Assessment for Learning in Maths

Action Research for Inclusion and Special Educational Needs and Disability (ISEND): Case Study

Assessment for Learning in Maths

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This Action Research case study was completed as part of the Department for Education (DfE, UK) nasen Universal SEND programme.

Abstract

Context: This action research case study was conducted in a mainstream secondary school to address the persistent attainment gap in mathematics for pupils with special educational needs and/or those significantly behind age-related expectations. The study focused on identifying and closing gaps in cumulative learning through targeted, scaffolded interventions

Aims: The research aimed to evaluate the effectiveness of a Maths Intervention and Supervision Programme that uses detailed baseline attainment data to inform teaching. It explored how concrete, pictorial and abstract methods could support mathematical understanding and confidence, and how best to communicate the intervention model to other educators

Methods: Two action research cycles were completed. Data collection included pupil progress tracking, Teaching Assistant journals, pupil voice activities, and confidence scales (including the Blob Tree). Interventions were delivered in small groups using structured resources. In Cycle 2, research conversations informed the development of a resource booklet to support wider implementation. Ethical consent was obtained for anonymous publication.

Findings: Year 7 pupils gained an average of +0.495 years in the 'Number' strand over 14 weeks, and Year 8 and Year 9 pupils gained +0.388 and +0.275 years respectively in Number over 7-8 weeks. Confidence increased by an average of +2.14 points for all your groups. Case studies showed improved engagement, reduced maths anxiety and greater classroom participation. The intervention booklet clarified the rationale, assessment, delivery and impact monitoring for the intervention.

Implications: The study highlights the importance of dynamic assessment, personalised learning roadmaps and concrete resources. It recommends early identification, small group support and staff training. The intervention model offers a replicable framework for inclusive maths practice in secondary education.

Keywords

Inclusion, special educational needs and disabilities; assessment; mathematics intervention; confidence; Learning Support Assistant (LSA)

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Action Research for Inclusion and Special Educational Needs and Disability (ISEND): Case Study

Assessment for Learning in Maths

Establishing a clear baseline of a pupil's mathematical understanding and addressing gaps through concrete, pictorial, and abstract teaching methods can help reverse a persistent and widening attainment gap, while also boosting pupil confidence in maths (Mainstream, Secondary).

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Appendix 3 – *Maths Intervention and Supervision Programme Booklet* is appended as a separate document.

BACKGROUND INFORMATION

Type of setting	Mainstream Secondary School
Age range of pupils	Age 11 – 14
Roles of the Research Team	Secondary Special Educational Needs (SEN) Consultant Secondary Maths Consultant Intervention Leaders (x2)

ACTION RESEARCH CYCLES

See Appendix 1 for the Action Research Cycles

Ethical consent has been sought to publish this data anonymously.

SUMMARY

Research focus	Maths, GCSE, attainment, confidence, self-esteem
Research question	What maths intervention practices should be put in place at secondary to ensure that all pupils have the best chance of achieving maths GCSE Grade 4 or above? What additional effect did these practices have? (e.g. on pupils' welfare, behaviour, attitude to learning and confidence)
Overview/Key information	**Maths Intervention Case Study**

	The maths intervention featured in this case study is founded on the principle that when pupils enter secondary school with substantial gaps in their mathematical knowledge, catching up becomes highly challenging unless those gaps are systematically identified and explicitly addressed through targeted support. **Research Methodology** - Two action research cycles involving planning, implementation, and review - Data collected via pupil progress tracking, Teaching Assistant journals, pupil discussions, and confidence scales (including use of the Blob Tree) - Interventions delivered in small groups using resources from the Maths Intervention and Supervision Programme; see Appendix 3. **Key Findings** - **Quantitative Gains**: Pupils made modest but meaningful progress in the 'Number' strand, with Year 7 pupils gaining an average of +0.495 years over 14 weeks period - **Confidence Gains**: Almost all pupils showed increased confidence, with an average uplift of +2.14 (excluding one outlier) - **Case Studies**: Detailed profiles of three pupils (Pupils C, N, and A) illustrate academic progress and increased maths confidence, including improved engagement and classroom participation **Effective Practices Identified** - Use of concrete and pictorial resources to support understanding - Dynamic assessment to identify gaps in children's mathematical understanding - Personalised learning roadmaps - Small group interventions to foster safety and confidence - Ongoing support and training for Teaching Assistants to deliver the maths intervention **Cycle 2 Development** - Collaborative discussions led to the creation of a **Maths Intervention and Supervision Programme booklet** - The booklet outlines rationale, assessment methods, intervention strategies, TA support, and impact monitoring **Next Steps** - Continue tracking pupils through to GCSE - Review transition from KS2 to KS3 - Share the intervention booklet with other schools - Explore potential for earlier intervention at primary level
Evidence-informed practice	Establishing a clear baseline of a pupil's mathematical understanding and addressing gaps through concrete, pictorial, and abstract teaching methods can help reverse a persistent and widening attainment gap, while also boosting pupil confidence in maths.

RESEARCH TIMELINE

November	December	January	February	March
Action Research Cycle 1 Step 1: Establish the research focus	**Action Research Cycle 1** Step 2: Study Steps 3-5: Plan 1	Step 6: Do 1 Steps 7-8: Review 1 **Action Research Cycle 2** Step 9: Study 2 Steps 10-12: Plan 2 Step 13: Do 2 Step 14-15: Review 2		Share and disseminate the research (anonymised) with other interested parties.

ACTION RESEARCH CYCLE 1

RESEARCH FOCUS: Step 1

Initial research interest, aim/question (Step 1)	What maths intervention practices should be put in place at secondary to ensure all pupils have the best chance of achieving maths GCSE Grade 4 or above?

KEY LITERATURE SHAPING THE RESEARCH (STUDY 1): Step 2

Reference	Bates, L. (2025, April 16). *Exploring the maths attainment gap in the UK: Where do we stand and what needs to be done?* Third Space Learning. https://thirdspacelearning.com/blog/a-space-for-maths-uk-maths-attainment-gap/ Henderson, P., Hogden, J., Foster, C. and Kuchemann, D. (2017) *Improving mathematics in Key Stages Two and Three: guidance report*. Education Endowment Foundation. https://d2tic4wvo1iusb.cloudfront.net/production/eef-guidance-reports/maths-ks-2-3/EEF-Improving-Mathematics-in-Key-Stages-2-and-3-2022-Update.pdf?v=1749289491 Menzies, L., Ramaiah, B., and Boulton, C. (2021), *A Space for Maths: Exploring the need for maths tutoring and the potential role of Third Space Learning.* Centre for Education & Youth Third Space Learning. https://thirdspacelearning.com/blog/a-space-for-maths-uk-maths-attainment-gap/ Neesam, C. (2025). *Are concrete manipulatives effective in improving the mathematics skills of children with mathematics difficulties?* [Practice Review Report, University College London]. https://www.ucl.ac.uk/educational-psychology/resources/CS1Neesam15-18.pdf Norledge, C. (2025, April 25). *GCSE intervention strategies: Making the most of your extra lessons*. Third Space Learning. https://thirdspacelearning.com/blog/gcse-intervention-

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Key point(s) of note	**Bates (2025)** Bates summarises findings from the 'A Space for Maths' report, highlighting the urgent need for targeted maths tutoring in UK primary schools to address widening attainment gaps, particularly among disadvantaged pupils. **Henderson et al. (2017)** The EEF guidance report offers evidence-based recommendations for improving mathematics teaching in Key Stages 2 and 3, emphasising conceptual understanding, structured practice, and the strategic use of manipulatives. **Menzies, Ramaiah & Boulton (2021)** This report explores the role of Third Space Learning in addressing the UK's maths attainment gap, advocating for scalable tutoring models to support disadvantaged learners. **Neesam (2025)** Neesam's practice review investigates the effectiveness of concrete manipulatives for children with maths difficulties, concluding that their impact depends heavily on how well they are integrated into teaching strategies. **Norledge (2025)** Norledge outlines effective GCSE intervention strategies post-pandemic, recommending one-to-one tuition as the most impactful method for supporting disadvantaged students and closing the maths attainment gap.

	Sharma (2022) Sharma provides a comprehensive overview of dyscalculia, distinguishing it from other maths learning difficulties and advocating for targeted, concept-based interventions to support numeracy development. **Sillem et al. (2021)** This action research report finds that using physical manipulatives like algebra tiles and geoboards can significantly boost engagement among post-16 GCSE maths learners, especially when teachers are confident and skilled in their use. **University of Kansas (n.d.)** The Dynamic Mathematics Assessment framework combines concrete, representational, and abstract (CRA) assessment, error pattern analysis, and flexible interviews to give teachers a detailed understanding of students' mathematical thinking and guide targeted instruction. **Key points of note** - The importance of cumulative steps in maths learning and the negative effects of missing pieces of learning. - The valuable and necessary use of manipulative and pictorial representations to complete the stages of pupils' understanding. - The negative effect of maths underachievement on a pupil's self-esteem and anxiety. - The value of starting pupils' maths intervention learning from a place of current understanding to develop the cumulative links to previous understanding. - The importance of continued dynamic assessment to continually reflect and amend future plans for each pupil.

PLAN 1: Step 3

As part of the process of planning Action Research Cycle 1 and having completed the 'study' phase, the research question can evolve and become further refined.

Revised research question	Which maths interventions should be implemented to ensure gaps in cumulative learning are identified and closed, and all pupils have the best chance of achieving a maths GCSE Grade 4 or above?

PLAN 1 and DO 1: Steps 4 and 6

Methods of data collection

- Pupil progress tracking data
- Teaching Assistants' research journal (notebook)
- Discussion with pupils - evaluation and reflection, using scale of confidence guide, including the 'Blob Tree' (see
- *Appendix 2 – Blob* **Tree**) to prompt for feelings and a poster of questions on the classroom door (e.g. 'What was tricky?').

Description of research sample, timing and location

Participants
The pupils engaged in research were identified as requiring Maths intervention, having found it difficult to access Key Stage 3 maths learning.

Some of the pupils were on the school's special educational needs and disabilities (SEND) register, whilst others had not reached age-related expectations at the end of Key Stage 2 (age 11).

Twelve pupils were tracked for their confidence levels at the start and end of intervention lessons. Records were noted on a scale of 0-10, with 10 being the most confident and 0 being the least confident.

Assessment
Prior to the intervention, all pupils completed a formal assessment led by the Secondary Maths Consultant. This assessment identified gaps in their mathematical understanding.

Intervention
Teaching Assistants then used a ready-made programme of resources from the Maths Intervention and Supervision (Appendix 3) as a basis for intervention, timetabled lessons, guided by the School Consultancy Programme consultant and the consultant school SENCO (Special Educational Needs Co-Ordinator).

Two trained Teaching Assistants supported pupils in small group maths intervention work, and noted (observed) the children's work and progress.

Intervention lessons took place in small groups (maximum 4), once or twice each week for one lesson (40 minutes). In some cases, the same Teaching Assistant also supported maths lessons in the classroom.

The children's **progress was tracked** through the intervention work.

PLAN 2: Step 5
Ethical consent was sought from each participant to publish this data anonymously.

REVIEW 1: Step 7-8

Data Analysis: process
Having monitored the pupil maths intervention for 7-14 weeks, the Secondary Maths Consultant, the SEND Consultant and the two Teaching Assistants compiled the tracked academic achievement (quantitative data) and the Teaching Assistant notebook recordings of conversations and confidence levels with pupils (qualitative data).
Summary of Findings
Research Question Which maths interventions should be implemented to ensure gaps in cumulative learning are identified and closed, and all pupils have the best chance of achieving a maths GCSE Grade 4 or above? ***Quantitative Data: Overview*** *NB. The data presented below features all intervention pupils - 34 pupils in total*

The data in Table 1**Error! Reference source not found.** summarises the progress made by pupils in the area of 'Number' during the intervention period. Pupils are grouped by year group, with the average year-group-equivalent level recorded at the start of the intervention and again on 25 March 2025.

The data in Table 1 summarises the progress made by pupils in the area of 'Number' during the intervention period. Pupils are grouped by year group, with their average year group attainment recorded at the start of the intervention and again on 25 March 2025.

At this stage in the research, 'Number' is the only mathematical concept that has been addressed through the intervention.

Table 1 Data Summary for Maths 'Number'

	Period of intervention	'Number' area - average year group at start of intervention	'Number' area - average year group, March 25	Average increase in the year group
Year 7 (21 pupils)	14 weeks	3.229	3.724	+0.495 years
Year 8 (9 pupils)	7-8 weeks	3.156	3.544	+0.388 years
Year 9 (4 pupils)	7-8 weeks	2.625	2.900	+0.275 years

Pupils in Year 7, who received 14 weeks of intervention, demonstrated an average gain of 0.495 years in their mathematical understanding within the 'Number' strand. This equates to approximately 4.5 months of progress over three months.

Pupils in Year 8, who received 7–8 weeks of intervention, demonstrated an average gain of 0.388 years in their mathematical understanding within the 'Number' strand. This equates to approximately 4 months of progress over a two-month period.

Pupils in Year 9, who received 7–8 weeks of intervention, demonstrated an average gain of 0.275 years in their mathematical understanding within the 'Number' strand. This equates to approximately 3 months of progress over a two-month period.

Pupil Confidence Tracking Data: Overview

Table 2 presents self-reported confidence scores from twelve pupils before and after the 'Number' work intervention. Scores were collected on a scale from 0 to 10, with the difference indicating whether confidence increased or decreased during the session.

Table 2 Pupil Confidence Tracking Data

Pupil	**Average Confidence Score (out of 10)**		**Difference**
	Start of lesson	**End of lesson**	+ Confidence increased - Confidence decreased
C	3	7.8	4.8
E	4.5	7.5	3
N	3	6	3
A	2.3	4.7	2.4
T	3.3	5.5	2.2
G	5	7	2
M	6	8	2
O	4.5	5.6	1.1
K	1.3	2.3	1
S	5.5	6.5	1

H	4	5	1
L	5	0	-5

Overall, the data reflects a positive trend, with the majority of pupils reporting increased confidence by the end of the intervention. One score (Pupil L) was notably lower due to an emotionally challenging day and represents only a single lesson, making it an outlier in the dataset.

When excluding this anomalous result (Pupil L), the average increase in confidence across the remaining pupils was **+2.14**, indicating a meaningful uplift in self-assurance following the intervention.

In the following sections, a more detailed presentation of three children is presented:

Pupil C (Year 7) showed the most significant increase in confidence, rising from 3.0 at the start of the lesson to 7.8 by the end—a gain of +4.8.

Pupil N's (Year 9) confidence increased from 3.0 to 6.0, a gain of +3.0.

Pupil A (Year 8) began the intervention classes with a low confidence score of 2.3, which increased to 4.7 by the end—an improvement of +2.4.

The Maths content has been organised into two categories:

- **Number**: This includes place value, rounding, negative numbers, addition, subtraction, multiplication, division, fractions, decimals, percentages, and ratio.
- **All Maths Areas**: This broader category includes all the number topics listed above, as well as shape, time, measure, angles, data handling, algebra, movement, and position.

Case Study - Pupil C, Year 7

Baseline Assessment 13.11.25			**After 14 weeks of intervention**			**Improvement made in 14 weeks of intervention**	
Initial **'Number'** average year group	Initial **'All Maths Areas'** average year group		**'Number'** average year group	**'All Maths Areas'** average year group		**'Number'** areas – in year groups	**'All Maths Areas'** in year groups
2.3 (age 6-7)	1.6 (age 5-6)		2.4 (age 6-7)	1.7 (age 5-6)		+0.1 years	+0.1 years
Difference from current year group (Year 7)	**Difference from current year group (Year 7)**		**Difference from current year group (Year 7)**	**Difference from current year group (Year 7)**			
-4.7 years	-5.4 years		-4.6 years	-5.3 years			

Baseline Assessment Findings
C has significant gaps in primary maths learning. She has some understanding in some areas, but nothing is linked or understood sufficiently to support the next stages of KS3 learning.

Main areas of ability

- Place value for ordering and writing numbers to 2-digits
- Could add/subtract up to 3-digit numbers mentally with no regrouping or exchange
- Some x table facts

Main areas of need

- All x tables and division facts

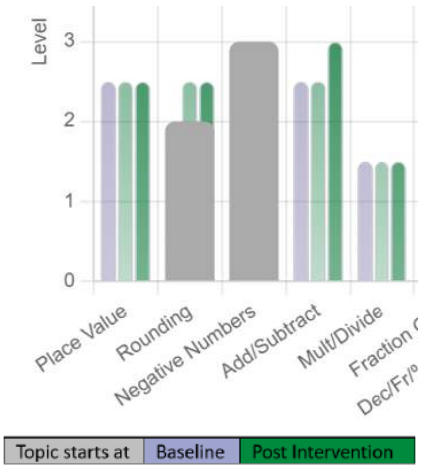
- Rounding numbers
- Written methods for adding and subtracting
- Methods for short and long multiplication and division
- Negative number ordering and calculations
- Fractions, decimals and percentage knowledge for Year 2 and above
- All shapes, angles, data handling, measurement, time, and money from Year 2 upwards

Overview of Progress
C made modest gains in maths over 14 weeks, with average progress of +0.1 years in both 'Number' and the wider maths areas.

A gain of 0.1 years in understanding over 0.27 years of time (14 weeks) shows that C was progressing at a rate **slightly faster than expected**, given the time available.

Quantitative Achievements
Pupil C now achieved Level 3 with her **Addition and Subtraction** (having previously been working just above Level 2); she can now:
- use different methods to understand how to add and subtract numbers up to 3 digits.
- use inverse operations and estimating to check and estimate answers.

Pupil C has almost achieved Level 3 for **Place Value** (having previously been working just above Level 2). Pupil C needs just a bit more practice with rounding methods, but the rest of the content is secure.



Level 3: **Place Value**
- Can read, write, compare and recognise numbers up to 3 digits.
- Can represent 3-digit numbers in different ways.
- Understands the value of each digit and use this for rounding and adding/subtracting round numbers (e.g. 100 more).

Qualitative data findings

February Progress Meeting	March Progress Meeting
Struggled to apply herself at the start of the intervention Said the work was 'babyish' and didn't want to show workings pictorially because of this. This often led to incorrect answers, and then she would avoid doing the work so as not to get the answers wrong. Low confidence Fixed mindset that she could not achieve.	Much more confident in intervention (moved from an average 3.0/10 at the start of the lesson to 7.8/10 by the end of the lesson. Likes the feeling of 'being able' and moving on Gained in confidence (reported to have 'skyrocketed' recently by staff – although she has taken a while to become motivated to learn) Will often now complete two worksheets in one lesson and sometimes asks to stay to complete a 3-star worksheet as she wants the challenge. Enjoys the feeling of success Secure methods seen In maths class, she recently achieved a higher mark than expected and will now do more work in class.

Pupil C Quotations - 'I finally get this!'

Case Study - Pupil N, Year 9

Baseline Assessment 22.1.25			**After 7 weeks of intervention**			**Improvement made in 7 weeks of intervention**	
Initial **'Number'** average year group	Initial **'All Maths Areas'** average year group		**'Number'** average year group	**'All Maths Areas'** average year group		**'Number'** areas – in year groups	**'All Maths Areas'** in year groups
3.4 (age 7-8)	2.6 (age 6-7)		3.6 (age 7-8)	2.7 (age 6-7)		+0.2years	+0.1 years
Difference from current year group (Year 9)	**Difference from current year group (Year 9)**		**Difference from current year group (Year 9)**	**Difference from current year group (Year 9)**			
-5.6 years	-6.4 years		-5.4 years	-6.3 years			

Baseline Assessment Findings

N has significant gaps in primary maths learning. He has some pockets of knowledge and some areas where 'learnt' methods are visible, but this is not backed up by the answers seen in other areas, showing the depth of understanding, and the links are not secure.

Main areas of ability

- Place value for ordering and writing numbers to 5-digits
- Adding and subtracting using column methods
- Names and properties of shapes

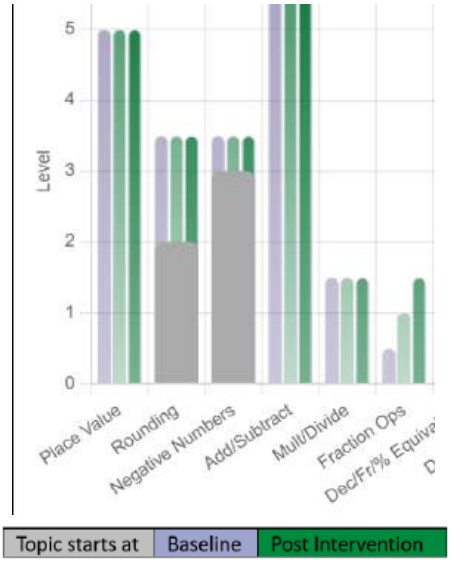
Main areas of need

- Methods for short and long multiplication and division
- Rounding
- Negative number calculations and understanding
- Fractions, decimal and percentage knowledge from KS1
- All angles, data handling, measurement, time, and money from year 2/3 upwards.

Overview of Progress

N made modest gains in maths over 7 weeks, with average progress of +0.2 years in 'Number' and +0.1 years across all maths areas.

A gain of 0.2 years in understanding over 0.13 years of time (7 weeks) shows that N was progressing at a rate notably faster than expected, given the time available.



Quantitative Achievements

Pupil N now achieved Level 1+ in **Fractions** (having previously been working below Level 1); he now:

- Understands fractions of shapes and numbers.
- Understands how to write fractions.
- Can half and double numbers.

Qualitative Data Findings

February Progress Meeting at the start of the intervention	March 25 Progress Meeting
Anxious and avoidant of maths work. Needs to be collected for the maths intervention.	More confident in intervention (moved from an average 3.0/10 at the start of the lesson to 6.0/10 by the end of the lesson. Responds well to using manipulatives and hands-on learning (which is helping with fractions). Enjoys cutting up fractions and the practical way of learning. Will try and fall back on his 'learnt' methods seen in his assessment, but as he does not fully understand 'why', he will often make errors. Concrete and pictorial methods are helping, but it will take N a while to take his learning back a step to move forward.

Pupil Quotes: 'This is so easy (using manipulatives); 'This is really fun' (cutting up fractions).

Case Study - Pupil A, Year 8

Baseline Assessment 07.01.2025			**After 9 weeks of intervention**			**Improvement made in 9 weeks of intervention**	
Initial **'Number'** average year group	Initial **'All Maths Areas'** average year group		**'Number'** average year group	**'All Maths Areas'** average year group		**'Number'** areas – in year groups	**'All Maths Areas'** in year groups
2.9 (age 6-7)	1.9 (age 5-6)		3.2 (age 7-8)	2.1 (age 6-7)		+0.3 years	+0.2 years
Difference from current year group (Year 8)	Difference from current year group (Year 8)		Difference from current year group (Year 8)	Difference from current year group (Year 8)			
-5.1 years	-6.1 years		-4.8 years	-5.9 years			

Baseline Assessment Findings
Pupil A has significant gaps in primary maths learning

Main areas of ability
- Place value for ordering and writing numbers to 4-digits
- 2 x table
- Adding and subtracting using column methods

Main areas of need
- All x tables outside 2x tables, and division facts
- Rounding
- Methods for short and long multiplication and division
- Negative number calculations

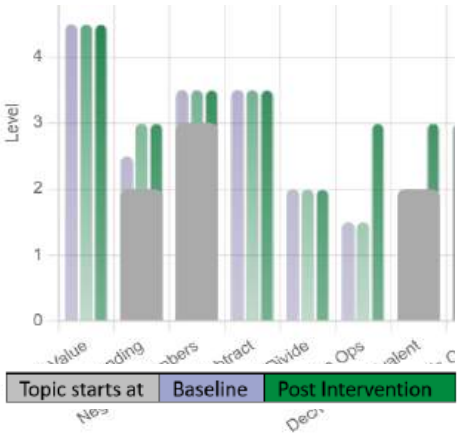
- Fractions, decimal and percentage knowledge at Year 2 and above
- All shapes, angles, data handling, measurement, time, and money from Year 2 upwards

Overview of Progress
Pupil A made modest gains in maths over approximately 7–8 weeks, with average progress of 0.3 years in 'Number' and +0.2 years across all maths areas.

A gain of 0.3 years in understanding over around 0.15 years of time (7–8 weeks) indicates that Pupil A was progressing at a rate noticeably faster than expected, given the time available.

Pupil A has advanced approximately **3.6 months** in *'Number'* and **2.4 months** in *'All Maths Areas'* over the 7–8 week intervention period.

Quantitative Achievements
Pupil A has now:
- Achieved Level 3 in **Rounding** (having previously been working just above Level 2). He now 'understands value of each digit and use this for rounding and adding/subtracting round numbers (e.g. 100 more)'.
- Achieved Level 3 in **Fractions Operations** (having previously been working just above Level 1).
- Achieved Level 3 in **Decimals, Fractions, Percentages and Equivalent** (having previously been working at Level 2 where the topic starts). He now:
  - Understand fractions of shape and number
  - Can find a fraction of a number using a suitable strategy.
  - Can find/understand equivalent fractions.
  - Can compare unit and non-unit fractions (same denominator).
  - Can add and subtract fractions with the same denominator and understand why the same denominator is needed.
  - Can relate fractions in tenths to decimals. Understand what makes 1 whole in fractions and decimals.



Qualitative Data Findings

Progress Meeting 1 at the start of the intervention	**March 25 Progress Meeting**
Very vocal Says she is 'dumb' and 'hates maths' Extremely low confidence Doesn't take pride in her work and will scribble if she finds something too difficult. Will rip up her work and books Is confused in maths lessons and gets frustrated she can't keep up with the speed.	Much more confident in intervention (moved from an average 2.3/10 at the start of the lesson to 4.7/10 by the end of the lesson). Finds she can do the work and is also enjoying helping others Works more in the main maths lessons too. Uses manipulatives to help her in intervention and will now ask for them in the main maths class. Reported more confidence and engagement in some other lessons, too (science).

Doesn't ask questions in class Avoidant of any maths work	Always comes voluntarily to maths intervention, no longer says negative words about her ability and hasn't ripped up her work in class or intervention.	

Pupil A quote: 'I find this room fun!' *and* 'I can't do this work if I don't have the resources' [when asking for resources in class]

Other Pupil Quotes:

K, Year 8: "I love this room, it makes me feel smart."

P, Year 9: "Ah that makes much more sense now!"

F, Year 7: "Oh I get it now! …. Am I getting smart now, Sir? … Yeah!!"

G, Year 7: "Maths is my favourite subject now!"

S, Year 7: "These are going to help me so much" (manipulatives – using in class too)

Summary Observation

Pupils who have found maths difficult throughout primary school, reach secondary school and can't 'fit in' academically, so turn to other ways to avoid uncomfortable feelings of failure (e.g. challenging behaviour, work avoidance, absenteeism).

Anxiety levels can run high in maths lessons, impacting self-esteem and mental wellbeing. Students may be so far behind in all or parts of their understanding that nothing makes sense in Key Stage 3 lessons. In addition, abstract methods of learning are primarily used in secondary schools and assume a certain ability level of understanding, which may be lacking. The student may need to recap on concrete and pictorial methods again before abstract learning can succeed.

Pupils have no way of going back to the point where they stopped understanding, so they become apathetic and negative to protect themselves from feelings of failure. These negative feelings can take time to change. For example, their maths anxiety may be so deep-rooted from many years of challenge in primary school that they may even be frightened to care or succeed for fear this will be taken away again.

Although the gains children have made in maths are modest in relation to the overall catch-up required to reach the level of their peers, it is significant nonetheless. This is because, for the first time in over four years, the trend of falling further behind has reversed, and the gap between them and their peers has begun to narrow.

Next Step(s) for the Pupils

- **Continue** with maths intervention, moving at each pupil's pace and from their current understanding so that they can develop links and confidence.
- Continue intervention in **small groups** to build safety around mistakes and speaking out.
- Use **concrete resources and pictorial representations** to strengthen initial understanding and make links with previous learning, before introducing abstract methods.
- Use **interactive displays** to develop pictorial and concrete prompts.
- Continue to build **positive relationships with students** to build trust and motivation.
- **Take the learning into the classroom** so pupils can try to use resources or make links with Key Stage 3.
- **Monitor** the academic achievement of pupils using the intervention programme and the effect on their wellbeing, attitude, behaviour and attainment.

Next Step(s) for the Research

- To help staff understand the intervention and its implementation, produce a booklet that explains the programme in greater detail.

ACTION RESEARCH CYCLE 2

KEY LITERATURE SHAPING THE RESEARCH (STUDY 2): Step 9

Reference	No further literature was drawn upon at this point.

PLAN 2: Step 10

Revised research question	What maths intervention practices should be put in place at secondary to ensure that all pupils have the best chance of achieving maths GCSE Grade 4 or above, **and how should they be communicated to others**?

PLAN 2 and DO 2: Steps 11 and 13

Methods of data collection

- 3 Research conversations

Description of research sample, timing and location

Throughout the research process, the Secondary Special Educational Needs (SEN) Consultant, Secondary Maths Consultant, two Intervention Leaders, and a Professor from the University of Derby reflected on the efficacy of the intervention. Recognising its detailed and specific nature, these discussions informed the second cycle of the Action Research project and led to a collaborative decision to identify the key elements that should be communicated to others about the intervention. This resulted in the development of a resource booklet designed to explain the intervention clearly.

Each research conversation lasted an hour and was conducted online, focusing on the nature of the intervention and its effectiveness.

PLAN 2: Step 12

Ethical consent was sought from each participant to publish this data anonymously.

REVIEW 2: Steps 14-15

Data Analysis: process
The Secondary Maths Consultant made notes during the research conversation and supplemented these with other data gathered in Action Research Cycle 1. Drawing on the notes and data from AR1, the Secondary Maths Consultant wrote the *Maths Intervention and Supervision Programme* booklet; see Appendix 3.
Summary of Findings
Action Research Cycle 2 Research Question What maths intervention practices should be put in place at secondary to ensure that all pupils have the best chance of achieving maths GCSE Grade 4 or above, **and how should they be communicated to others**?

Key findings that informed the development of the booklet highlighted the importance of capturing pupil voice. Children's attitudes towards maths—and their willingness to engage with tasks they found challenging—were recognised as pivotal to their progress.

The team also examined the effectiveness of the assessment tool and the delivery of content by Learning Support Assistants. The training and ongoing support of these staff members emerged as a crucial aspect of the intervention and was discussed in depth.

Through these conversations, the purpose of the booklet became clear. It is intended to:

- **Explain the rationale** for early and targeted support, particularly for learners with significant gaps in foundational maths knowledge.
- Detail the **assessment and identification process**, including how pupils are selected and assessed using both standardised and bespoke tools.
- Outline the **intervention approach**, including personalised learning 'roadmaps', the use of concrete and pictorial resources, and dynamic assessment techniques.
- **Support Teaching Assistants** with training, resources, and ongoing supervision to deliver the programme effectively.
- **Demonstrate impact** through case studies, progress tracking, and reporting mechanisms that monitor pupil development and inform next steps.

Analysis and next steps leading into Action Research Cycle 2

These conversations led to the publication of the *Maths Intervention and Supervision Programme* booklet (Appendix 3).

Blurb for the booklet

The SEN Maths Intervention and Supervision Programme is a targeted approach designed to support secondary pupils who are not yet working at Key Stage 3 level in mathematics. Developed in partnership with The School Consultancy, the programme identifies gaps in foundational maths knowledge through dynamic assessment and standardised testing, then provides personalised learning 'roadmaps' tailored to each pupil's needs. Delivered by trained Teaching Assistants using concrete, pictorial, and abstract methods, the intervention emphasises sequential learning, regular monitoring, and pupil voice. It aims to close attainment gaps, build mathematical confidence, and ensure pupils with SEND or significant learning difficulties can access and progress through the curriculum effectively.

Next Steps

- Continue to track these pupils through to GCSE to measure the impact of the programme on GCSE data.
- To review the steps from Key Stage 2 intervention to Key Stage 3 learning.
- To continue to monitor the Key Stage 2 entry data to identify pupils as soon as they enter secondary school.
- To review data in primary schools to see if intervention at this level would reduce the secondary catch-up needed.
- To share the booklet with others who might be interested in a focussed catchup programme.

Following completion of this project, the Secondary Maths Consultant spoke with an LSA in a different locality about how the intervention might be used by a child in their setting who experiences emotional distress at school and is currently not attending maths lessons.

Appendix 1 – Action Research Cycles

Action Research Cycle 1	**Establish the research focus**	**Step 1:** Identify the ISEND area for development which requires research.
	Study 1	**Step 2:** Review the research literature.
	Plan 1	**First Plan**
		Step 3: Start the process of refining the research.
		Step 4: Decide what kind of direction you are going to take (direct or enquiry).
		Step 5: Consider research ethics (engage with the ethics checklist).
	Do 1	**Step 6:** Implement the first plan (either direct action or enquiry as action).
	Review 1	**Step 7:** Review and Reflect.
		Step 8: Analyse the meaning of the data gathered.
Action Research Cycle 2	**Study 2**	**Step 9:** Review further literature if required.
	Plan 2	**Second Plan**
		Step 10: Based on the 'reflect' phase, refine the research (this may involve revising or developing the research questions) and plan the next actions.
		Step 11: Decide what kind of action you are going to take (direct or enquiry).
		Step 12: Seek any further ethical permissions if needed (engage with ethics checklist).
	Do 2	**Step 13:** Implement the second plan – (either direct action or enquiry as action).
	Review 2	**Step 14:** Review and reflect.
		Step 15: Analyse the meaning of the data gathered.

Appendix 2 – Blob Tree

Wilson, P. & Long, I. (n.d.) *Blob Tree*. Milton Keynes: Incentive Plus.