

A Numbers Count Lesson

INTRODUCTION

"I was really impressed with the pace of the lessons, and the constant use of a range of vocabulary. I was able to see a wide range of interesting and appropriate resources being used, and I also saw how Judith was guiding the child beyond the resources, keeping the context so he was confident but encouraging him to calculate mentally."

Comment by a Year 3 teacher after observing a Numbers Count lesson

Numbers Count lessons are based on the Individual Learning Plan that a teacher devises for each child after the diagnostic assessment carried out at the start of the intervention. While the content of each lesson is personalised to the individual child's needs, the lesson always has the same basic structure: a 30 minute sequence of episodes that ensures a good pace and progression of learning while giving the child daily opportunities to engage in a range of mathematical activities and to use and apply their learning.

AN ILLUSTRATION OF THE SEQUENCE OF LEARNING EPISODES IN A LESSON

Making a Positive Start

Toby begins the lesson by deciding whether he would like to play the 'doubles game' or 'snakes and ladders'. He selects the 'doubles game' as he is confident that he will beat his teacher, who forgot some of her doubles the last time they played. She asks him whether he wants to play it with the spinner or a die and he chooses the giant sponge die. He throws it onto the carpet, jumping in the air with excitement as he does so.

Toby *6. Double 6 is 12 [immediately]! A point for me!*

Teacher *Oh dear, it looks as if you're going to win again, Toby. How did you do that so quickly?*

Toby *I practised with my mum last night to make sure I would beat you.*

Like the warm-up at the start of a PE lesson, Making a Positive Start prepares the child for the more strenuous learning activities that will follow. It sets a positive tone for the start of the lesson while building on the child's confidence and fluency. In this example, Toby is empowered to make a choice, which develops his independence and encourages him to take ownership and control of the learning situation. It also provides gentle opportunities for his teacher to strengthen and consolidate his mathematical knowledge and skills and to find out more about his learning.

Making a Positive Start often but not always takes the form of asking the child to choose a familiar mathematical activity with which to begin the lesson. Sometimes, Toby's teacher instead reviews with him some mathematics that he has done at home. At other times, she chats with him about the progress he has made in Numbers Count or about how he is getting on in class mathematics lessons.

Counting

Children count in every Numbers Count lesson because counting underpins almost every aspect of their numeracy. With daily counting opportunities, they can develop the procedural skills of both oral and object counting and then proceed to more sophisticated skills such as counting forwards and backwards, counting in steps, and starting or finishing on a given number. Toby's teacher uses a range of counting contexts and activities to enable him to build up his counting strategies and skills. Today, she goes with him to the shop that she has set up in the corner of the Numbers Count room.

Teacher *Toby, please could you help me to count these 5p coins while we put them back into the till? I need to buy some more toys because I've sold them all, but I'm not sure if I have enough money.*

Toby Picks up each 5p coin and places it into the money box.
5, 10, 15, 20 ...
Hesitates when he puts the next coin in. Looks around the room for something to help him. Goes to the 'hand number line' that he made with his teacher at the beginning of the intervention and which his teacher has put on the wall.
... I'll use this ... 25 ...you have 25p!

Teacher *Thank you Toby. I like the way you decided to use the number line to help you when you got stuck. That was a really useful idea.*

The teacher gives Toby specific praise for his strategy of using the number line because she wants him to be aware of and pleased about what he has done, so that he will do it again in the future. She has found out by talking to his class teacher that he rarely uses any resources to help him when he has a difficulty in his class mathematics lessons, and they have agreed they will both encourage him to do this.

The teacher now moves on to an activity that will help to develop Toby's conceptual knowledge of counting:

'Children who themselves count a set of objects correctly are credited with procedural knowledge while those who can detect errors in the counting of others are credited with having conceptual knowledge of counting.'

(MacLellan, 2008: 36)

She does this with Spotty, a soft toy dog.

Teacher *Toby can you please fetch Spotty? We need to see if he has learned to count backwards from 15 to 10.*

Spotty *15, 14, 13, 11 ...*

Toby *[Listening intently] No, Spotty! You forgot to say 12. It's 15, 14, 13, 12, 11.*

Spotty *15, 14, 13, 12, 11, 10.*

Toby *That's right.*

Toby's teacher uses this part of the lesson to enable him to practise and reinforce a wide range of existing counting skills. If she wants him to learn any new counting skills, on the other hand, she waits until the Current Learning Activities episode of the lesson.

Current Learning Activities

Most Numbers Count lessons contain two Current Learning Activities in order to maintain variety and pace of learning, although there are times when it is more appropriate to have only one, longer activity. The teacher selects areas to develop from the Individual Learning Plan: she might decide to introduce a new concept, to build on one that was introduced the day before or to give the child an opportunity to practise and consolidate learning from the previous week.

After reflecting on the previous day's lesson, Toby's teacher has decided to develop counting-on strategies when adding two small numbers together as the main focus of today's Current Learning Activity. She sits at the table with Toby and uses an 'I can' statement to share the learning objective with him.

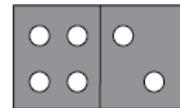
Teacher *Toby, today we are going to work on counting on and at the end of our activity we will decide if we can place this star on your 'I Can' planet.*

Both [reading together] *'I can count on when adding two small numbers'.*

Teacher *What do you think 'count on' means?*

She asks this question to activate and build on Toby's prior knowledge. Numbers Count is based upon a social constructivist understanding of learning. Teachers take to heart von Glasersfeld's (1995) observation that children do not passively receive and absorb knowledge from their teachers. They treat children instead as active learners who want to make sense of their world, who try to build on what they already know and believe when presented with new mathematical experiences, and who can be helped to do this through dialogue with others. In this instance, Toby's response indicates that he has constructed an understanding of counting on from playing with dominoes.

Toby Goes to the resource trolley and comes back with a domino tile that has 4 spots and 2 spots.
Well, when we used these last week, I didn't have to count all the spots to find out how many. Look ...
Points to the side with 4 spots.
... I know there are 4 spots on that side so I just counted 4 ...
Points to the individual spots on the other side.
... 5, 6.



His teacher assesses that Toby understands the principle of counting on with small numbers in this context and decides that she now needs to help him to build on this by counting on from larger numbers and in other contexts. She uses a variety of short, linked activities during this single Current Learning Activity episode of the lesson, all with the same objective.

She begins with a 'bucket count', dropping counters one at a time into a red bucket on the floor. Toby shuts his eyes and keeps count while listening to the sound of counters hitting the bottom of the bucket. When she stops, he announces that there are 9 counters in the bucket. She shows him 3 more counters in her hand, and asks him, *'Can you work out how many counters will be in the bucket when I drop these 3 in?'* She continues the Current Learning Activity by going back to the shop with Toby and using coins to calculate an increase of 5p on each item. Finally, they kneel on the carpet with the 'small world' garage scene that Toby made out of a shoe box during his diagnostic assessment. Toby drives 8 cars that 'need fixing' into the garage and closes the doors so that they can not be seen; his teacher drives 5 more cars in front of the garage and asks him, *'Can you work out how many cars the mechanic has to fix now?'* They repeat this several times with different numbers, Toby's teacher encouraging him to count out loud *'so that I know what you are thinking'* and to check his calculations by counting all of the cars.

By the end of this Current Learning Activity, both Toby and his teacher are confident that he can add the star to his 'I Can' planet. His teacher notes that he has been able to count on in a variety of contexts using concrete materials and she plans to develop this in problem-solving situations tomorrow. She then moves on to a second Current Learning Activity focusing on place value, which is not described here.

During the Current Learning Activities, teachers illustrate mathematical concepts for children through a variety of situations. They give them an opportunity to develop their mathematical thinking through making connections, relating their mathematics to real life scenarios, engaging in mathematical talk, reasoning, and solving problems in a range of different contexts.

Ending on a Positive Note

Numbers Count teachers encourage children to reflect on and assess their own learning throughout each lesson because this helps them to take responsibility for their own learning and to be actively involved in the learning process. Munns and Woodward (2006) found in research that pupils of all ages can learn to assess their learning and that doing so improves their engagement in learning and level of achievement. This is reinforced in the lesson's final episode.

In Ending on a Positive Note, the teacher initiates a dialogue with the child that celebrates the success of the lesson and helps the teacher to identify how the child feels he has progressed and to identify next steps. The dialogue also enables the child to identify what he can remember and understand, to know why his work is good and to think about what he needs to do to improve. This self assessment can and does take place at any time within a Numbers Count lesson: Toby has already decided in the Current Learning Activity that he deserves an 'I Can' star for his counting on. So his teacher decides not to probe any further and to close today's lesson on a note of success.

Teacher Picks up a large sticker on which she has already printed 'Ask me about ...'.
Toby, I think you've done so well today that you deserve this sticker. Can you read it?

Toby Smiles. He knows this sticker because he's had it twice before.
'Ask me about'.

Teacher *What shall I write?*

Toby *Ask me about beating Mrs Kay at doubles!*

Teacher *I was afraid of that! OK.*
Writes out the sticker for Toby, because she knows he is not a confident writer. Holds it up ready to stick on his chest and pauses – she has just seen a chance to highlight and reinforce an important learning strategy.
Do you remember why you beat me, Toby?

Toby *Because I practised with my mum.*

Teacher Puts the sticker on his chest.
Yes, practising with your mum was a really good idea. If you keep doing that I don't think I'll ever beat you. Do you think your mum deserves a sticker, too?

Toby *Yes, coz she helped me.*

Teacher *Go on then, choose one for her.*

Toby Chooses a smaller sticker for his mother that says "Numbers Count winner".

CONCLUSION

A number of themes have surfaced throughout this lesson. You may have noticed how active both Toby and his teacher were, moving around the Numbers Count room between and within learning episodes; a Number Count lesson is very intensive and often both the teacher and the child are tired at the end. Toby's teacher was very keen to develop his skills as a learner of mathematics, so in every episode she asked a question or made a comment to help him to be aware of the strategies he was using that would help him to go on learning well even after he had finished his Numbers Count intervention. She also worked closely with both his class teacher and his teaching assistant to discuss and plan for his progress and needs throughout the intervention.

Toby's Year 2 class teacher, his teaching assistant, and the Year 3 teacher all observed a Numbers Count lesson so that they could find out more about what went on in Numbers Count. His class teacher commented on the combination of fun and intense mathematical engagement that she had seen in a lesson, and decided to introduce some of the games that she had observed into her own class lessons. His teaching assistant said that she had never seen a child talk so much about mathematics and asked the Numbers Count teacher to help her to plan talk-promoting questions that she could ask Toby and other children when she supported them at mathematics. The Year 3 teacher also commented on children's talk: she was particularly impressed by the way that the child she observed was able to reflect on her own learning strategies in Numbers Count and made a note that she must build on this when the Numbers Count graduates come to her class in the following year.

References

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