

Mathematics into School - Executive Summary of Reflective Journal

Tom Mann

April 27, 2025

Introduction

I spent 9 weeks at Our Lady and St Thomas Catholic Primary School, and as part of my time there I delivered 6 sessions to a group of girls in the Year 6 class. During my time in the classroom and running my sessions I had many of my preconceptions around teaching challenged. I would like to discuss these, starting with the use of competition in the class, including both students competing against themselves and against other students. This will be followed by how to write effective questions to assist students' learning, and finally the effect of a coeducational experience on students.

Competition in the Classroom

During the later weeks of my placement I observed the class I was in playing a "Times Tables League". This consisted of the students completing a 12 by 12 grid of times tables questions against the clock (Journal, Week 16). They then read out their times and they were awarded points based on their time, with a bonus point for moving down into a new minute bracket. Their scores were kept track of over the year, with a prize awarded to people with the most points at the end of each term. I initially thought that this kind of competition was detrimental to students learning due to two reasons. Firstly, some students may become demotivated as it is impossible for them to catch up to the students with the most points. Secondly, competition may increase students fear of failure or lead to low self-esteem.

One study found that students in "competitively structured discussion" are more anxious and lose self-assurance [1]. This is something my observations from the classroom agree with. Earlier in my placement the students took a 10-minute arithmetic test, where similarly their scores were read out. Afterwards I heard two students exchange "What did you get?", followed by "I don't know" (Journal, Week 12). This clearly shows how even when students aren't directly competing, simply having their score shared with their peers can make them feel anxious.

In my last week at the school, one of the more maths-confident students asked to do another round of the "Times tables league", to my surprise when it was put to a vote the vast majority of the class wanted to take part (Journal, Week 19). It appears that competition does act as an effective form of motivation for the children. Shindler agrees that competition is an extremely powerful tool for motivation, but there are features of competition that make it healthy or unhealthy [2]. Most importantly a competition must be short term, have no real or significant reward, all individuals have a reasonable chance of winning and the goal is primarily fun. The "Times tables league" met some of these

criteria, but the combination of the long term points system and it being almost impossible for some students to win pushes it closer to unhealthy competition.

One study of undergraduates found that introducing a competitive element to game based learning improves learning outcomes and motivation of participants [3]. I hoped to recreate the benefits seen in this study in my last session with the students. The session involved the students playing a simple game against me and their peers, importantly there was no prize, the game was simple enough that all students could win and the competition was only 20 minutes. This proved extremely effective as some of the more uninterested students put more effort into this session than previous ones (Journal, Week 19). The two main things that differentiated this from standard competition is that the students benefited even when they lost, and the only thing the students were competing for was the pride of winning. As the main aim of the session was to develop a strategy for the game, the children learn by losing which likely took the fear of failure away. A standard competition involves a resource or goal that cannot be shared by everyone competing, in this case this is only the pride of winning, which is minimal as the competition was so short.

How to Write a Good Question

Questions are usually only thought about as a way to examine knowledge not a way to teach, but a good question can help students understanding and a bad question can set students back. It was in my second week at the school that I noticed the first badly written questions given to the students. The students were studying ratios, and were given a question similar to “If it takes 6 builders 9 days to build a kitchen, how many days would it take 2 builders?” (Journal, Week 12). While there is nothing immediately wrong with this question, none of the children answered it correctly, showing that it did not provide a learning opportunity.

According to Sullivan there are three features a good question should have, it should involve more than simple recall or the repetition of a skill, students should learn from answering the question (and teachers should learn from students’ answers), and there may be several acceptable answers [4]. I think the most important feature here is the ability for students to learn from a question, if a student can learn from a question it likely includes more than recall. One paper on how to write valid maths questions posits that one reason students get maths questions wrong is because they identify the wrong schema [5]. Students will often store models of how to answer certain questions in their working memory, and when they recognise a similar problem they will call upon the schema most closely related to it.

In the earlier example, the only similar schema the children had was how to solve a simple ratio problem, so that is the one they called upon. In this example the ratio 6:9 is the same as 2:3, so the incorrect answer is it would take three days. This question fails to recognise that the students would need guidance to build a new schema which they can call upon in the future. This question should have at least two parts, one asking how total days it took to build the kitchen, and then the second using this answer to solve a simple ratio problem.

One article classifies the types of errors students make into: translation and understanding, understanding and calling upon relevant knowledge, planning, and execution [6]. This respectively relate to the knowledge requirements: linguistic and factual, schematic, strategic, and algorithmic. I would argue that linguistic, factual, and algorithmic knowledge are the most basic as a question to recall a fact or reproduce an algorithm does not

necessarily require schematic or strategic knowledge. This suggests that questions used in the classroom should focus more on schematic and strategic knowledge, in particular scaffolding and structuring questions to help students build schemas. Whereas in most cases maths questions often have the property of being all or nothing, they are like a puzzle in which students try different approaches until one works [5].

Even when a question is split into multiple parts, often times it can still be unnecessarily confusing. During my third week at the school the students were learning about scale drawings. They were given a question that involved a 18cm square that had been drawn to scale on a square grid as a 3 by 3 square. The question given was

a) $18 \div ___ = 3$

b) One small square is worth $___ \text{ cm}$.

All of the students could solve the first part easily, but had no idea how the two parts linked together. I think the question would achieve a better desired effect if the first part was a) $3 \times ___ = 18$. While they convey the exact information, I think the structure emphasises the link in a more natural way as multiplication is more intuitive to most people than division. This means the students are more likely to learn from the question and develop a schema they can use in the future.

Girls & Boys

All of my schooling has been in a coeducational environment, and up until my placement I had never considered the possibility of anything else. Mixed sex education has become more common, in recent decades a significant number of formerly single-sex schools have transitioned to coeducational models. In particular the percentage of single sex schools in the UK has decreased from 24% in 2014 to 18% in 2024 [7, 8]. The benefits of coeducation are clear, such as promoting gender equality and improving social skills. It was not until my project which focused on improving the self-confidence of Year 6 girls in maths that I considered how a mixed education may be detrimental.

During my session with the girls, we talked about why they may be anxious or worried in a maths lesson. One of the most common answers was a fear of judgement from other students (Journal, Week 13). Gillibrand argues that when girls are free from the competitive nature of boys and the perception of not being up to the boys standards they are more likely to participate actively in the classroom [9]. This agrees with an observation from a session, one girl volunteered to answer what "data" is when none of the other girls in the session put their hand up, this shows girls may not fear judgement in an academic sense as much in a single sex environment.

The impact of mixed education may be more detrimental in STEM as girls in single sex schools are substantially more likely to take STEM A-levels than girls in mixed sex schools [10]. This is not due to greater access of these subjects as all-girls schools are only marginally more likely to offer most STEM A-levels than mixed schools. One of the reasons mixed education may be more detrimental to girls in STEM is because of the different learning styles of boys and girls. Hughes argues that girls are more likely to benefit from a collaborative learning environment as they utilise more words in the learning process and this allows girls to communicate with each other about the topic at hand, whereas boys focus on completing the task well without as much attention to emotions [11]. This may suggest that boys are more comfortable learning in an environment involving competition. As mentioned previously, one boy in the class asked to do the "Times Tables League" and when it was put to a vote most of the class agreed and the few that didn't were mostly girls (Journal, Week 19). This difference in learning style may be more exaggerated in

mathematics as at school level it is naturally less cooperative and more competitive as answers are either right or wrong. This again links to how maths questions are puzzle like, it is difficult to collaborate on questions where students either get the answer immediately or never get it.

While I have mainly mentioned how mixed sex education can be detrimental to girls, it is important to note it can be just as harmful to boys. Lessons can be adapted to meet boys' learning styles better in a single sex environment as well, such as increasing movement in the lesson [11].

This is a well debated topic with abundant evidence both for and against the argument that single sex schooling increases academic achievement. Regardless of whether this is true or not I think it is important to consider how single sex schooling may impact qualitative factors such as student satisfaction and self-confidence.

Conclusion

Overall, this experience has allowed me to explore various pedagogical theories and the realities of applying them in a classroom. Seeing the contrast between theory and application has allowed my develop my understanding and effectively incorporate theory in the planning of lessons.

References

- [1] Roger T. Johnson, David W. Johnson, and Brenda Bryant. Cooperation and competition in the classroom. *The Elementary School Journal*, 74(3):172–181, 1973.
- [2] John Shindler. *Transformative classroom management: Positive strategies to engage all students and promote a psychology of success*. John Wiley & Sons, 2009.
- [3] Nergiz Ercil Cagiltay, Erol Ozcelik, and Nese Sahin Ozcelik. The effect of competition on learning in games. *Computers & Education*, 87:35–41, 2015.
- [4] Peter Sullivan and Pat Liburn. *Good questions for math teaching: why ask them and what to ask, K-6*. Math Solutions Publications, 1997.
- [5] Alastair Pollitt. Understanding students' minds: the key to writing valid mathematics questions. In *International Symposium on Test Development for University Entrance Examinations, National Center for University Entrance Examinations, Japan*, 2002.
- [6] Hannah Fisher-Hoch and Sarah Hughes. What makes mathematics exam questions difficult. *British Educational Research Association, University of Lancaster, England*, 66, 1996.
- [7] Independent schools council. ICS census and annual report. https://www.isc.co.uk/media/2466/2014_annualcensus_isc.pdf, 2014.
- [8] Independent schools council. ICS census and annual report. https://www.isc.co.uk/media/uukn4r3i/isc_census_2024_15may24.pdf, 2024.
- [9] Eileen Gillibrand, Peter Robinson, Richard Brawn, and Albert Osborn. Girls' participation in physics in single sex classes in mixed schools in relation to confidence and achievement. *International journal of science education*, 21(4):349–362, 1999.

- [10] Jake Anders, Claire Crawford, and Gill Wyness. Written evidence submitted by ucl centre for education policy & equalising opportunities (cepeo), 2022.
- [11] Teresa A Hughes. The advantages of single-sex education. *Online Submission*, 23(2), 2006.



Mathematical Sciences in Schools

Level 3

[MATH3481]

Reflective Journal

Journal

The Journal is to be completed on an on-going basis, recording your reflective learning throughout the module.

CONTENTS	Page
1. The Purpose of a Journal	3
2. The Executive Summary	5
3. Starting Maths into Schools	
3.1 Self-Audit	6
3.2. Your Expectations of Maths into Schools	7
4. Recording Your Experience	
4.1 Keeping a Record	8
4.2 Weekly Record Sheets	9
5. Personal Reflection	
5.1 Focusing Your Reflection	31
5.2 Interests	32
5.3 Skills	33
5.4 Values	34
5.5 Other Thoughts about the Project Experience	35
5.6 Organisation of Schools and Teaching	36
5.7 Learning and Teaching of Maths in Schools	37
6. Action Planning	
6.1 SMART Plans	38
6.2 Personal Action Plan	39

1. THE PURPOSE OF A JOURNAL

Why is it important to use a Journal?

To log your experience

Recording activity in detail means that the experience is not lost and can be drawn upon later. Weekly record sheets are provided (in Section 4) for you to log what happens as it happens.

To review your learning

Reflecting on your learning and experience enables you to articulate what it is you have learnt from it all and how. Section 5) may help you to think about and to draw together your thoughts about your experiences in a focused way. These headings will help you develop your insight about your values, skills and interests, maths learning and the organisation of schools and teaching.

To aid objective setting

Reviewing your situation can help you think through why you are undertaking an activity and to determine what you hope to get out of the experience. In this way you are more likely to achieve your objectives. A section for recording your expectations is provided for you (in Section 3) to fill in before you start your project.

To aid profiling

Identifying your strengths and weaknesses gives you the chance to do something about improving yourself in areas that are important to you. The weekly record sheets will enable you to spot areas for development and to draw on the resources around you to try out new ways of doing things.

As a portfolio

The collected evidence and a record of your achievements and experiences in the form of a Journal can be useful as a databank of information to draw upon for use in constructing a job application, a CV or just as an aide memoir.

Action Planning

Reviewing can help you recognise and plan for what comes next, whether that be your immediate personal, academic or career plans. An action planning section is provided (in Section 6) so that you can decide how you want to build on your experience.

Why use a written record?

Many people question why it is a good thing to record this kind of information in a journal, which might be seen as a chore. "Surely I can review, reflect, evaluate my position and plan without all this?"

This is true, but the basic facts are:

- Most people don't review effectively in a vacuum.
- Details are often forgotten.
- Only the good bits or the superficial bits are remembered.
- Writing it down creates the time and space for you to think things through properly.
- Once something is written it is easier to share and bounce your ideas and reflections off other people: colleagues, friends, yourself.
- Written thoughts and reflections can be drawn upon to write CVs, letters of application and the like - at least it gives you something to start from.

Once written the Journal is there for you to use, put aside and come back to later and possibly refine.

2. THE EXECUTIVE SUMMARY

2.1 As an Assessment

We do not assess the journal directly; indeed we will not read most of it. (So you don't need to worry about formal correctness in the journal.) Instead, 30% of your module mark is for an Executive Summary of your journal.

This is **not** simply a much-shortened version of your journal. The idea of an "executive" summary is to pick out and organise the bits that matter most. For this module, we ask you to pick out three or four "themes". These are topics which, over the year, you have found interesting and important. Probably they will appear again and again in your journal.

Some themes focus more on schools (eg. "Providing for children of different abilities"), some more on your personal development (eg. "Public speaking skills"). We welcome unusual themes – ask if you aren't sure.

2.2 Developing an Executive Summary

Don't try to pick your themes too soon. We'll ask you to write one formative theme in Michaelmas term, but it's up to you whether you will include this theme in your summative executive summary, in Epiphany. If you do so, you should have more to write about, and your views may well have changed.

Your journal is the main raw material for your executive summary. This is why it's important to keep writing your journal! It is your only record of your first-hand observations and experiences. It should also record your developing ideas (reflections, analysis) about these experiences, and about information from other sources (eg. papers about teaching). A later seminar will say much more about how to combine these three elements: experience, sources, and your own ideas.

The executive summary should demonstrate the development of your ideas, interests, skills and values. When writing it you could consider:

1. What have you learnt as a result of your participation in the module?
How do you plan to build on this experience in the future?
2. How has your school gained from your placement? What have you gained from them?
3. What did you set out to get from the module and have your expectations been met? How have you ensured that you made the best of the opportunity? If you had problems how did you resolve these?

3. BEFORE YOU START MATHS INTO SCHOOLS

3.1 Self-Audit

Before you begin, you might find it useful to think about the skills and knowledge you already possess which will aid you in your role.

Write about:

- **Details of any prior experience in a similar area if relevant**
- **Details of relevant knowledge and skills**
- **Identification of new knowledge and skills that may be required, such as knowledge of school culture/working practices, IT skills, presentation skills, team-building skills, leadership skills**
- **Sources of information and resources and opportunities for gaining new knowledge and skills**

I have previously volunteered to help tutor high achieving GCSE students. My role was to walk around the classroom and assist students and explain anything they may not understand. As all the students in this group were aiming for the highest grades and they were there voluntarily, they were well behaved and were easy to explain new topics too.

Due to my previous experience tutoring and more casual experience of teaching/explaining to siblings/cousins I believe I have some relevant skills in explaining new topics in various ways to aid understanding and comprehension.

There are many new skills I will require:

- **Communication** – I don't have much experience in speaking to many people, and I have previously found this very challenging, and I have felt anxious before speaking publicly even to a relatively small number of people.
- **Leading a classroom** – I have never had to deal with misbehaving children or dealing with children who are progressing at different speeds. It may be difficult to keep those who are progressing faster engaged while making sure others don't fall behind.
- **Presentation** – I have never had to teach something new to many people at once.
- **School culture/working** – I have never worked in an environment like a school before

There are some sources linked on the ultra page relating to; Maths education in context, psychology of learning and teaching, Problem solving and maths questions, and behaviour management.

3.2 Your Expectations of Maths into Schools

To help you to set yourself objectives for the experience, use the space below to write down why you are undertaking this activity and what you hope to get out of it.

Think about how these objectives might be achieved, e.g. what support you might need, and identify potential barriers and how you might overcome them. Develop an action plan.

The main reason I took this module was to get out of my comfort zone, this is not normally the type of thing I would 'enjoy' doing.

I'm hoping that this module will help me improve my communication, public speaking, written skills and confidence in presenting and speaking.

During the seminars I am sure a lot of these common skills will be covered, I will be able to do my own research surrounding them. However, I think the best way I will improve is simply by practising them through the open day, the school visits in Epiphany term, the assessed written reports and presentation.

Luckily there is a lot of support given for the written reports, I will have to make sure to take full advantage of this. I think extra support for the presentation could be useful for me, as this is an area I particularly struggle with, more so than the written report. The best way to make myself feel more confident in with presenting is to make sure I know the content I am presenting inside and out; I think this will apply to both presenting in the classroom and the assessed presentation. To get to the point where I am confident in my presentation I think I will need plenty of practise, but also to be prepared for any questions that may come my way. This may be more difficult in a classroom setting, especially as children are known to ask the most random questions.

As I find writing quite difficult, it often takes me longer to express my thoughts than others. This may make it more difficult to keep on top of my work, I need to make sure to keep to tight deadlines, so I don't fall behind work otherwise it will be difficult to catch up again.

4. RECORDING YOUR EXPERIENCE

4.1 Keeping a Record

Remember to keep a record in your Journal each week so that you don't forget what happened and so that you get into the habit of thinking about potential areas for development. This section will help you note what happened each week.

We suggest you:

- record ideas as you go;
- review earlier entries as time goes by;
- add extra entries as appropriate.

Keep a note of the people you work with each week. Try to give concrete examples of the ways in which you think you have been helped by them and they have been helped by you and your project.

You can also use Section 5 to note emerging ideas about your interests, values and skills and your observations of the project experience, science learning and the organisation of the school you are working with. The Action Planning section (Section 6) builds on your ideas about what you have gained from the module and helps you define your next step, whether it is to do with teaching or working with young people, or your insights into learning or other areas of life.

All of your ideas and your recorded reflective learning should be drawn together at the end of your project to help to form your executive summary (see Section 2).

4.2 Weekly Record Sheet

WEEK ONE

Date:8/10/24

Activities undertaken:

Introduction seminar and ice breakers

Names of people worked with (if relevant):

Abi, Matt and Lachlan

Observations:

What have you seen this week in terms of public learning and teaching etc?

We had to deliver a small amount of public speaking in the form of an icebreaker. While this was only a minute long each it did make me feel surprisingly nervous, I also struggled to fill the allotted time given. Although we weren't given much time to prepare, I didn't really consider the amount of time I would have to fill, next time I would like to take this into consideration.

How do you feel about this week's seminar / school visit?

I don't particularly like speaking to a group, especially with little advance notice. It makes me feel unprepared.

I feel excited to continue with the course, I am really hoping I will gain a lot of skills.

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

It was nice to get to know the other people on the course.

Although reflective thinking/writing is a new experience, I find it interesting, and I am looking forward to some hopefully positive outcomes.

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

No significant challenges, only a small number of nerves for the presentation, I have always been nervous speaking to more than a few people. There is no real way to deal with it other than getting on with the presentation, hopefully this module will give me more confidence in my public speaking as I gain practise

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

Having looked at the content on the ultra-page on communication there are some pieces of advice I would like to incorporate into my public speaking. Hopefully the next time I need to speak I will have a chance to practise what I need to say. I also want to hold myself better, hopefully I can focus on what I am saying rather than thinking about what is happening.

Project Initial thoughts

I'm not set on my project yet as I want to make sure that it is accessible to everyone in the classroom. I'm hoping to go to a primary school but I'm not sure what year(s) I'll be working with, so I don't know what level I am working with. I think one way to make it more accessible is to introduce a new area of a topic they won't have seen before, this way everyone is on the same level and can start from the same point. Possibly something such as geometry, nets of shapes, showing that there are different nets for the same shape, getting them to figure out the shape from the net e.t.c.

I don't think there is an degree level maths I could make meaningly accessible to primary school students, I think my aim should be to make what they are studying more interesting, and introduce them to a topic just outside of what they have covered.

WEEK TWO

Date:

Activities undertaken:

We completed two communication-based activities, the first involved getting into pairs; one person would describe a drawing they had in front of them and the other had to try and recreate it. The first time round the person listening couldn't speak, the next time round they were allowed to ask questions.

The second task undertaken, the seminar group was split into half, one half learnt how to make one origami shape, and the other half learnt a different shape. We were then tasked with writing instructions on how to make our shape, we could either write, draw or write and draw instructions. We were then given instructions made by the other half of the seminar group and we had to try and recreate their origami based off their instructions.

Names of people worked with (if relevant):

N/A

Observations:

The first task we had to undertake, I found my partners instructions were very good as I managed to recreate the image very well and wasn't particularly frustrated about not being able to ask questions. I struggled more with giving instructions than with receiving them, I should've spent more time preparing my instructions rather than diving straight in.

The second task was also quite difficult as I could only give written instructions which was quite challenging given the task at hand. I think I did a decent job, I just had to make sure my written instructions gave a good image of what was meant to be built at every step to make sure the person knew roughly what they were aiming for.

What have you seen this week in terms of learning and teaching etc?

The actual content of the seminar this week clearly related to a school environment. It did make me realised that I need to practise my communication and explanation skills ahead of going into a school.

How do you feel about this week's seminar / school visit?

Positive outcomes

Challenges faced

Action

Context and External resources

<https://youtu.be/gCfzeONu3Mo> - How miscommunications happens – TEDed

This video raises the point that when communicating the same message different people will share it differently based on their own understanding (which is influenced by many things e.g. culture...) and when receiving the same message everyone will interpret it differently for the same reasons. While I don't think most of these reasons are applicable to maths communication, it definitely raises a good point that making sure everyone has the same prior knowledge when communicating or explaining a new topic is very important. **Understand how other people view the problem you are trying to fix.**

<https://youtu.be/gFWsTsvJ8Xw> The recipe for Great communication

This video mentions 5 key 'ingredients' and when you should use them

Clarity – There is a lot of complexity

Brevity – Time is short, short attention spans

Context – Unfamiliarity, moving between topics

Impact – When there is a lot of noise

Value – When there is scepticism

When it comes to maths communication and teaching maths, I think the areas that need to be focused on more are context and value, in school you are moving between many different subjects very quickly so having some context on what you are learning that can bring students back to the topic quickly is very important.

I think value is the hardest to increase when teaching anything especially maths, as a lot of students don't want to be there. I don't have any strong ideas on how to increase value of maths, yet I think it will be important to think about in the next seminar as we talk about maths in society and why we teach maths.

<https://youtu.be/V6yixyiJcos> - Maths isn't hard, it's a language

This video mentions how understanding maths as a language can make it easier. It explains how moving from 1 apple + 1 apple = 2 apples to 1 third + 1 third = 2 thirds to $\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$ can allow children to understand maths as a 'human language'. While I think using such analogies can be useful to stop children fearing fractions, I do think that it could cause more problems where they do not understand exactly what they are doing and blindly follow a pattern. As long as this was used alongside other more formal explanations, I think it has its place.

Mayer's 12 principles of multimedia learning book excerpt

This chapter of the book looks at comparing written text; written text and a diagram; many stages of diagrams with written text alongside.

It concludes that while a diagram is better than nothing, constructing the answer on the diagram step by step is much better as it does not overload the reader.

It mentions how ill-conceived multimedia designs can overload the human information processing-

system. This can be particularly true in mathematics. Integrating the diagrams alongside the narration or written text is what makes it particularly effective.

The specific implications of this research suggest that

- When using static graphics coupled with written text it is advisable to integrate the text directly into the graphic
- When possible, combine static graphics with spoken text
- When combining with spoken text there is no need to provide equivalent written text
- For visually complex diagrams, use signals with spoken text to direct the learners attention
- Animation plus narration is better than narration alone
- Animations may be more beneficial for higher-achieving and high spatial-ability learners

This research backs up anecdotal evidence of dynamic graphics being effective for mathematical learning, the creator of the YouTube channel 3Blue1Brown designed his own python script “Manim” which allows him to create relevant animations for what he is presenting. This software focuses on transforming and dynamically changing the diagrams and models he is producing. This could be useful to look into for use in what school I go into.

<https://www.digitallearninginstitute.com/blog/mayers-principles-multimedia-learning>

This blog summarises Mayer’s principles for multimedia learning, it starts off with three assumptions.

1. **Dual-channel** – People have two separate channels for processing auditory and visual information
2. **Limited-capacity** – individuals have a limited capacity to absorb information at any one time
3. **Active-processing** – People should be actively engaged in the learning process rather than passive receivers

Some of the principles it outlines are more relevant than others for a school environment, but it is definitely a useful resource to consider before starting in a school.

Maths and the Public PowerPoint

Only 60% of 16-19 year olds holding a GCSE mathematics level C/4 or above – This is particularly low considering that it is mandatory. Something is going wrong if 40% of students can’t pass their maths GCSE.

31% of UK adults describe themselves as “not a numbers person” (23% of men vs 38% of women) – It is the 38% statistic for women that is particularly shocking. If people underperform in maths exams it may lead them identify as above, but I would imagine this statistic is higher than for the comparative statistic for English (“not a words person”). This suggests that it is more to do with the experience of how maths is taught in schools rather than individuals’ ability in mathematics.

“I am no good with numbers” 47% of UK adults were embarrassed to say the above compared with 58% for reading/writing. The UK public finds it more acceptable to struggle with maths, this may stem from a collective negative experience of maths in schools.

A 2019 survey found that the population valued literacy skills to numeracy skills – I do agree that literacy is a more important skill than numeracy. Numeracy is secondary to literacy, if you don’t

have sufficient literacy, it would be impossible to have any meaningful numeracy skills.

Why do we teach maths in schools?

It is very easy for people to see the benefit of teaching reading/writing, interaction between humans relies on them and is necessary for cohesive society.

The applications of mathematics can often be abstracted as people question why they are learning specific parts of mathematics.

No-one questions why we study Shakespeare, great poets or historic pieces of text; you are probably not going to read poems or plays in day-to-day life, but it is easy to see how this transfers into your life.

The average person is probably not going to need to solve quadratic equations, but they might at some point need to understand a new formula or set up a balance sheet for their business.

Doing maths is like lifting weights, you don't bench press so you can go out and do the exact movement in the real world, but to make everything you lift slightly easier.

WEEK THREE

Date:

Activities undertaken:

Discussion of Maths in Society PowerPoint

- 44% of adults hold a GCSE Maths level 4/c or above (2011 Skills for life survey) this figure was 60% for 16-19 year olds and 29% for 55-65 year olds. These figures don't surprise me too much, the one that was most shocking was that only 60% of 16-19 year old holds level 4.c in GCSE maths. This level of maths education is required for most jobs or further education, so it shows how much these options are limited for some groups.
- (Skills for life survey 2011) - Adult numeracy at level 2+ (GCSE grade c/4 or above) dropped from 2003 to 2011, this is shocking
- Only 46% of Black (Caribbean) and 55% of Black (African) held a level 3 maths qualification or above compared to 79% of white (British). I would like to see this statistic in terms of people who went through full time education in the UK.
- The worst geographic area in terms of numeracy levels is the North East, this may be worth considering when going into schools. Not only in terms of the numeracy levels of the children but also the overall attitude towards maths.
- There was a big spike in the overall pass rate of GCSEs during covid, while this is most likely teachers just giving higher grades, it does suggest there is a disparity of what teachers think students are capable of versus how they test.

Discussion of “Why do We teach Maths”

This could be broken down into two areas, immediate objectives vs long term benefits and goals. The immediate benefits came under understanding of maths; enjoyment and understanding the use of maths.

Own experiences of attitude to maths

As an individual I have always had very positive experiences with mathematics, however from other subjects I have struggled with I can see how anxiety around a subject can lead to a vicious cycle of anxiety to lower performance to more anxiety. I struggled quite badly with English Language and Literature in school, even though I was placed in top set as I was quite good at other subjects I felt very out of place in that English class. I felt like I was missing something that everyone else in the room had, I couldn't quite understand where they were pulling ideas from. I did feel that because I achieved lower grades that my opinion would be less valued or laughed at. I think it takes a good teacher to be able to take any idea and take the value from it.

I have had experiences with relatives who have “maths anxiety” my eldest sister struggled a lot with mathematics even though she is perfectly capable of other subjects, and I know if she had a different experience at school, she might be much more confident dealing with numbers. She uses a website to compute what is a% of b e.c.t as she is so afraid of maths.

Ideas for activity day project

- Take an area of maths they are familiar with and come at it from a different angle e.g geometry, stats, algebra.
-

Group Meeting about activity Day project

We came up with two main ideas for the group project:

Using modular arithmetic for basic Ceaser cipher. This would require teaching the children how to turn letters into numbers i.e. A -> 1, B -> 2 ... and then modular arithmetic. We think this could be challenging to fit into a 40-minute time slot and could possible overwhelming.

Turning word-based problems into algebraic expressions. Emily raised the point that a lot of children are often capable of solving the algebra needed for a question, but they can't use the information they are given in a question to construct an algebraic equation to solve. We came up with the idea of splitting the children into groups of three and giving one an algebraic equation, one a word-problem that relates to it and one a graphic representation of the problem. The children would then have to walk round and find the two other people that lined up with what they have on their card. E.g.

“What number multiplied my three add two is equal to seventeen”, $3x + 2 = 17$, and “ $\square + \square + \square + 2 = 17$ ”

Names of people worked with (if relevant):

Grace Cowdry
Matthew Evans
Mia Liddell
Emily Whitaker

Observations:

N/A

What have you seen this week in terms of learning and teaching etc?

One thing I learned is that it takes a lot to keep someone's engagement, especially when the subject is something that they may not initially enjoy. The further reading mentions a lot of ways to keep people engaged, but some of them are more difficult to apply to primary school students than others, it is difficult to create a "story" element to a lesson.

How do you feel about this week's seminar / school visit?

I felt positive about this week's seminar, I think the topics we discussed were interesting.

Positive outcomes

Challenges faced

Action

Context and External resources

A: Underlying reasons / Contributing factors

Understanding Mathematics Anxiety 2019

Maths anxiety and performance: It has been shown by multiple studies that there is a slight negative correlation between maths anxiety and maths performance, i.e. as maths anxiety levels increase maths performance slightly decreases.

There is a lack of consistency in the proposed direction of this relationship, i.e. does maths anxiety lead to lower performance or does lower performance increase the chance of maths anxiety.

The Deficit theory suggests that lower maths performance leads to increased maths anxiety. This is shown by the fact that children with mathematical learning disabilities such as developmental dyscalculia have higher levels of mathematical anxiety than those without learning disabilities. Furthermore, it has been suggested that adults with maths anxiety might have problems with basic numerical processing, indicating that perhaps their performance was impaired at a very early stage.

The Deleterious Anxiety Model suggests that the link between maths anxiety and maths performance is driven by anxiety's consequence on learning and recall maths skills. Evidence suggests that people with maths anxiety are less willing to engage in maths tasks at all. For example, people with maths anxiety are less likely to enrol in maths classes and have a tendency to answer questions quickly but inaccurately. Secondly, whilst individuals are engaged in maths tasks, maths anxiety might act to distract them from what they are trying to learn or remember. Other studies have people do a task aimed to reduce maths anxiety, and have observed an immediate performance increase.

The reciprocal theory suggests that both of these theories might play a part in the relationship between maths anxiety and performance, effectively creating a cycle of maths anxiety → decreased maths performance → maths anxiety...

B: How to increase engagement

What makes people engage with maths – Grant Sanderson (3Blue1Brown)

The overall idea that Grant tries to get across is that engagement = relevance + story, and he more so focuses on the story. If you can get your audience to “need” to know the answer to a problem you have posed, they will happily learn the maths needed along the way.

Five Principles of extraordinary maths teaching – Dan Finkel

- 1) Start with a question
- 2) Students need time to struggle
- 3) You are not the answer key
- 4) Say yes to your students' ideas – accept ideas into the debate even if they are wrong
- 5) Play

WEEK FOUR

Date: 29/10/24

Activities undertaken:

Seminar 4 – Introduction to academic writing

Planning Activity Day project – Mia, Matt and I oversaw planning the activity day project involving cryptography and modular arithmetic.

Aims – introduce modular arithmetic and fundamentals of cryptography

Content – modular arithmetic (mod 12) and (mod 26) they should be familiar with (mod 12) from using a clock even if they are not aware of it. Ceaser ciphers, this will likely be completely new content.

Structure

- Introduction, write up cipher text on the board for motivation
- Mod 12 arithmetic in the context of time as they should be familiar with this
- Mod 26 arithmetic to allow us to use this in the context of the alphabet
- Translating letters to numbers and back, a to 1 etc...
- Ceaser cipher – shifting letters by a fixed amount
- If spare time, students can write coded messages for each other

Logistics and Materials

- Split the group into two, making sure they can see the whiteboard
- Mostly sat down
- Need two clocks that can be manipulated to help students understand the modular arithmetic, one clock mod 12 and one mod 26. However, the mod 26 clock may be too confusing.
- Short worksheets to allows students to practise modular arithmetic before we move onto Ceaser Cipher

Roles and Responsibilities

- Someone demonstrates mod 12 arithmetic
- Someone demonstrates mod 26 arithmetic
- Someone demonstrates Ceaser cipher
- Those who are not demonstrating are at the tables with students to help them

Names of people worked with (if relevant):

Mia and Matt

Observations:

The planning of the activity was fairly smooth. The only part I struggled with was trying to figure out what level of maths the children will be able familiar with. We were also unsure or how much time to leave for each task, as I don't have much experience with children this age I'm not sure how difficult it is to get them to cooperate.

What have you seen this week in terms of learning and teaching etc?

I am more aware of how much goes into planning a lesson. Obviously it would be easier when you are regularly teaching the same children, but for new content it is difficult to gauge how long it will take the students to understand the material.

How do you feel about this week's seminar / school visit?

The seminar went well, It was useful to have some basic mistakes pointed out.

Positive outcomes

Challenges faced

Action

WEEK FIVE

Date: 5/1//24

Activities undertaken:

Seminar – Reviewing activity day plans

Activity day plan - Completed activity day plan and risk assessment

Names of people worked with (if relevant):

Activity day group – Matt, Mia, Grace Em

Observations:

Reviewing activity day plans

During the seminar the feedback was mostly positive, but I think we misjudged the aim of the activity day, we ended up planning an activity around new maths we were going to teach the children, rather than adding a little bit of maths to an activity. This wasn't too difficult to fix, we just reduced the maths content and made the maths we are using a bit easier. We also made it more activity based, with the children spending more time doing than just listening or observing. I think it is difficult to get the right mix in just a 40-minute lesson.

Completing activity day plan – We changed our plan to have more of a theme and more activities in the allotted time. We chose to have the children solve a crime which would lead them to a prize of chocolate coins. We decided to have the children solve three codes, one which would transfer numbers to letters 1 to a etc.. and one which would be a Ceaser cipher and one which would combine both. If there is any time left over, we can have the children write codes for each other.

What have you seen this week in terms of learning and teaching etc?

How do you feel about this week's seminar / school visit?

Positive outcomes

I believe we improved our plan for our group activity to make it more engaging.

Challenges faced

It was difficult to balance including some challenging maths, while making the lesson fun and engaging. It was also quite difficult to organise everything as some members of the group were busy for a large proportion of the week.
I also found that I was busier in general and had less time to contribute than I would have wished.

Action

WEEK SIX

Date: 12/11/24

Activities undertaken:

Seminar – Discussion about pedagogy and some relevant theories

Activity day – Continued planning session, completed PowerPoint and make final resources necessary

Names of people worked with (if relevant):

Matt, Grace, Mia, Emily

Observations:

Seminar – We discussed four different theories: growth mindset, the zone of proximal development, cognitive load theory (working memory), operant conditioning.

It was interesting trying to find information online, as these are all psychological theories it is very hard to find anyone who agrees on anything. Whatever evidence you do find there is another report disproving it and then a report disproving that one etc.

Planning Activity Day – It is still very difficult to gauge time management for the lesson, I flip between thinking we have too much to cover to not enough to cover. We have considered ways we can extend or shorten the activity if we need to. If the children are struggling, we can simply help them decode some of the message to speed up the session, if the session is not long enough, we have spare paper to let the children write coded messages for each other.

I also think we should have done a run through of the lesson sooner, I think this will be very revealing of areas where we have forgot to plan, i.e. the transition between each one of us teaching. The group planning process is very difficult, there is very little time where we are all together and it is very difficult to get everyone organised.

What have you seen this week in terms of learning and teaching etc?

The topics we covered in the seminar were quite interesting, the two that interested me the most were the zone of proximal development and cognitive load theory, these seemed like the two that could be most actively used. Growth mindset was also interesting, but it seemed more passive, about changing the language you use around teaching rather than changing the way you teach, which is interesting that such a simple thing can have such a large impact. Operant conditioning seemed to focus more on behaviour than learning.

From the summaries the other people in the group shared with us, zone of proximal learning suggested that there are different zones of learning: things we can do on our own, things we can do with help, and things we can't do even with help. By doing tasks that are in the "things we can do with help" zone, helps us learn the most. This makes sense, and I would agree with it from personal experience. There is an obvious problem with implementing this in a classroom, and that is that all the children will have different zones of learning and will all need individual attention if we wish to have them in their "zone of proximal development".

Cognitive load theory states that everyone only has a certain amount of working memory, and if we go beyond this threshold then our learning will be limited. i.e. doing 2 * 30-minute chunks of work with a break is better than 1 * 60-minute chunk. Again I agree with this, and there are lots of methods such as the pomodoro method which is working for 25 minutes and then taking a 5 minute break. This seems like it would have a larger impact the younger the children are, as they are more likely to have a shorter attention span.

How do you feel about this week's seminar / school visit?

Positive outcomes

Challenges faced

Action

I would like to research some more teaching methods before my placement next year. I think focusing on one or two that I find interesting and I think would have a large impact on the children would be very useful.

WEEK SEVEN

Date: 19/11/24

Activities undertaken:

Activity day

Names of people worked with (if relevant):

Grace, Mia, Emily, Matt

Observations:

Activity Day –

Our first session went smoothly, and I was happy with how quickly the kids picked up the codes. They also managed to figure some things out themselves, such as looping back round to the start of the alphabet if they got to the end in the Caesar cipher, however some of them had to have this explained to them. Most of the groups managed to figure out how to crack the codes on their own (with some prompting) this was what we were hoping for.

Overall, the sessions went a lot faster than we were expecting, we had to use some back up codes to flesh the sessions out, we also allowed the children to write their own codes for each other. I think this worked well as some groups didn't get on to writing their own codes, so I think we judged it well overall, and no group didn't finish or was sat waiting with nothing to do at the end.

I was surprised with how engaged the children were with the worksheets, it was rare that they were distracted or misbehaving. It was only the last group that got through the work slowly and seemed slightly more distracted (less focused on the task) than the previous groups, I would suspect this is just because they were tired because it was the end of the day.

The story line of the session helped keep the children entertained (this links back to a previous video about communication). With hindsight we were right to make the session more activity and less maths based, I think this helped the children stay engaged. Most of the children said that they learnt something new in the session, so there was still enough new content to give them something new.

We gave them two resources to help them the first was a list of numbers corresponding to letters i.e. a – 1, b – 2 etc. the second was “an alphabet clock” it had the alphabet written on a wheel on the inside and on the outside and you could rotate the wheel to help you crack the Caesar cipher. The children found the letters to numbers sheet helpful, but I think a few found the clock too confusing and just counted to decipher the message. A few children did find the clocks useful, and we gave them to the teachers to keep if they wanted to do a similar session at school.

At the start of the activity when the children were turning numbers into letters, we found that they grasped this very quickly and we often didn't need to help them too much. However, for the second and third tasks they often required a lot more help and it was very useful to have such a high ratio of us to the children. This allowed us to basically have 1 to 1 teaching with the children which is a privilege you wouldn't get in a classroom.

The first session we ran, we would wait for all the children to crack the code before sharing it with each other and us, this worked well but it did mean a few children were just waiting around doing nothing while waiting for other children. At the end of the first task when we had spare time, we allowed the children to write their own codes. We adapted this in future tasks by asking the children who finished first if they wanted to write their own codes while the others finished, I think this helped keep them engaged and made sure they didn't get bored. The only problem with this was that it was a bit chaotic, I think it only really worked because there were so many of us, so we could explain how to write a coded message to them individually.

What did I learn from the activity day

One thing that stood out, was how difficult it is to manage a classroom of different abilities. Each group only consisted of 5/6 children but within the group there was a range of levels of engagement with the activity and range of abilities. This was expected, and we designed our activity to be accommodating to all mathematical abilities, but we hadn't really considered the different amount of time children would take to complete the session.

What have you seen this week in terms of learning and teaching etc?

As above.

How do you feel about this week's seminar / school visit?

Overall, I feel positive about the seminar and the activity day. I was slightly nervous going into it, but I had a great time, and all the children really seemed to appreciate it. It was nice to see how much the children enjoyed the session.

Positive outcomes

Challenges faced

Action

WEEK EIGHT

Date: 26/11/12

Activities undertaken:

Consideration of feedback

Names of people worked with (if relevant):

Observations:

Children feedback form

The children's feedback form was sweet but didn't provide much constructive criticism, although we gathered that they all enjoyed the day which was the main aim, so it is good to know we achieved that.

Teacher feedback form

Surprisingly the teachers offered little constructive criticism as well, this may be because we didn't give them enough room in the feedback form to fully articulate their thoughts, so they just left it blank. The one bit of feedback we did get was that we could have let the children work things out on their own more before helping. I think this is a valid criticism, I think as a group we found it difficult to sit back and not do anything while the children were working. We didn't really plan what we were going to do while the children were working individually.

Feedback from Stephen

One criticism of the day was that a lot of work was left to the morning of, I tend to agree with this. The only work my team had to do was to chop up some sheets using the guillotine, but it still felt like it could have been done in advance. Another criticism was that a lot of the activities lacked movement, this was especially true of our activity as we only had the children moving once during the activity. In hindsight we could've had the children looking round the classroom to find clues to help them crack the codes. I think this would've added a nice element of movement into the lesson.

Another criticism was, that since all the children were working through the same code the answer often got shouted out early, as much as we tried to stop them. This could've been fixed by giving the children different clues, or slightly differently worded clues each time. This was particularly evident in the last session when one child noticeably copied their neighbour, or just guessed the whole clue after a couple of letter and filled it out quickly. If we were doing this activity again, we would make the clues slightly less obvious and give different clue to each child. i.e for the clue where they found out who the thief was, we could have one clue that said "They are a girl" another that said " They are wearing a blue shirt" etc...

Feedback from Sophy

A comment from a lot of the feedback was that the day was able to run so smoothly due to the almost 1:1 student-child ratio. We noticed on the day this made a significant impact, as we could explain things in more detail to each child if needed. Next term when we will be in classrooms of 25-30 I will definitely need

to consider more deeply how to explain clearly to large groups to make sure all of the children understand it.

Sophy mentioned that we didn't really include much modular arithmetic unlike our original plan. This was quite intentional, we noticed our activity was much "more mathematical" than other groups, so we changed our plans to make it more "active" and move slightly away from the mathematical background. I think with some of the groups, we definitely would've had time to explain some detail of modular arithmetic, however the last two groups didn't have a significant amount of time left at the end of the session, so we would've struggled to include it.

Own Feedback

At the end of the session we got the children to do thumbs up, middle or down to some questions to gather some quick feedback, 20/21 enjoyed the session, 11/21 found the session easy, 10/21 were in the middle (no one found it too difficult). 16/21 learned something new.

What have you seen this week in terms of learning and teaching etc?

How do you feel about this week's seminar / school visit?

Positive outcomes

Challenges faced

Action

WEEK NINE

Date: 3/12/24

Activities undertaken:

Reflective writing seminar and contacting school

Names of people worked with (if relevant):

Ruth Vietch

Observations:

The seminar was somewhat useful, although mostly a repeat of the online SWAY document. It was good to have it cleared up in person

Ruth was very welcoming when I contacted her and responded very quickly, I just need to contact the teacher whose classroom I am in to talk about my project for next term.

Ideally I should come up with a few ideas before I speak to her, just to help get the ball rolling.

What have you seen this week in terms of learning and teaching etc?

How do you feel about this week's seminar / school visit?

Positive outcomes

Challenges faced

Action

WEEK TEN

Date: 10/12/24

Activities undertaken:

Spoke to school about project next year

Emailed Ruth to organise logistics of visiting the school, will be going in on a Wednesday Morning.

Emailed / Called Teresa to talk about visiting the school and my project.

One area mentioned was girls underperforming in maths, could possibly take a small group of girls for the project.

Otherwise the project would likely be a starter at the beginning of every lesson for 15 mins.

Names of people worked with (if relevant):

Ruth V

Teresa Graham

Observations:

What have you seen this week in terms of learning and teaching etc?

How do you feel about this week's seminar / school visit?

Positive outcomes

Challenges faced

Action

Need to research about girls and maths to see whether it is a viable project.

WEEK 11

(Copy, paste and edit these two pages to add entries to your journal)

Date: 13/1/25 (In school 15/1/25)

Activities undertaken:

Peer review of formative ESoRJ,

From Peer review: Women are twice as likely to experience maths anxiety as men
National Numeracy (2022), Numeracy levels and attitudes towards maths and numbers, Technical report, YouGov.

First visit into school. I got in just before the first maths lesson started and I was introduced, we had an informal chat for a while just to get to know the students and for them to get to know me.

The maths lesson was focused on imperial and metric measurements and converting between them. The children did some class work together and then started doing worksheets. It was nice to get to move round with the children and help them. They usually start the lesson with half an hour of arithmetic but didn't do this today as they spent that time introducing me and getting to know the children. It surprised me the ratio of time spent explaining the topic to the amount of time the children spent working on the sheets, it felt like by the time the children got started the lesson had to end. This may change next week as they won't have to spend any time introducing me.

Names of people worked with (if relevant):

Teresa Graham

Observations:

I am really struggling to plan my project; I know my teacher suggested working with a group of girls but I'm not sure exactly what that would entail. I am hoping I will have a better idea after visiting my school. If not after speaking to Sophy and Stephen.

I think the school is fairly small with only one class per year, and 18 pupils in the class I was in.

I noticed how much of a relaxed relationship Teresa had with the students; it felt a lot more relaxed than the relationship I had with my primary school teachers. This may be due to the size of the class and of the school in general as the students are likely to know all the teachers in the school.

Throughout the day the students and Teresa digressed from the teaching a lot. This is not necessarily a critique as the students were likely still learning general knowledge, but they were definitely allowed to wander from the topic more than I thought they would.

I discussed over the phone with Teresa at the end of last term that my project could involve the girls in the class as they are underperforming compared with the boys. Nationally girls tend to perform just about the same as boys in maths (whereas they normally outperform boys in most other subjects). I definitely noticed that the girls in the classroom were less likely to raise their hand to give answers, there were a couple of girls that did, but not as many as the boys.

When I had a chat with Teresa at lunch she told me that the girls are generally much more shy in maths,

this is lines up with my research and own experience. Girls are much more likely to experience maths anxiety than boys, they are also more likely to be less confident in maths than boys (even though their performance is about the same in tests). I know a lot of girls are less willing to give answers as they get shouted over by boys in the classroom.

One trivial observation was that attention and performance waned in the afternoon. I felt this myself, and it was noticeable in the students. Teresa seemed to have less patience in the afternoon as well.

Teresa used a lot of sheets, which was not a bad thing as it cuts out a lot of time the children would waste copying or drawing tables etc. This is something I will have to keep in mind when designing my project

What have you seen this week in terms of learning and teaching etc?

The main thing I noticed was how good the relationship between Teresa and her students was, all the students seemed to like her and respect her. There was no terrible behaviour, a few students getting distracted and talking when they shouldn't be, but that was quickly resolved.

Teresa really engaged the class even when giving a regular presentation, she has great control of the classroom using her voice, and keeps everyone's attention and keeps them entertained.

How do you feel about this week's school visit?

I think this visit went well, I was a bit nervous before but after meeting Teresa and the children I wasn't nervous at all. I enjoyed the maths lesson but felt like I wasn't particularly useful as they already had a TA who comes in for the maths lesson. I also felt I couldn't do much in the PSHE and Science lessons. I would like to be able to help more but I am not sure how I can do this when Teresa is presenting to the class most of the time.

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

I enjoyed helping the children with maths, and the general community you can see within the classroom. All the children got along and seemed to support each other well.

I had limited contributions but definitely helped some children with conversions, they definitely seemed to appreciate my help. When I helped a shy girl she seemed to really appreciate it and was happy when she managed to finally get the question right. I remember a child saying "is it

that easy” after I explained it to them, which was nice to hear.

I haven’t developed any materials yet, but hopefully I will come up with some ideas for my project over the weekend

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

It was difficult to know when to help the children, I wanted to give them time to work things out on their own. Some were keener to put their hand up and call out my name, but some I just talked to walking around. I think next time I will just have to ask students if they need any help, as they were appreciative of the help once I talked to them.

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

WEEK 12

(Copy, paste and edit these two pages to add entries to your journal)

Date: 23/1/25

Activities undertaken:

30 minutes of arithmetic followed by lesson on ratios

Names of people worked with (if relevant):

Observations:

Before the maths lesson the children took part in 30 minutes of arithmetic (closer to 45 mins in reality) this consisted of the children doing a 10 minute arithmetic test which they then marked themselves as the teacher went through it. The students that got the answers right worked through some of the longer questions on the board in front of the class. Although this seems like a good idea the students weren't the best at presenting their answers and I'm not sure it helped the class.

Some of the questions on the test the children hadn't learnt about yet (i.e percentages) this seemed mean as it meant the children couldn't get 100% even if they did what they knew perfectly. This may be very discouraging for the children.

After the children had marked their test they had to say their scores out loud to Teresa in front of the whole class, although Teresa praised the children no matter how well they did on the test, I can't help but feel it made some children feel self-conscious. After the tests had been put away I heard some chatter between students about who score what "she scored..." "he got..." "what did you get..." "I don't know"

Although the children went through the answers, they weren't really given any time to correct their working which I feel like they missed out on the most important part of the lesson.

The whole endeavour felt more about testing the arithmetic than learning anything, which while it is necessary I'm not sure how often it needs to be done.

Before the lesson Teresa had to go and collect the tests from the printer, so I had to entertain the students for a bit. We got to play fizz buzz which was nice as it was a game I can remember playing a lot at school.

The actual maths lesson was about ratios, the children had done some work on them before from what I could tell.

Teresa used an interactive teaching tool where she could type in the answers the children gave and see if they were correct. The examples on the board were along the lines of a bouquet of flowers needs 3 lilies for every seven roses, what is the ratio of lillies to roses, how many lilies are needed for a bouquet with 49

roses. This was quite good, but most of the questions were word based, this may have been intentional as they may have already used objects and images in previous lessons and wanted to move onto word based problems. From what I could tell a lot of the children could have benefited from having objects or pictures to really cement the idea in their head. Images of diamonds to rubies were used once at the beginning of the lesson but never again.

The questions the teacher gave the students I felt weren't very good. A lot of them seemed badly thought out and weren't very obviously ratio question. The first one was simplify 7:21. The next one said if three apples cost £1.35 how much does 8 apples cost. In my head I wouldn't tackle this as a ratio question, in fact one of the students did it the way I would do it by finding the cost of one apple and multiplying it by 8. But the fact that students were encouraged to use a ratio for this seems to have made it more confusing.

The worst question was along the lines of "If it takes 6 builders 9 days to install a kitchen, how long will it take 2 builders". Most of the children immediately saw 6 and 9 and put together a ratio of 6:9 -> 2:3 and said it would take 2 builders 3 days, obviously this is incorrect as it would take longer. But this question is over the top and difficult for children who are just learning ratios. This should be an extension for the task, as the children would have to think about working out how many hours they would work and doing multiple extra calculations to work out the final answer.

What have you seen this week in terms of learning and teaching etc?

I have learnt that it is very important to choose good questions when teaching a topic. These can be just as important as the teaching themselves. Good questions can guide students in learning and discovering things themselves, bad questions can cause confusion and for students to become less clear on the topic. This is something I am familiar with myself even at university level. Good question sheets allow for discovery and understanding. This is something I will have to consider when designing my own project.

How do you feel about this week's school visit?

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

A lot of the children I dealt with really benefited from my explanations. While they were doing their own work, I was constantly getting asked questions, which was a nice problem to have as it meant the children really valued me and knew that I could help them. The only downside was that I couldn't help all of them and I felt bad choosing one over the other. Even though I was only meant to be working with a small group of girls one boy at the back needed my help and I couldn't exactly tell him no.

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

WEEK 13

Date: 29/1/25

Activities undertaken:

First session of project, followed by maths lesson / maths games.

Names of people worked with (if relevant):

Observations:

The first session of my project was mainly about getting to know the girls and following that with a little game.

I started off by asking the girls if they enjoyed maths by using thumbs up middle or down. One said they enjoyed it, 5 were in the middle and 2 said they really didn't like it. When I asked some of the girls why they didn't like it they said it was because they found it difficult.

The second question I asked the girls was whether they thought being good at maths was something you were born with or something you got better as you worked on it. They all agreed that it was a mixture of both, I should have asked them how much they thought each part impacted it. But it was good that they didn't think maths was completely God given.

The third question I asked the girls was "do they ever get worried in maths lessons?", after I asked this there was a resounding yes. All the girls said they got worried about maths at one point or another. When I asked why they were worried in maths lessons the most common answer I got was that if they didn't understand something the teacher might move on and they would be left behind not understanding something. Another similar answer was that they were worried that they would be the only ones in the class that don't understand something. E.g. a teacher would ask "does everyone understand this topic" and they don't want to be the only one with their hands down. They don't want to be the only person in a class that doesn't get something.

The last question I asked the girls was "do you ever know the answer to a question but still don't put your hand up". After a minute, all of them admitted to doing this. When I asked why they all said they were worried about getting the answer wrong. When I dug deeper, they were worried about people talking about them if they got the answer wrong, or at the class staring at them if they got the answer wrong. One girl said she doesn't want to appear stupid.

There were some other general comments I got from the girls. One was about how maths is more frustrating than other subjects because you either get it or you don't a lot of the time, if you don't understand what the teacher went through in a lesson you are just staring at your page guessing. It feels like there is nothing you can do, whereas with other subjects you can at least have a go at something and there is no right or wrong.

One of the girls said she finds it boring when the maths lesson is just filled with numbers and equations so I am going to try and plan a session around something that doesn't require any numbers such as geometry where they can do some arts and crafts such as making a Möbius strip. They can then spend some time

exploring the properties of it.

With the last ten minutes of my session, I played a game with the girls where I thought of a number between 1-100 and they had to find it out by asking yes or no questions. There were 8 of them in total so I told them they could have a 'dojo point' if they figured it out by the time it got to the last person. I was planning to have a discussion with them at the end about what was the best question they could ask, while a lot of them said "is the number odd or even", I didn't have time to talk to them about why this or equivocally "is the number \geq or $<$ 51" would have been the best question. I'll have to make sure to plan around the fact that I only have 30 minutes and it goes faster than you realise.

After my session the children had their maths lesson. A TA was leading the lesson as the usual teacher was away, the children were a lot louder and a lot more excitable. I'm not sure if this was because the TA was leading the session. She didn't seem to have the children under control as well as the usual teacher. The children didn't have the same level of 'respect' for her, they seemed to get up and out of their seats whenever they liked, and overall, the classroom was a bit chaotic.

The maths lesson did seem to comprise more of the children doing work than going through it on the board (not a good or bad thing). This was nice as it allowed me to spend more time helping the children as this is what I enjoy the most. They were doing scale drawings and again the questions they were given weren't very good. There was one question that had a 18 by 18cm square that had been drawn to scale on a grid as a 3*3 square. The sheet gave a question $18 \div \underline{\hspace{1cm}} = 3$, followed by "one small square is worth $\underline{\hspace{1cm}}$ cm". In my head they are both 6, and the first question is trying to lead with the understanding of the second one, but every student I spoke to had gotten the question wrong and didn't understand that the first one related to the second one. I had to rework the equation to say 3 small boxes * $\underline{\hspace{1cm}} = 18\text{cm}$ and this helped the students more.

One student, Aarav, really appreciated when I helped them and said "no one has ever explained it like that before". It feels like such shame that these students only get a couple of minutes of the teachers time if that, they clearly could all learn so much from 1:1 teaching.

What have you seen this week in terms of learning and teaching etc?

I think you must be firm with children; it is easier to keep children calm then it is to make them calm after they have got excited.

In the staff room a couple of teachers were talking about how it is harder to discipline children now. There are more guidelines around welfare of the children that doesn't allow for children to be told off or made uncomfortable.

Again I thought about how important having the right questions can be.

How do you feel about this week's school visit?

Overall I feel this weeks visit went well,

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

After talking to the girls about trying to be more interactive and raise their hand more in class, the girl that I sat close to in class did seem to raise her hand more in the maths lesson after and she looked at me as she put her hand up. Hopefully the girls will get more confident as the sessions go on.

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

The main challenge faced was the lack of time in the session, I will really have to plan in detail the sessions in future as it is difficult to gauge how much time the children will take. Hopefully this will be easier once we start doing more maths.

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

I would like to do some research around the design of questions for children. And also to plan a session where there are no numbers involved probably by using geometry.

Come up with a brief plan for future sessions, as I would like to do a project over two sessions where the children collect data about their classmates and then produce pie charts and graphs to represent them.

I also want to do some research about interaction to see if I can get the girls to be more interactive in their normal lessons.

WEEK 14

Date: 5/2/25

Activities undertaken:

Maths lesson – algebra substituting numbers for letters in equations e.g. $x = 10$, $y = 5$
 $3x + 5y = 3 \cdot 10 + 5 \cdot 5$

Names of people worked with (if relevant):

Observations:

The maths lesson was one of the most successful yet, the children really seemed to understand the content and were happy to do so as they thought algebra would be hard.

At the beginning of the maths lesson one of the students asked me what its called when you can swap to numbers in multiplication e.g. $6 \cdot 3 = 3 \cdot 6$ this was surprising as even though the concept is at their level putting a name to it isn't something most people do until university. Apparently one of the other teachers had told him about it.

In previous lessons the students had used physical objects to represent other values, i.e. tens and units' blocks. This is good as it cements their understanding, and I think it really helped in this lesson. They started off with using shapes to represent numbers and then moved on to letters, which also helped.

The students managed to understand most of the questions but often tried to do the whole question in their head. E.g. with a question $h = 5$, $g = 6$, $4(g-h) = \underline{\hspace{2cm}}$ they would try and go straight for the answer rather than writing $4 \cdot (6-5) = 4 \cdot (1) = 4$. This is a common theme and I often see children making their work more difficult for themselves rather than just writing obvious working out.

The question the children struggled most with was $m = 4/5$, $k = 0.1$ what is $m + 2k = \underline{\hspace{2cm}}$, the children struggled the most with this but I think this was more about converting fractions to decimals and vice versa as that is where I had to help most of the children.

Another part of algebra the children struggled with was understanding that $4x = 4 \cdot x$ not $4+x$ or something else, which is understandable as it is quite confusing notation at first. The way I explained it was that mathematicians just get lazy and don't want to write \cdot every time so we drop the symbol.

The last question the children were given was "True or False the value of $4a + b$ will always be greater than 4" It was nice to see the children get asked this type of question as it allowed them to think about

maths in the kind of way you would do at university. Really, they (dis)proved a statement without realising. Funnily though all of the children did something along the lines of $a = 0.5$ $b = 1$, $4a+b = 3$, none of the considered that a or b could be zero or negative.

My session this week was about making unexpected shapes, it was based on the Numberphile video by the name "Unexpected shapes (part 1 / 2)"

My plan was to start by making Mobius loops and exploring them by drawing on them and cutting them, then in the videos they show that two normal loops stuck back to back and then cut down the middle turn into a square, then they do the same with a mobius loop stuck to a normal loop and then a mobius loop to a mobius loop of the opposite chirality, to show what shapes they make.

In the session I showed the girls how to make the mobius loop and then got them to make one in pairs $\frac{3}{4}$ of the pairs managed and I gave on to the pair that couldn't do it. I then got the girls to draw round the loop with a pen to show them that it only had one side, again it was a bit tricky and took them a while but they got there in the end. The didn't realise anything straight away but when I reminded them that they had only drawn on one side and never flipped it over they got really freaked out. I then told them that this is because it only has one side, in hindsight I should've asked them how this is possible to see if they could figure it out themselves.

We then cut the mobius loop in half as to show them that it would stay so one piece, they were all very confused. They did all spend the next ten minutes trying to figure out how this was possible before they got slightly distracted at the end. The girls did seem to really enjoy the session and were very happy when I told them the session wouldn't contain any numbers. Considering most of them said they didn't like maths I think this was a positive way to start the sessions off.

After lunch time the TA took small groups of children to do some arithmetic questions, the groups were split into a girls and boys so Teresa suggested that I go and observe as it may be interesting to note the split between the groups. This week I only managed to observe the girls as the boys had already been when it was suggested I observed. I did notice that the girls seemed to be more confident when they are in a smaller group, and they appeared less anxious about getting an answer wrong. This is definitely a benefit of teaching in smaller groups.

What have you seen this week in terms of learning and teaching etc?

There wasn't too much to learn this week as the lesson and session went quite well. The only problem we had was that at the end of my session I didn't have enough time to start something new, so the girls were just left messing about for a couple of minutes which was quite hard to control. It is necessary to have a set task for the children to be doing otherwise they will cause chaos. By the end of the session the girls ended up cutting the mobius strips and making masks and earrings out of them.

How do you feel about this week's school visit?

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

The children enjoyed learning algebra, and I think we did a good job of explaining the algebra as the children really seemed to understand it and said things like "is it that easy". The girls also really enjoyed the session and I think they were surprised to learn that they can do maths without numbers as when I said "there aren't going to be any numbers in the session" one girl replied "is that even maths then?".

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

WEEK 15

(Copy, paste and edit these two pages to add entries to your journal)

Date: 12/2/25

Activities undertaken:

Children took a maths SATs practise paper.
Then the regular maths session in lunch as usual.

Names of people worked with (if relevant):

Observations:

There wasn't much to observe during the actual maths SATs paper, a few children needed help but all I could do was read the question to them.

While the children were sitting the SATs paper the teacher had marked the one they had taken the day before. When the children got back to classroom the teacher offered to read out the marks from the papers they did yesterday, she said they didn't have to have their mark read out in front of everyone if they didn't want to. Most of the children had their marks read out and everyone in the class was very supportive and clapped for everyone's marks. One boy and one girl didn't have their marks read out, they boy was particularly upset. Even though he didn't have to have marks read out this is basically telling the class that he thinks he didn't do well, he didn't even look at the mark he got and just turned the paper over, he did this again and again after the teacher turned it back. He was so upset that he was crying and had his head in his hands, this was really harsh to see as everyone in the class was really supportive and I don't think anyone would've judged him.

The session this week was based around statistics, I had no idea if the girls had heard of statistics before so I wanted to start from the very basics. We first discussed what statistics was, they had heard of statistics in the sense of "a statistic" but not as an area of maths. So then we discussed what data is, they had a basic understanding that data is information. Then we moved on to discussing that statistics is about collecting data and analysing/understanding it and even presenting it.

When I asked the students if they knew what data was, none of them put their hand up at first, but eventually one girl volunteered an answer and said, "Is it like information". She was very unsure of herself and I don't think she would have been confident enough to put her hand up in a regular lesson.

Then we brainstormed different ways of collecting data through asking people, collecting surveys, taking first hand observations and measurements, using secondary data.

Then we brainstormed ways of analysing data, I showed the girls some different charts to give them some ideas. I also mentioned averages, but they had never seen them before so I don't think that was much use.

Then I told the girls that they were going to be collecting their own data so they can present it in the next session, they seemed slightly more excited about this.

At the bottom of the worksheet, I gave the girls an opportunity to research about statistics and find interesting ways it can be used. This was based around the fact that if the girls found reasons to use statistics this might help boost their interest. There is also an opportunity for them to speak to their parents about maths in a positive light which might not normally happen.

Overall, the girls didn't seem as excited as last week, but they had just sat a SATs paper so that is probably why, hopefully next week they will be a bit more enthusiastic.

One girl said "Is there a worksheet, uuggghh" – so maybe I should try and stay away from worksheets as much as possible.

What have you seen this week in terms of learning and teaching etc?

This week it was quite difficult to control the girls, the first week they were quite nervous, so they were quiet at put their hands up, but now they are more confident they are more willing to shout out. This wouldn't be a bad thing if it was relevant what they were shouting out about. Although "shhhshing" the girls does get them to be quiet they are very off topic and often talk over me.

I guess maybe I need to make it clearer when I am talking so the girls don't talk over me.

How do you feel about this week's school visit?

This week's visit was a bit dull, but hopefully next week the session will be a bit more interesting and there will be a normal maths lesson for me to help with.

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

The girls learnt about a new area of maths, hopefully they found it interesting. It's good to open up new areas of maths for them and for them to learn about how it is used in the real world.

One girl noticed the fact that I had made the worksheet we were using and seemed impressed.

“Did you make this worksheet?”

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

WEEK 16

(Copy, paste and edit these two pages to add entries to your journal)

Date: 19/2/25

Activities undertaken:

Algebra lesson

Statistics session – Stephen visit

Names of people worked with (if relevant):

Observations:

Before the lesson the children did a times tables league, the children were given a grid of times tables questions some in order “medium” and the rest were given ones muddled up “normal”, the children then completed them as fast as they could and then wrote down how long it took them. At the end of the session they all read out their times and they were put into a ‘league table’. They were awarded points for how fast they did it and also a bonus point if you got into a new minute e.g. 5:15 to 4:45. This was the last one for the half term so their scores were added up and the two with the highest scores, one for “normal” and one for “medium” got to go and pick a toy out of a bucket. While in theory this encourages competing against yourself, even if the children improved loads they are never going to beat someone who was just good from the start. The children knew this as well, when the teacher asked “I wonder who will be the winner this term”, they all went “Joe...”. I think it is good to encourage people to get better but maybe doing it on a % change would be slightly better (although mildly unnecessarily complicated). None of the children seemed to be too disappointed with their times although one child didn’t finish in the time and seem quite disappointed. They also never check their answers so they could just get them completely wrong, although I’m sure most of the children got all of them right.

The maths lesson was based around algebra, it was about solving for an unknown in an equation. E.g. $y - 3 = 10$, solve for y . Most of the. Children did well and didn’t struggle with questions like this. The children found it a bit more challenging when multiplication was involved, e.g. $10y = 80$. I think some children didn’t really understand the concept or an “inverse operation” i.e. dividing my 10 to find out what y is, they just knew that $10 \times 8 = 80$. I did always try to reiterate that you are doing an operation to both side of the equation to try and find out what the unknown is, which helped solidify what the children were learning.

One question the children struggled with was “ Someone builds a tower out of bricks that have a height of $2a$, they tower they build is 7 blocks tall, the tower is 42cm tall , work out the value of a ”. The way I would work this out would be $7 \times 2a = 42$, $14a = 42$, $a = 3$, but when I was helping one student out he didn’t understand that you could go from $7 \times 2a = 14a$. I tried to explain this by simply making the multiplication more obvious $7 \times 2 \times a = 14 \times a$, but this also wasn’t quite clear enough. So I resorted to drawing out squares where each one represented a , I drew 7 pairs and made him count them and then he realised there were 14. I think this helped but didn’t fully help with the understanding that you can multiply with the coefficient of an unknown.

At the end of the lesson the teacher had to step out to speak to Stephen so I was left to explain that question and another one to the class. No one in the class really formed the equation the way I had. Most of them divided 42 by 7 to find out what $2a$ is and then divided by 2 to find a . Obviously this is completely understandable and also a correct method, but it did make me think if I was explaining these questions in the best way possible.

The session this week was a continuation of the previous week. Last week the children had collected their own data on people’s hair colour, eye colour and age, most of the children had forgotten to bring it in but soe had brought their own data in. This week I wanted them to present it by drawing bar charts. I started off buy giving the children some examples of bar charts and asking them “what is the most popular fruit?”, “what is the least popular fruit?” and saying I want them to answer as quickly as possible they all put their

hands out and then shouted out the correct answer. I then got them to do the same with the data they had collected or the data I had made up for them, obviously it took them a lot longer. I then got them to talk about which was faster and why it was faster, why this is an advantage. I then got them to organise the data they had collected by counting the amount of people with each hair colour and eye colour.

Then I asked them how they might draw the bar chart, most of them knew to simply draw the bars to the correct number and then colour them in. After the girls had completed their bar chart I asked them questions about what the most common hair colour was and got them to read it from their chart. Then the girls had to do a similar task for the eye colour, but they had to draw and label the bars themselves. Then I asked the girls more questions about their charts.

I tried to talk to the girls about whether they thought their data was representative of the real world, I was trying to get the idea that a large enough sample can be representative of the population but I don't think I explained it very well.

Unusually I had some time left at the end of the session so I decided to try and get the girls to work out the median age of the data they had collected. I got the girls to line up in age order so I could work out the median of them by picking the one in the middle of them. This worked quite well and it was nice to get the girls out of their chairs and moving, this is something I will try to incorporate in future sessions.

The girls seemed to get the median well, some girls were confused what to do if a number appeared twice, but by using the example of getting the girls to line up in age order I could explain that we have to write all of the repeated numbers as lots of the girls were the same age when the lined up.

In the last few minutes, I talked about why the median might not be any good. I tried to explain the concept of variance informally by using the example of the median of 2 10 year olds and a 90 year old.

The girls seemed much more excited by this session, I think getting them drawing and getting up and moving about really helped.

What have you seen this week in terms of learning and teaching etc?

I have learnt that sometimes the way you might tackle a question makes no sense to a child and they might be even more confused. It is often more beneficial to break a problem down into smaller parts than to make it more "complicated". It is easier to break a question down into smaller ones they know how to solve.

A lot of teaching is just asking the children the right questions, and a lot of learning is just asking yourself the right questions.

How do you feel about this week's school visit?

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

I need to focus on what I can get out of the sessions. I need to make sure I have enough to write about in my report.

I might need to directly talk to the girls about confidence in maths, about how they are much more confident in the sessions than they are in the classroom, and it would be great if they could transfer that confidence across as they are all very hard working.

I also need to consider modes of delivery of my sessions, I had one session that was quite crafty based but the last two have been very standard worksheet sessions. I might need to research how modes of delivery affect confidence. I would like to do a session where the girls are more active, as that way I have included lots of different modes of teaching.

WEEK 17

(Copy, paste and edit these two pages to add entries to your journal)

Date:

Activities undertaken:

Names of people worked with (if relevant):

Observations:

What have you seen this week in terms of learning and teaching etc?

How do you feel about this week's school visit?

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

WEEK 18

(Copy, paste and edit these two pages to add entries to your journal)

Date: 5/3/25

Activities undertaken:

Maths lesson – Adding decimals

Lunchtime Session – Coordinate grid (Revising old content)

Names of people worked with (if relevant):

Observations:

Before the maths lesson the children did a 10 minute grammar test, similar to the 10 minute maths tests I had seen them do before. At the end of the test the children had to read out their scores in front of the class like how they had done for the maths test. Compared to the maths one the children seemed to be less worried about their scores being read out, even though some of the children didn't do particularly well. I don't know if this shows that the stigma around maths is the problem rather than reading the scores out.

Maths lesson – Students were learning adding numbers with decimals. It seems like most of the children were already very good at this as most children only got one or two questions wrong for the whole lesson, normally because of a silly mistake. None of the children really required any help with any of the questions and they were all happy to work on their own.

Lunch time session – The plan for the session was to introduce the girls to coordinate grids (or refresh them if they had seen them before) then get them to follow a series of clues hidden behind a pieces of paper (labelled as a coordinate grid) on the floor. This would then lead them to find some sweets hidden in

the classroom. The clues were related to work I knew they had done in class and few other basic topics I was confident they had covered.

I started the session by giving each of the girls a coordinate grid and teaching them how to read off points from it. Teaching them “along the corridor and up the stairs”. Unfortunately, this part was a bit rushed, I felt I had too much to get through in the session so I didn’t spend as much time explaining the coordinate grid as I would’ve liked. I got them to read off the coordinates of a point I had drawn on the grid and then got them to point to a coordinate that I told them. I think this left them a bit confused and not all of them understood it. I then gave them the first clue and told them that if everyone solved one clue they would get a bonus “dojo point”. This part worked quite well as they were all eager to do I clue, I didn’t realise how much they would each want to solve a clue, I thought it would be the other way round because they would be nervous about getting it wrong. But it shows how much confidence they have when they are in a more casual environment.

Above each clue I wrote either ‘The answer to this clue will tell you the first/second coordinate (the X/Y coordinate)’ or I wrote “The answer to this clue will tell you how many steps left/right/up/down to take” In my head the children would interpret this as moving from the square they were currently but they seemed to get confused and think that moving 4 steps to the right and 3 up would be going to the tile with (4,3) written on it. This is probably my own fault as when I was explaining the coordinates I was talking about going along and up, I should have either made my explanation clearer or made the clue clearer.

Most of the clues written on other cards worked quite well, they were either: algebra, missing number equations, geometry, ratios, or long division. This worked quite well apart from the simplifying ratios which I think the children had forgotten. After the session I heard one child speaking to a boy who wasn’t in the session saying “we had to do really difficult maths that we learnt ages ago” I think this is a good thing as it shows the children were revising what they already knew, if they had done all of it too easily then it wouldn’t have been effective revision.

Some of the clues I wrote were a bit difficult because of how the long division worked, i.e $112 / 16$, the children couldn’t really practise long division, they just had to count the multiples of 16 as $112 / 16$ was less than 10 so there was no real long division being done. However, all of the girls worked their clues out, sometimes with a bit of help but most of them did it on their own. Although I had planned to have one child do a clue at a time individually this kind of backfired as then 7/8 girls weren’t doing anything for all the session.

Unfortunately, the session ran over time by the time the girls had got to the last clue and I didn’t have time to do a summary of what they had learnt in the session at the end.

Overall, the girls seemed to really enjoy the session and I think it was good to get them doing something active.

What have you seen this week in terms of learning and teaching etc?

How do you feel about this week's school visit?

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?
The timing of the session was definitely the biggest challenge.

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

I need to make sure to have some kind of plenary / recap to talk to the girls about their confidence at the end of the last session as this is the main aim of the sessions and I don't want to get to the end without actually talking about confidence.

WEEK 19

(Copy, paste and edit these two pages to add entries to your journal)

Date: 12/3/25

Activities undertaken:

Maths lesson: Dividing decimals by integers

Lunch session: 1-2 Nim

Names of people worked with (if relevant):

Observations:

Before the maths lesson started one of the children asked the teacher if they could do “times tables league”. This is where the complete a multiplication grid 1-12 and try and beat their time from a previous week. The boy who suggested it quite likes maths and is quite good at it, so it didn’t surprise me. Teresa then asked the class who else wanted to do times tables league, to my surprise the vast majority of the class put their hands up. I did notice that the few students who didn’t put their hands up were mostly girls. It seems that the competition does influence the children wanting to do maths. All the children seemed to enjoy doing their times tables, which isn’t something most children would experience.

The maths lesson was dividing decimals by integers, I initially thought the students were going to struggle with this, but they all did well. They didn’t seem to struggle transferring their normal division skills to dividing decimals. Some students were unsure but usually correct, just lacked confidence.

Some of the questions were slightly confusing, I’m not sure what they were trying to teach the children. A lot of the questions helped the children by saying $4.12 \div 4 = 1.03$ so $0.412 \div 3 = \underline{\hspace{1cm}}$. But some of the questions were confusing, such as $6.36 \div 3 = \underline{\hspace{1cm}} \div 6$. If I was teaching children how to solve this I would get them to solve the LHS and then multiply by 6, but I think the equation is suggesting that the unknown would be double 6.36 because you are dividing by double of 3, in my head this is quite an in depth understanding of division and multiplication and how they interact, I wouldn’t expect the children to see that straight away. For me that didn’t really teach the children anything and probably just confused them even more.

The lunchtime session for this week was based around a game I had found on a maths website. It was called 1-2 nim, it is a two-player game with 8 counters. Each player can take either one or two counters

and the player to take the last counter wins the game. I started by explaining the game to the girls and playing a game as an example, I then let the girls play a few rounds in their pairs. They understood the game, but a few of the children got a bit too excited/annoyed when they lost.

I then got the girls attention again and asked them how we could make the game simpler so we could figure out the best strategy, one girl suggested playing with 6 counters, I then said how could we make it even easier, then another suggested 4 counters and then 2 and then 1. So I asked what the best move would be if there is only one counter, they all said just take it and win, and the same with two counters. I then asked them what the best thing would be to do for 3 counters, it took them an second so I asked them "what don't you want to do" and they said you don't want to go first. I gave the girls a sheet to write down the strategy for 1,2 and 3 counters.

At this point I told the girls to go off and play the game and figure out the best strategy for 4-8 counters. They then experimented amongst themselves, it was a bit trickier to figure out what to do with more counters but a lot of the girls figure out what to do with more counters and were desperate to play against me so they could beat me. While the girls were exploring different strategies, I was playing against them trying to prove or disprove their strategies.

I drew the girl's attention back in to try and get them to share what they found, most of them had found the correct strategies for higher numbers of counters and were happy to share. I wanted to see if the girls could spot a pattern in the strategies, it required a bit of coaching but when I read out the strategies they realised that when it was a multiple of 3 you wanted to go second, one more than a multiple of three you go first and take one, and two more than a multiple of three you go first and take two. I tried to lay the counters out in a grid with three rows to show how this worked intuitively but it was a bit rushed and I'm not sure they really go it.

The design of this session, the mixture of the game and competition really seemed to motivate some of the more uninterested students. The students that were necessarily quiet but didn't really seem to enjoy maths seemed to put a lot more effort into this session.

It was unfortunate the session was a bit rushed, but I wanted time to talk the girls at the end about their confidence in maths. I told them that they are all capable and how they had shown me how had working they were over the last 8 weeks. I also told them that even though the might not all chose to do maths in the future they are all capable of doing so if they wished.

One girl told me that while she hasn't enjoyed normal maths lessons more, she has enjoyed the sessions I have done. It is difficult to have an impact on the maths lessons when I can only do a half an hour session once a week so I suppose this was the best outcome I could have hoped for.

At the end of the session the girls were very sweet and wrote thank you notes for me. It was very nice to know that they appreciated and enjoyed the sessions.

What have you seen this week in terms of learning and teaching etc?

How do you feel about this week's school visit?

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

I think the biggest challenge I faced at school was classroom management. Even though everyone there was mostly very well behaved I didn't have the experience to be able to keep the classroom quiet and the girl's attention at all times. It was so bad that at one point a teacher came in and told the girls they were being too loud even though they had an adult in there with them. I think because of the nature of the mats sessions trying to be more fun and casual than a regular lesson it was difficult to get the girls to be quiet and only speak once they put their hand up as I would have liked.

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

WEEK 20

(Copy, paste and edit these two pages to add entries to your journal)

Date:

Activities undertaken:

Names of people worked with (if relevant):

Observations:

What have you seen this week in terms of learning and teaching etc?

How do you feel about this week's school visit?

Positive outcomes

Include comments on: What did you enjoy about the session? What did you see as your contribution? Did the people you worked with understand something new? Materials developed? Don't forget to note any evidence for your thoughts.

Challenges faced

Did you have any difficulties? Why do think they arose? How did you deal with them?

Action

Is there anything you would like to work on/do differently next time? This could be formulated after discussion with the module co-ordinator or external partner. Make a note of what happened when you implement your plan.

5. PERSONAL REFLECTION

5.1 Focusing Your Reflection

As an adult you already have much insight into yourself, but it is possible to build on this knowledge and this can enhance your chances of achieving your potential in the future.

Learning to communicate about your personal qualities and attributes in a way which makes sense to other people is a prerequisite to achieving your goals in further study, employment and other areas of life. Writing about yourself will help your fluency in communication.

As you keep your Journal on a weekly basis there may be things you discover about yourself which are worth noting in greater detail. Use this section to draw together information about yourself. You are encouraged to do this in a well established framework of ***values, skills, interests and observations of the experience of project, science learning and the organisation of the school you are working with***. There is a section for each where you can record your thoughts and any evidence you have for your conclusions.

The benefits of reflection to you:

- Find out more about yourself;
- Learn how to communicate about your skills and attributes;
- Help yourself in reaching your objectives.

5.2 Interests

What are you learning about your interests?

5.3 Skills

This section allows you to record what you are learning about your skills. You already have a wide range of skills and personal qualities, some more developed than others. The skills and qualities which the project will help you develop include:

- **Communication**
- **Leadership**
- **Negotiation**
- **Prioritising**
- **Team Work**
- **Organisation**
- **Decision making**
- **Motivation of others**
- **Patience**
- **Taking responsibility**
- **Using your initiative**

Try to describe the skill and the ways in which you feel you possess it. You may also identify and be able to demonstrate other personal or learning skills. Identify gaps or limitations in skills which you feel it is important to address, and indicate it in the 'Further Action' column.

Record of thoughts on skills development	Further Action

5.4 Values

This section allows you to write about what you are learning about your values.

Values reflect your views about how you wish to function in the world. During your project you will have the chance to gain a deeper insight into your personal views which you may never want to communicate with anyone else. However, your values influence your decisions very deeply and it can be very useful to understand on what basis you are making some of your more important decisions.

- Note what you're happy/unhappy doing or things you notice which conflict with or support your sense of values.
- Reflect on what basic value these feelings are attached to.
- You may feel the need to acquire further information or find out what other people think about certain issues. Indicate this in the 'Further Action' column.

Record of thoughts about your values	Further Action

5.5 Other Thoughts about the Project Experience

This section allows you to record any other thoughts about the project experience and your personal development which you have not mentioned in the previous sections e.g. Are you meeting your original objectives? Have they changed in any way?

Record of thoughts	Further Action

5.6 Organisation of Schools and Teaching

This section allows you to record your thoughts and observations about the organisation of schools and teaching.

Write about:

- Schools as organisations;
- Culture of schools, e.g. staffroom, playground etc.;
- Health and safety;
- Organisation of teaching.

How do your observations relate to:

- Current policy?
- Discussion of related issues in the media?

Record of thoughts on above areas/questions

5.7 Maths Learning and Teaching in Schools

This section allows you to write about your awareness of the role of maths learning and teaching in schools, how learning about maths takes place in schools and your potential contribution to it.

- How does maths learning and teaching in schools contribute to peoples' maths learning?
- What kinds of things did you observe during your placement and/or your project?
- How and when does maths learning take place?
- What have you contributed to engagement in maths in schools?
- What was the attitude of the people (both teachers and pupils) towards:
 - maths learning?
 - maths in society?

Record of thoughts on above questions	Further Action (where relevant)

6. ACTION PLANNING

6.1 SMART Plans

Use this page to develop your thoughts about how you are going to build on your experience. It may have given you ideas about:

- A future job;
- How you learn best;
- How you act in certain situations;
- How others learn;
- What you enjoy;
- What you want to avoid;
- How you get on with people in different communities.

You can plan to do something about all of these areas of your life (and of course any others that you have come up with).

Use SMART goals to help you achieve your objectives. These are goals which are:

Specific
Measurable
Action-Oriented
Realistic
with a **T**ime-scale defined

Action Planning in this way will help you:

- Set goals for your future development;
- Make sure the goals are achievable;
- Help you reach your objectives with minimum frustration.

For example: "I'm still not sure which community I want to work with. To find out more about this I will try to get some more experience with a specific community that I haven't worked with before in the next 3 months."

6.2 Personal Action Plan

Areas to address:

SMART Goals: