**xxxx Lesson Study: Research Lesson Planning**

|  |  |  |  |
| --- | --- | --- | --- |
| Date: | 12th November | Year group: | 3 |
| School: | Henry Fawcett Primary School | | |
| People present: | Alice Mansell, Lloyd Cozens, Rebecca Akintola | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Impact focus (from Impact Framework): | *The difference I want to make….children at age related expectation (ARE) use and apply an empty number line (ENL) strategy for addition and subtraction to solve word problems.* | Initials of focus children (from Impact Framework): | Al  SH  SI |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date of research lesson: | 19th November | Permission to video lesson: | Yes: | No:  × |
| Research lesson title: | Empty Number Line | Place of lesson in the sequence: | 1 | |
| Story of the lesson (eg the unit it is taught within and its place within that unit) | This is the first lesson the children have had for a considerable while on addition strategies. | | | |

|  |  |
| --- | --- |
| Phases within the lesson, purpose, and neriage: | **Research Questions:**  How do children learn from their own experience?  How do children learn from discussing with others?  How does collaborative learning impact on children’s learning?  What aids children to explain their mathematical reasoning?  What are the barrier to them explaining their reasoning?  **Lesson objectives**  I am learning to use an empty number line to explain my addition.  I am learning to make decisions based on my knowledge of number.  I am learning to reflect on my decisions and to make improvements.  I am learning to explain my reasoning.  **Phase A, Timing: 10 minutes**  Chn at tables, introduce an empty number line that illustrates jumping from one number to a multiple of ten. Give chn few minutes to look and think.  In 2/3s, chn to have different problems. Teacher observe. E.g. 56 to 60 on number line.  CT to ask “what does this show? Discuss” Chn to feedback. “Could you write a number sentence for that picture?” Feedback and discuss. Encourage discussion, chn to explain to others on tables what they have done and why.  What maths words did you use in your talk today?  Children discuss and feedback as a class.  Display pre prepared slide on whiteboard of maths vocabulary.  Did children come up with same words?  Explain to children that we are looking for lots of maths talk today using these words.  Chn to be given a different number line problem. E.g. 25 + 5 = ? Discuss. ‘’How do you know?”  **Phase B, Timing: 10 minutes**  Paired pair discussion of phase A  **Phase C, Timing: 10 minutes**  Children have 2/3 addition number sentences and different annotated ENL without numbers. Can children match the number sentence to the correct ENL and justify?  **Phase D, Timing: 10 minutes**  Children discuss with another pair on their table how they came to their conclusions.  **Phase E , Timing: 5 minutes**  Children discussed what helped them with their learning today. What did they find out? Children record the learning points on large sheet of paper. Prior knowledge, strategy they have used or something they have learnt.  **Phase E**  **Timing: x minutes** |
| Materials: | Worksheets for Phases A and C  Large sheets of paper and post-its for reflective plenary  Smart board notes  Display of maths words children will be using |

|  |  |  |
| --- | --- | --- |
| **Planned teacher – student interaction** | | |
| Key questions that the teacher will pose | Anticipated student responses | Teacher responses to student responses |
| **Phase A**  What do you think is missing in the ENL?  What maths words did you use in your maths talk? | Discussion in pairs.  I don’t understand.  The words we used are… | Can partner explain and give their own views?  Have you seen one of these before? |
| **End of Phase A and Phase B**  What have you noticed? | That is 4 more than that.  I know 16 + 4 is 20  I know 6 +4 is 10  I know we are counting on/jumping up  I counted from 16 to 20  My partner told me | How do you know what the missing number is?  How did you work it out?  Do you know how they worked it out? Did they explain how to you? |
| **Phase C (matching activity)**  How are you using the resources?  What do you notice about the ENL?  How are they different from the other one?  How do you know which one matches which?  What maths learning are you using today? | I’m getting confused!  I notice this one has a big jump and a small jump  I think this one matches this one because this has ….  Both of these could match this one because …  None of them match | Which part is confusing?  What does that mean?  Can you tell me more?  Which maths words would help you to explain?  Could one number sentence match more than one of the ENL?  Is there more than one way of working out the answer?  Are you sure?  How do you know? |
| **Phase D Paired pair discussion**  Can anyone give this group advice on how to …  Can you explain using the maths words from today? | I think they are almost there but…  I think they have gone wrong here because…  They need to … | Why? Can you explain? |
| **Phase E**  **What helped you with your learning today?**  **What maths words did you use?**  **What maths skills/learning did you use?**  **How could you explain your learning today to another person?** | **I used my head.**  **I used the number line**  **I used counting on/down, add, partition,……..**  **I used number bonds to 10,**  **I used partitioning into tens and units……..**  **I can write number sentences.**  **I can explain how the number lines make finding the answer to addition and subtraction easy now** | **How did the number line helped you?**  **What else? Is there any other skills/learning that you think you have used?** |

|  |  |
| --- | --- |
| **Key discussion points (question stems for guidance only)** | **Decisions made / how points were resolved** |
| What do the observers need to know about the class? | Seating arrangement  Statemented/SEN/EAL children  Lloyd to help identify focus children |
| How are we going to ensure that the lesson is about ENL? | Planning session focussed on ENL |
| How do we provide opportunities for pupils to use maths talk? | Vocabulary displayed and discussed  Vocab and questioning on planning |
| How do we ensure all pupils engage with the learning? | Carefully chosen peer learner pairs  Prompt questions  Colourful resources  Scaffolds eg. 100 squares, cubes, number lines  Extra resources |
| How to ensure children have enough time to complete task? | Built in time for discussion in planning  Teacher flexible with timings  Questioning planned for and responses considered |
| How to support children who struggle with SL? | TA support  Mixed ability peer supporters  Resources |
| How to support children who are more able ? | Extension questions eg can you make up a number sentence for this annotated ENL  ‘Teaching’ lower ability children. |

|  |
| --- |
| **Focus for observers (should relate closely to Research Question)** |
| How able and willing are children to share their expectation?  How do the different forms of sharing affect their learning?  How able are they to capture their learning?  What are the barriers children’s learning? |

|  |
| --- |
| **Observer notes (to be completed during the lesson observation)** |
| **Focus children (initials only):**  **AL-**  Not interested in the problem initially, until teacher scaffolding with questioning.  Child found it hard to count and retain her calculations she had made on the 100 square.  **SH-**  Not interested initially, still quite reluctant even with teacher scaffolding with questioning.  Shiloh’s outlook in the lesson made sharing difficult. Not very receptive to sharing.  **SI**  Form the start engaged and wanted to share ideas with his partner.  SI was able to use 100 grid to help him explain his learning. Most vocal of all focus children, wanting and able to discuss his learning.  **All children:**  Different forms of sharing all focus children found it difficult and didn’t see the value of this.  Gaps in all children’s learning are barriers to their learning: counting in ones, counting in tens, number bonds to 10, retaining information. |

|  |
| --- |
| **Discussion notes (to be completed during the post-lesson discussion)** |
| We are going to adapt the lesson and teach it again. To make improvements to the next lesson:  Phase A:  32  +2  ?  25  ?  Children have a number bonds to 10 sheet with gaps, children fill in gaps independently and then use this as a reference/scaffold throughout the session.  Phase B  show the children this number line and number sentence:  25+7=  Children at tables and look at this on the board, have an A3 copy in tables too. No 100 squares on tables.  (Children had a lot of choice in the first lesson, many different number lines, this time only one) this time in pairs, mixed ability pairs. Re think parings, especially for SH.  Children have a go at completing this in pairs.  When feeding back to the class, children have to say their partners idea, encouraging listening.  Do we really need a 100 square to help us? (avoid over-reliance on the 100 square)  How does the number bonds to 10 help you in completing the calculation on the number line?  Share together as a class this calculation, discuss as a class. Children feedback what they have done. Those who haven’t got it can then see where they have got in wrong.  Teacher to identify who did it correctly and ask this pair to model.  19+ ?=25  How do they think this number line can help them to solve this? Children use the number sentence and jottings to work out what goes where the question mark is. How can you use your number bonds to 10 to help you?  ?  ?  ?  25  20 |
| Children have a go at solving this question then they share what they have done with another pair.  Phase D 10 minutes  Take the 3 focus children as a group. Children match annotated empty number lines that have the answer and some of the jumps filled in to number given sentences. Children justify their choices using maths words. eg.  17+5 or 9+6  2  3  22  Remainder of the children match number sentences to annotated number lines in mixed ability partners.  Number sentences are on cards eg.  46+8  46+14  35+7  These children have number lines with no numbers on them but they do have the jumps and the answer.  +3  +5  54  Or:  20  30  34  **Phase E**  Children discussed what helped them with their learning today. What did they find out? Children record the learning points on large sheet of paper. Prior knowledge, strategy they have used or something they have learnt. |

|  |
| --- |
| **Focus for observers (should relate closely to Research Question)** |
| How able and willing are children to share their expectation?  How do the different forms of sharing affect their learning?  How able are they to capture their learning?  What are the barriers children’s learning? |

|  |
| --- |
| **Observer notes (to be completed during the lesson observation)** |
| **After 2nd lesson 3rd December 2014:**  **Focus children (initials only):**  **AL- seemed** to agree with her mixed ability partner. She wanted to contribute in focus group, receptive to questioning, wanted to explain her learning.  Only focus child to refer back to the number bonds scaffold from the input.  She was able to draw on her prior learning and use it to help explain to the others in focus group.  Able to use maths vocab in her explanation.  She hasn’t got a rich mathematical language to explain her learning. She is beginning to show this but this is an area she needs to work on.  **SH-** disinterested when he was with a stronger child. Wanted to do something else, not the learning. Distracting himself.  In the focus group, he felt in his comfort zone, willing straight away.  Developing use of mathematical language. Able to explain some of his choices using maths words. Questioning really helped him, needed the prompting.  Difficult for him to capture his learning, happy to talk about his learning but then not interested in recording or writing down what he has done.  **SI-** He wanted to share with his mixed ability partner but did struggle and struggled also in the focus group.  Mathematical language is a barrier, found it difficult to explain his thinking.  Understanding of place value is also a barrier for him.  **All children:**  The whole class needs catch up work in terms of place value. All need to be using known number facts rather than counting on fingers or 100 squares.  Children need to be trained more in this style of learning, sharing and teaching each other. Sharing their learning with rest of the class. Definite progress, many children were more able to share. Need more opportunities to do this, plan it in, so they have more experience of this.  Many of the children need to same level of questioning and scaffold that the focus children had. |