The use of Sometimes, Always, Never statements in Colerne CE Primary, Corsham Regis and Box CEVC Primary

Does the regular use of Always/Sometimes/Never questioning improve the reasoning skills of children?

The study took place in the autumn term of 2008 in three classes in three different schools, each in a different context. Two of these classes were Y5/6 and one Y1/2. Although all children were taught, particular focus was on the progress of a small group of ‘invisible children’ – those who lacked self confidence; viewed mathematics as either right or wrong; were often quiet and undemanding and were at risk of falling behind in KS2.

Over the term the pupils were regularly asked to solve always/sometimes/never questions. For example, is it always/sometimes or never true that prime numbers are odd? Or, is it always/sometimes or never true that a 2-digit number added to another 2-digit number gives you a 3 digit number? From these statements children were increasingly asked to make generalisations about the mathematics involved.

The progress of the selected children in AT1 maths was assessed using the Assessing Pupil Progress (APP) materials to see whether using these questions improves reasoning, communicating and problem solving skills.

Always, Sometimes, Never questions in year 5/6 (Box and Corsham Regis)

What we did:

Both Corsham Regis (Regis) and Box Primary Schools’ numeracy subject leaders teach years 5 and 6. The motivation behind use of the Always, Sometimes, Never (ASN) questions within lessons was similar in both schools, despite the difference in catchment. Both subject leaders felt the need to increase the children’s security in discussing mathematical concepts, as well as exploring and investigating possibilities in a number of different areas of maths.

County Numeracy Advisor, Michael Park led a discussion session with a group of children from Box to introduce the idea of ASN questions. He then led a whole class session at Regis.

Following this model, we established as a group how to incorporate the questions into our weekly planning in a systematic and structured way. The use of questions like ‘when you subtract 2 numbers, the answer is smaller than the first number’, were our starting point. Such questions prompted the children to start by looking for examples of where this would be true. The children began to express their answers by responding to each other and making statements (e.g. ‘well, it obviously would be’ and ‘it all depends whether you have negative numbers’).
In the very early stages, discussion required prompting from both teachers to challenge the children on the ideas they already held true in several areas of maths. However, as the process continued and the children got more confident in looking for anomalies in their theories, they started to question and challenge each other. What they thought was always true turned out that sometimes, it wasn’t!

Context and findings:

ASN questions were used to introduce new areas of learning, as well as consolidate areas of misconception. They also provide a natural extension activity in some contexts. This type of discussion-based activity is naturally differentiating, but also enables children to work together in a mixture of different groups; children who may struggle with mental calculations were able to find success in spotting patterns that their higher ability peers may have missed.

The children at Box started to record their working; the included sheet shows children’s early attempts. After discussing how they might become more systematic in their approach to answering the ASN questions, the children were shown how to create a table to tackle finding all possibilities in problems. There were marked improvements in recording, both within the focus group and the remainder of the class (see appendix 1).

At Regis, the children continued to focus on the discussion element of the ASN questions. The focus group made great strides in their confidence to question each other and look for evidence to support or disprove their assertions. Their willingness to share with the group in whole class discussions increased. Overall, the whole class developed their ability to ask questions and make statements about what they knew to be true.

In both schools, the children’s ability to discuss their thoughts has improved, which has shown a better understanding of mathematical concepts in general. The children are beginning to question what they had previously accepted without question.

Colerne

At Colerne the ASN reasoning activity was incorporated into Year 2 Numeracy lessons over a period of 10 weeks through twice weekly oral starter sessions using a series of related statements intended to deepen understanding in an area mathematics.
The statements were introduced separately by revealing them one at a time using the Show/Hide Screen Shade tool from the SMART Notebook toolbar menu.

Children first helped to clarify the vocabulary used in the statement before discussing the validity in learning partnerships. If needed each pair was given a whiteboard and pen so they could test the statement with examples.

After a period of discussion, lasting anything from 30 seconds to 3 minutes, children were asked to decide whether the statement was always, sometimes or never true. After a countdown children gave their decision through gesturing thumb up (always true), shaky hand (sometimes true) or thumb down (never true).

The activity clearly had a positive impact from the beginning. All children in the class (aged 6 and 7) understood what they had to do. Most children quickly became efficient in testing statements with examples to attempt to both prove and disprove a statement.

The statements enabled children working at different attainment levels in maths to take part. Higher attaining learners often discovered truths and patterns within maths.

One particular event led to children deciding that zero must be an even number. When testing the statement, “Adding two numbers together will give a multiple of 2”, one child explained that “even plus even is even”. We then tested this with different examples. I then wrote 0 + 2 = 2 and asked what this meant about zero. Without any hesitation one child said that zero must be even, because 2 is even and even plus even is even.
The next stage in using ASN will be to ask children to come up with their own statements to test, and then to resolve independently, either in small groups or individually. This could be used as an evaluation of learning within a unit of work.

Overall progress of the children in the three schools:

Looking at the Assessing Pupil Progress framework, the focus children in both year 5/6 classes have made good progress. We hope this is due at least in part to the implementation of the ASN questions. There are other obvious considerations (general teaching provision) to indicate that progress would definitely have been made by virtue of good teaching. However, in the more specific areas of oracy and confidence in use of mathematical vocabulary, the children have definitely made more progress over the autumn terms than would otherwise have occurred. As stated by PPA cover in Regis ‘we could’ve spent the whole session in a discussion, the vocabulary they were using was fantastic!’

At Box, the six focus children moved from level 3/4 of the problem solving strand to level 4/5 (with 4 of the 6 showing very clear evidence of level 5). Within the focus group at Regis, the 6 children went from strong level 3s to secure level 4s on the problem solving strand. Our work on the A/S/N questions has provided the opportunity for us as teachers to be more specific about where the ability to problem solve is being integrated into planning.

Other general findings for the three schools:

- Broadening of children’s understanding of numbers
- Children are able to chat, question and challenge
- Developed confidence
- Formalising thinking
- Accessible for all levels and children understanding that maths can be taken further forward
- Patterns and laws in maths that you can only get to through reasoning
- Children starting to come to the understanding that there are certain truths that they can rely on
- Children feel more comfortable ‘mucking around with numbers’
- Children are actively engaged
- More facilitation and consideration of our planning, especially the mental sessions. We are being more reflective.
- Improved language

What next?

- introduction of A/S/N questioning to other members of staff so that implementation can be whole school
• sharing of questions, resources within key stage meetings and cluster meetings

• incorporate into success criteria of performance management

• Ask the children what they would like to explore, for example, at the end of the unit. This could be where the children write down some to reflections.

• Produce a written report for the NCETM

• Produce a notebook that contains a range of sometimes/always/never statements and make it available to the cluster

Did the organisation of this project allow for good CPD?

The initial idea for the subject leader cluster came from the LA who arranged an initial meeting for all literacy and numeracy subject leaders, arranged them into clusters and asked them to discuss common issues that they were finding in their schools.

Once a focus could be agreed on funding was then allocated for the clusters to meet six times in a year.

Our cluster decided that the work that we had decided upon may also be of interest to the NCETM and so applied for some extra funding from them which they kindly gave us. Pete Griffin, South West Regional coordinator, also attended many of our cluster meetings and helped to move our thinking.

How has the model worked in our cluster?

As Subject Leaders
• Addresses more specific areas (identified by us)
• Makes us active participants working as a team (as opposed to passive learners on a course)
• Agenda and pace set by us
• Raises confidence in our own ability
• Helps us to have a strong sense of cluster strengths and weaknesses (This allows us, as subject leaders, to have a good understanding of who we could draw on for help and advice in the future)
• Non threatening (equitable support and challenge)
• Enables us to go through the process first, working out the model that worked best for us and spotting its potential pitfalls etc
• Enabled us to trial the our work with small groups of staff and support them with area of difficulty
• Enabled us to se and feed back to county that staff had difficulty in taking the mathematical conversation forward after the initial question
• Allowed us reflection time
As teaching staff
• Non – threatening
• Drip fed
• Simple easy to use support resource available (more to come)
• Enthusiastic lead to follow
• Understood the need and method
• In house support

Implications for the cluster and the county
• Other schools have been carried along on the wave and want to join in with the project
• The LA have raised the profile by advertising it well
• The LA have an understanding that this model for developing subject leaders works

Corsham Cluster:

Michael Park Wiltshire LA
Chris Conners Box CE VC Primary,
George Samios Colerne CE Primary
Rachel Newman Corsham Regis

Thanks must be given to Pete Griffin for his support, enthusiasm and ability to challenge our thinking during this small but rewarding project.

Appendix 1
Sample questions and responses

The square of any number is bigger than the number.

“I think I’ll start with the smallest number first.”