increasingly ambitious investigations can be planned for. It’s been huge learning curve!

