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| Lesson Study MLD project: Case Report  |
| **Title of case study**  *Using lesson study to support underachieving White British Boys with telling the time and solving time problems.* |
| **Who might find this case report useful?**  *KS1 teachers KS2 teachers Maths teachers* |
| **Key points:** * Underachieving White British Boys.
* Strategies to increase confidence, participation, use of models and images and recording methods.

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| Names and usual roles and contact details of LS group membersHelen Brougham, Deputy Headteacher and Numbers Count Teacher, Belfield Community School hbrougham@belfield.rochdale.sch.ukRachel Lockley, Y4 teacher Belfield Community SchoolClare Welbourne Y3 teacher, Belfield Community School  |
| Section A: Context and overall aims *Belfield Community School is situated in an area of high deprivation, 36% of children are eligible for free school meals. 73% of children speak English as an additional language. The school wants all its pupils to be independent learners, enjoy learning and know what to do in order to improve. Our curriculum is organised so that Maths and Literacy are taught in the mornings, with topic work, Science, French, RE and PE in the afternoons. There are several intervention groups running across the school to accelerate progress in maths, reading, writing and also groups to support children with social, emotional or behavioural difficulties. Pupil progress meetings take place every 6 weeks and intervention groups are adjusted accordingly.* *Our lesson study group consists of Miss Lockley (RL) a Y4 teacher with 4 years teaching experience and who has recently been awarded a Masters in Education. Mrs Clare Welbourne (CW) a Y3 teacher with 12 years teaching experience and an extensive knowledge of special needs having been a SENCO for 3 years. Helen Brougham (HB) is the Deputy Headteacher with 14 years teaching experience and is a Numbers Count teacher.* |
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| **Section B. Aims of the LS, classes and case pupils you worked with** |
| The lesson study was conducted in a Year 4 mixed ability class. Data showed that White British Boys in this cohort were not making as much progress as their peers. This is also apparent throughout the school as a whole. We chose to teach ‘time’ to the whole class as this is a concept that pupils in Year 3 and 4 often find difficult. (To *tell the time to 5 minutes on an analogue and digital clock. To be able to solve problems involving time*).We decided to focus on using and applying Maths through elapsed time word problems. This followed on from the previous Lesson Studies, where we had tried to improve the use of mathematical language and using equipment to solve puzzles and problems.We wanted to improve the way White British Boys learn to tell the time. * We considered the data from the class which highlighted that the White British Boys were not able to tell the time to five minutes on an analogue clock.
* We analysed the school data which shows White British Boys perform lower across the curriculum.

Case PupilsCB (White British) working at a low 2a overall in Numeracy. DB (White British) working at a secure 2b overall in Numeracy.We focused on trying to ensure that both pupils were engaged in the lesson. Both can be easily distracted and need encouragement and reassurance to record and complete work. |
| Section C: Your first research lesson1) (RL – planning, delivery, observations and analysis meeting  |
| * We wanted the students to learn to tell the time to 5 minutes and solve elapsed time problems using a time line (number line).
* The lesson was planned to give the White British Boy’s visual cues to support them with telling the time. It also gave them opportunities to use equipment (clocks) and images (number lines) to solve the time problems. We included whole class teaching, partner work, individual challenges and group work. We designed activities to be fairly short to keep the pupils engaged.
* The lesson was taught by CW. HB and RL were observing the learning of the case pupils.
* The case study pupils both got involved in the lesson, but were more inclined to ‘guess’ at answers rather than give themselves time to work them out. They both used the prompts (clocks/number lines/ counting hoop) to help them to answer. DB was more forth coming in answering closed and open questions. CB often took longer to answer but frequently had the correct solution. During group work CB used the number line to answer time problems. DB was taking a long time to record his answers, worrying about the length of his line etc. DB stayed on track when others in the group were trying to distract him. CB sometimes seemed disengaged but was able to answer and show working when prompted.
* During the pupil interviews DB revealed that he liked using the number line to solve the problems, but preferred to draw it on his whiteboard. He explained that he liked his work to be neat in his book. He said he found counting in the fifteens tricky. CB said he had learnt how to solve time problems he couldn’t remember what equipment he had used. *“ I* *didn’t know the time before and now I do. I know how long it takes for people to do things*.” CB. Both pupils liked it when the time problems were linked to them.

From the post lesson discussion we decided to continue with the elapsed time in the next lesson to challenge DB and CB with quarter past/quarter to problems. We also planned to have the fifteen intervals marked on the counting hoop initially in the M/O starter (from DB’s interview). The decision was made to write personalised word problems *e.g. ‘D walked to school with his sister. They set off at 8. 0’ clock and arrived at quarter to 9. How long did it take them to walk to school?’* We planned to model drawing a number line and not worrying about how neat or long it was both in whole class and group session. It was also decided to make sure DB had some reassurance through the lesson and had strategies to remember key parts of the question (struggles with short term memory/retention). |
| Section D: Your second research lesson (RL2) – planning, delivery, observations and analysis meeting  |
| * We wanted the pupils to learn how to solve time problems using a number line. We concentrated on counting on time again in this session.
* We tried out the approach of modelling how to record jottings/working out on a number line to support case pupil. We included personalised time problems to engage learners.
* CW taught whilst HB and RL observed case pupils.
* In the post lesson discussion we discovered that DB was able to count in fifteens, even when labels were removed. CB lacked confidence in answering questions. Loses focus and has to be brought back with a question from the teacher. It was observed that CB does not seem to be listening but is capable of answering the questions and does so when asked or at the last minute. DB was guessing again (possibly because he has forgotten the question). CB was keen to start challenge (especially as questions were about him). DB struggled with counting on even when using the number line and clock. However, he did draw number lines quickly in his book after demonstration by teacher. Teacher revised planned plenary and modelled counting on an hour from different points on the clock.
* In the pupil interviews DB said he enjoyed working out the answers. He did it using the small clock and the large clock. DB used the clock on the board that had time intervals written on it. He said that it would be better if he could work with a partner. CB commented that he liked the time problems that were about him. He used the number line to help him but could do some of them in his head.
* In planning for the next lesson the decision was made to move CB to a higher group as he needed more of a challenge. We decided that CB would be in a group with the teacher working on a mixture of counting on and counting back in time problems. DB would work with a partner in an independent group solving a mix of hour/half hour and quarter hour problems. The equipment would remain the same as both pupils had used it to support them with their learning. Change to mental/oral starter to reinforce concept of time within the hour e.g. starting 0 at a different point/counting on 30 etc.
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| Section E: Your third research lesson (RL3) – planning, delivery, observations and analysis meeting  |
| * In the final lesson we wanted DB to work independently using the strategies from the previous lesson. We wanted CB to move on to more complex time problems including counting back in time intervals.
* CW taught whilst HB and RL observed.
* Continued with quick activities; counting from different point on the clock ‘hoop’ ;matching intervals to clock extended by partner removing one and other having to guess and say how they knew; making to times on an analogue clock. DB’s group started independent task while teacher modelled counting back in time on a number line to rest of class. (C arrives at school at quarter past nine. It takes him 20 minutes to walk from home. What time did he set off?) CB worked with a partner to highlight time problems they thought would be counting back; initially got some wrong-CB has a tendency to rush (lack of self esteem). Solved them using a number line after input and demonstration from teacher. Got answer correct but checked that his partner had the same for reassurance. DB needed support from teacher to count in fifteen minute intervals using number line. Still unsure about 15- on the clock being 15 minutes etc.
* During the post lesson discussion we came up with an idea for another resource to reinforce the idea of time. To use a circle with moveable quarters and halves which could be moved to show time elapsed. We also decided that we should have included link to whole turn/half turn/quarter turn and made this practical.
* During the pupil interviews DB explained that he had used the clock and the number line to help him. “ ..*the clock was the most helpful because all you had to do was see how many times the clock went round.*” DB was pleased that he had achieved more in his recordings. He did not think the time problems were tricky. HB asked DB questions to assess which strategies he had remembered. He could recall how to solve the problems on the time line.
* CB liked being in another group and felt that he could solve the time problems. He explained that he liked working with another pupil. CB also explained that he had solved the problems using digital time as he found this easier to record.

**What was learnt from Cycle 3*** Models and images support pupils’ thinking; interval clock on the board, hoop linked to clock.
* Modelling using equipment (number line) not always really precise/neat.
* Encourage jottings-not a sign of failure.
* Equipment available for pupils to use to support own learning.
* Shorter challenges/ same concept taught in a variety of ways; hoop clock, matching time intervals, time line.

Pupils listening even though they are fiddling/looking away. Link to ‘quiet girls’ lesson study-confidence to talk about Maths. |
| Section F Impact on pupil learning and progress  |
| **During the course of the three lessons the teaching emphasised practical ways of telling the time; using clock matching game/making times on an analogue clock/repetition and opportunities to practice. Having an image on the board gave learners reassurance and allowed them to take responsibility for their own learning. Writing personalised time problems was an interesting way of getting pupils, who can be easily distracted, engaged in the learning and encouraged them to start straight away. It also made the Maths learning relevant in their lives.** **For the White British Boys it was clear that they were better able to learn with shorter/quick fire tasks that they could complete and then move on to the next challenge. Initial success was needed (e.g. a familiar activity they could succeed at-matching time intervals on a clock) to give them the confidence to approach more complex problems. Important to set clear challenges. I want you to complete ... in 10 minutes. Permission to record workings/untidy jottings to aid memory and path to solution. Not a weakness to have to make jottings.** |
| Section G Impact on practice and future teaching. |
| * All children to have a ruled off space in their daily maths work for informal jottings (not marked) and encourage them to record workings e.g. number lines.
* Opportunities for all children to explain their work using models and images to support them.
* Maths equipment out for every lesson.
* High expectations on correct use of vocabulary- staff to be excellent models.

Pace within lessons and range of activities that keep pupils engaged. (Planning). |
| Section H: Impact on departmental and school approaches to teaching, learning, supporting pupils with learning difficulties, and CPD.  |
| * *School calculation policy / end of year expectations to be updated to include children demonstrating understanding using equipment/models/ images*
* *Staff CPD feedback on lesson study*
* *Ensuring that it is made clear to pupils why we learn concepts such as telling the time-making it relevant to real life.*

*Encourage White British Boys to use correct maths vocabulary/language frames to support concepts.* |
| Section I: Personal reflections  |
| *It was a brilliant experience to be able to observe one pupil so closely. It gave me a deeper insight into how different children learn. Made me think about different ways of approaching teaching and definitely reinforced the idea of practical lessons whenever possible.* *I really enjoyed planning the lessons. As we taught in blocks of three it was useful to review the lesson and look at ways to change it the next day.* *I am looking forward to feeding back this experience to all the staff and putting forward the findings to move teaching and learning on in our school.* |