

**The University of Manchester**

**Manchester Institute of Education**

**Secondary PGCE**

**Mathematics PGCE Curriculum Handbook**

**2023-2024**

**The purpose of this handbook**

Thank you for choosing The University of Manchester for your PGCE, which is the start of your teaching career.

The purpose of the PGCE Mathematics Trainee Handbook is to orientate you regarding all matters concerning your PGCE year. It will give you an idea of the PGCE Mathematics course content, aims, and will help you navigate different aspects of the course, from placements to assignments. It will raise awareness of the Core Curriculum Framework (CCF).

This handbook gives you an overview of teaching sessions specific to PGCE Mathematics and outline the Educational and Professional Studies (EPS) programme. It provides detailed information regarding subject specific reading, subject reading lists and useful social media links to follow to maximize your knowledge of teaching of your subject. It also highlights the expectations of trainees and mentors in your subject area, with a summary of key roles and responsibilities.

This subject handbook should be used in conjunction with PGCE Secondary curriculum handbook which has useful guidance for all trainees regardless of subject area. You will also need to reference the Graded Assignments Handbook in relation to the three Masters assignments.

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**Welcome to the PGCE Mathematics course at UoM**

The University of Manchester Mathematics PGCE Course is designed to ensure you are fully prepared to begin your career in education and to allow you to enter the profession as an Early Career Teacher (ECT). The UoM PGCE programme is recognised as ‘Outstanding in all areas’ by Ofsted and we are a leading provider for Initial Teacher Education (ITE). Throughout the course you will learn how to apply subject and curriculum knowledge, pedagogy, and assessment techniques to ensure that your students make progress and develop an interest in the subject. During the course you will be asked to engage in wider debates around education which will develop your understanding of education from sociological and political position, allowing you to adapt your to adapt your practice to a variety of school settings.

**Support for individual needs and/or disability**

Please let us know of any individual needs or disability so we can support you in the best possible way.

We will be more than happy to make adjustments to support you. As well as the support from your tutors you can register with the Disability Advisory and Support Service (DASS) at the University of Manchester. You can find further information at [www.dass.manchester.ac.uk](http://www.dass.manchester.ac.uk).

In the School of Environment, Education and Development (SEED) you can also access support from the Information, Advice and Guidance (IAG) Team in person 9am to 5 pm Monday to Friday at the SID desk on the 2nd floor of the Arthur Lewis Building or you can e mail the team at seed.iag@manchester.ac.uk. To find out more you can follow the team on Instagram @uomseed.

**Aims and overview of the Mathematics Subject Programme**

By the end of the academic year, all trainees work towards achieving Qualified Teacher Status or QTS and the award of a Post Graduate Certificate in Education. You can choose to be awarded a QTS for 11-16 or 11-18. The majority of our trainee teachers qualify as 11 – 18 teachers since they are interested to teach up to A level mathematics, however you might wish to choose to qualify as an 11 to 16 teacher.

Our curriculum provides access to the knowledge and experiences laid out in the DfE ITT Core Content Framework (known as the CCF) <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/974307/ITT_core_content_framework_.pdf> , and will equip you to meet the Teachers’ Standards <https://www.gov.uk/government/publications/teachers-standards> at the end of the programme, and so gain Qualified Teacher Status (QTS).

A full version of the mathematics curriculum is available on Blackboard.

We have our own aims on the Mathematics PGCE course. These aims will allow you to meet The Teacher Standards and be awarded the academic PGCE, but to go a step further. The Mathematics aims of the course will develop your expertise in the value and importance of school Mathematics. This knowledge then creates an excellent and well-rounded reflective Mathematics teacher.

The aims of the Mathematics PGCE work alongside the programme wide PGCE aims at The University of Manchester. All Mathematics PGCE trainees will work towards meeting the following aims:

1. To understand how Mathematics as a subject applies to everyday life, learn its foundations and origins and complexities as a subject to be taught in schools; and learn how to articulate the belief that Mathematics is an exciting and creative subject.
2. To understand how Mathematics is learnt by children, through an appreciation of learning theory. They will appreciate how children make sense of Mathematics and demonstrate learning of the subject.
3. To learn how to plan, teach, and assess Mathematics learning experiences, which are embedded in mathematical pedagogical knowledge. This will be demonstrated in and out of the classroom. Trainees will learn how to reflect on whether these practices have allowed Mathematics learning to take place.
4. To demonstrate a range of pedagogical practices which are suited best for their pupils progression in mathematical knowledge acquisition. They will construct their own understandings through working collaboratively on engaging, challenging tasks, problem solving and reflecting on their experience.
5. To learn how to support children to investigate mathematics solve porblems, make connections, use reasoning and proof, exploit ICT and draw on the historical and cultural roots of mathematics.
6. To appreciate that their own subject and pedagogical knowledge is crucial in their own ability to teaching good Mathematics lessons and therefore to complete scholarly activities to keep it present.
7. To appreciate the many complex reasons why mathematical attainment varies across certain groups of children regarding race, gender, ability and wealth. Trainees will aim to address these barriers through research informed practice.

The PGCE Mathematics course from The University of Manchester will prepare you for teaching in your training year and beyond. We understand that you will have many questions at the beginning of the course but we will guide you in becoming an excellent Mathematics teacher. To do this effectively you will need to engage with educational theory as you begin to teach as an intellectual and as a reflective pursuit.

During the course you will explore how Mathematics contributes and enriches a child’s education. You will gain an understanding of why Mathematical skills and knowledge are of important value to pupil’s education. This makes your role as Mathematics teacher incredibly important and one which is rewarding. Your ideas and beliefs of Mathematics and Mathematics pedagogy will impact on the pupils you teach. We recognise that each of you is unique and brings to the course your own values, interests, knowledge and skills. You will have different, but equally valid, reasons for achieving qualified teacher status, and have enthusiasm and expertise within an area of Mathematics. Throughout the PGCE we seek to build on this and encourage you to play a key role in developing each other’s wider skills and knowledge. Collaboration and teamwork between trainees, mentors and teachers in schools, and university staff makes that possible. From the start, you are given opportunities to work in collaborative learning groups and to share and reflect together on your developing practice as well as to consider the key issues you will face in the mathematics classroom.

A detailed timetable of university sessions will be shared on Blackboard.

**The PGCE Mathematics Curriculum: its intent, implementation, and impact.**

The mathematics subject tutors have created a curriculum based on their own experiences of teaching the subject, guidance from subject mentors in school, subject associations and exam boards, and collaboration with Mathematics networks around the country. Understanding and interpreting the National Curriculum for Mathematics plays a prominent role. The mathematics curriculum has been grounded in the needs of schools, through dialogue with subject mentors and through observational visits. The key to the curriculum is that trainees learn through rehearsal and critical discussion in the university, and then through practice, reflection and critical discussion in their placements. You will learn a lot from your school placements: teaching and reflecting on planning, reading schemes of work, improving subject knowledge, and assessing. And in particular you will learn a huge amount through your observations of learners in Mathematics lessons in your department.

**Mathematics Curriculum intent**

*Mathematics is an exciting and creative subject. The University of Manchester secondary mathematics education team believes that learners construct their own understandings through working collaboratively on engaging, challenging tasks, and reflecting on their experience. We believe that to appreciate the beauty of mathematics learners as well as practicing should use investigative and problem-solving approaches, make connections, encourage reasoning and proof, exploit ICT and draw on the historical and cultural roots of mathematics.* As stated by the National Curriculum: *Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life, critical to science, technology, and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.*

The intention of the University of Manchester Mathematics PGCE is to train teachers who can address the above aims of the subject by providing a high-quality, inclusive Mathematics education to pupils in all manner of school settings. Trainees will know what the National Curriculum for Mathematics includes, and they will be able to teach to exam specifications. They will be able to demonstrate their subject knowledge through sound pedagogy. Mathematics trainees will learn and reflect on teaching and will be able to make reflection-based choices on how best to address misconceptions, assess and teach Mathematics. They will be able to demonstrate sound assessment practices and will be able to judge whether their pupils have made progress in an activity, lesson, scheme of work or phase of learning. Most importantly, trainees will know from practice and academic study that Mathematics is a subject suitable for all pupils, no matter their need or background, and they will create a teaching culture that fosters inclusion and progress for all. Trainees will reflect on recent development of the mathematics curriculum and exam specification, in particular they will be encouraged to develop their skills in teaching through problem solving and will become familiar with teaching for mastery.

**Mathematics Curriculum content – core questions**

The mathematics curriculum aims to develop trainees by providing knowledge and reflective practices in: Mathematics curricular knowledge, Mathematics subject knowledge, Mathematics assessment practices and most importantly Mathematics -related pedagogical practices. This curriculum has been constructed through personal and professional practices as well as subject expertise from serving teachers and subject bodies such as exam boards, subject associations, and the National Centre for Excellence in Teaching Mathematics (NCETM). The below tables show the mathematics curriculum for university blocks relating to placement 1, 2 and 3. The curriculum is positioned as ‘Core questions. You will reflect on these core questions in lecture and seminar formats and rehearse relevant activities as a group, and then practice and reflect on these questions in placement.

For most core questions, you are expected to demonstrate learning through discussion, planning and teaching episodes.

**Table 1: Mathematics Curriculum Overview**

|  |  |  |
| --- | --- | --- |
| **Mathematics Curriculum Content U1/P1** | **Mathematics Curriculum Content U2/P2** | **Mathematics Curriculum Content U3/P3** |
| Why teach Mathematics? | How do your pupils learn Mathematics? | What is mathematics ’s role in global citizenship? How did mathematics develop historically?  |
| Who decides what we teach in Mathematics? | What is mathematical understanding, in the classroom? | Reflecting on your practice, what values have you taught in Mathematics?  |
| How do we establish routines in the mathematics classroom? | How does Mathematics support intellectual development for all? | How can mathematics support global citizenship and sustainability, social justice and climate justice?  |
| What it is to think as a mathematician  | How do we address misconceptions in Mathematics? | What does the future hold for Mathematics education?  |
| How is a teacher’s passion for Mathematics made clear?  | How do we ensure that mathematics an inclusive subject? | How do you maintain professional development? |
| What is a Mathematics curriculum at KS3- KS5? | How can mathematics support EAL pupil?  | How to keep developing your subject and pedagogical knowledge in mathematics? |
| How can Mathematics curricula be constructed and planned? | Mathematics and pupils with special educational needs | Having fun with mathematics  |
| How do we show progression and continuity in school Mathematics? | Addressing diversity, social class, and gender representations in Mathematics  | Can Mathematics teachers engage with deeper research?  |
| What is pedagogy? How do pupils learn? What learning theories are suitable for Mathematics? | How do we adapt mathematics teaching to pupils’ needs better in placement 2? | Career opportunities for mathematics teachers. |
| How do we plan, monitor and assess Mathematics learning (part 1)? | How do we assess learning better in Placement 2?  | Mathematics teaching outside the classroom  |
| How do we differentiate (part 1)? | How do we use assessment to adapt teaching for all learners?  | How do mathematics teachers continue to develop their skills after the PGCE?  |
| Mathematical knowledge for teaching.  | How to adapt teaching to learners of different ages  | Mathematics as a creative subject  |
| Teachers as professionals  | Teaching mathematics through problem solving  | How to adapt your teaching to different contexts |
| How do we engage all learners in mathematics? | How to we stimulate learners’ intellectual curiosity in Mathematics?  |  |

**ITAP**

Starting from the 2024/25 academic year, all initial teacher training (ITT) programmes in England must include an Intensive Training and Practice (ITAP) component.

Intensive Training and Practice (ITAP) is designed to increase coherence between theory and practice and allow trainees to reflect on how research can inform practice. ITAP is part of the university component of the course and is not does not have to take place in a school and must be additional to, the placement itself.

During ITAP, trainees observe and reflect upon expert practice. The design of the experience should support trainees to understand what it is that makes such practice effective and to reflect on how it could be embedded in their own practice. Trainees should then have the opportunity to apply what they have learned through, for example, rehearsal and/or live practice, receiving constructive feedback from expert colleagues.

<https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1079080/ITT_Reform_Accompanying_Document.pdf>

The UoM five ITAP day themes reflect areas within our curriculum (and the CCF).

* Behaviour for learning (core area 1.2)
* Subject and curriculum knowledge (core area 2)
* How pupils learn (core area 3.2)
* Adaptive teaching (core area 3.3)
* Assessment (core area 4)

Following the ITAP days trainees will be encouraged to log their experiences reflections.

**Meeting the Qualified Teachers’ Standards (gaining QTS)**

The Teachers’ Standards define the minimum level of practice expected of trainees and teachers from the point of being awarded Qualified Teacher Status or QTS <https://www.gov.uk/government/publications/teachers-standards>. The performance of trainees is judged against the Standards at the end of the PGCE. During your training year, your subject tutor and school mentor will assess your development in accordance with the University of Manchester curriculum. Feedback from your subject tutor and school subject mentor will guide your development. As the year progresses, with the support of your university tutor and subject mentors, you will develop the skills, knowledge and dispositions required to meet the Standards. If there is any issue about you meeting the Standards during the year, you will be made aware of this with plenty of time to address that issue.

Teachers’ Standard (TS1) states ‘A teacher must set high expectations which inspire, motivate and challenge pupils.

*The University of Manchester Mathematics curriculum has consistently supported trainees to be able to plan exciting lessons which use a range of activities that motivate pupils; to use a range of interesting and differentiated objectives that challenge all pupils to make progress; to model high expectations by being well planned, research the topic well and made sure the mathematics being taught is pitched appropriately for their classes.*

As another example, Teacher Standard (TS2) ‘A teacher must promote good progress and outcomes by pupils.

*The University of Manchester Mathematics curriculum has consistently supported trainees to check learning of pupils such as using a test; using a mark book where they can track the progress being made by pupils; marking pupils work for either homework or classwork and giving feedback that celebrated successes and advice for improving their learning.*

**Education Professional Studies (EPS)**

Alongside your subject sessions in university and school experience you also follow the Education and Professional Studies Curriculum or EPS. EPS is a carefully constructed course within the PGCE, taught in mixed groups comprising trainees from across the PGCE subject areas, and linking to sessions in schools. EPS addresses critical issues for all teachers such as inclusion, diversity and equality, safeguarding, special educational needs, relationships and sex education and education and disadvantage. At the start of the year, you will be provided with an overview of all EPS sessions and an EPS workbook which is completed as you work your way through the programme. One trainee’s view of EPS is given below:

**Roles and Responsibilities in your PGCE year.**

The PGCE course at The University of Manchester uses a wealth of experience from range of experienced individuals. In University sessions you’ll get to know your subject tutor, PGCE leader and EPS tutors. You’ll also get to know the Professional Support team (PS) well and they are crucial in you navigating the requirements of the course.

The table below outlines the titles and roles of all the people you will be working alongside at University and on school placements this year.

|  |  |
| --- | --- |
| **Who?** | **Key roles** |
| Headteacher | Provide overall commitment and structure to facilitate effective ITE in school or college |
| Professional mentor \* | Ensure the key aspects of the partnership agreement are adhered to. Oversee trainee placements and work with the university to resolve any issues should they emerge Select mentors who are experienced and able to give the trainee support and mentoringEnsure subject mentors attend mentor trainingOffer moderation observations, support and guidance where needed to both subject mentors and trainees |
| Subject mentor \* | Attend mentor training in order to be prepared for and complete the expectations and requirement of the placementOffer time and support to the trainee to assist them in making progress across the placement including modelling good practice, agreeing clear targets, and checking planning, with a strong subject specific element.Model good practice and work collaboratively with the trainee to mentor and coach their development |
| Other school staff | Be willing to be approached by the trainee if they have a subject or specific leadership role that may support the trainee’s progress or subject knowledgeModel good practice and encourage the trainee to learn from their experience and/or expertise |

#

We are committed to a reciprocal and collaborative partnership with partnership schools, and this is built upon clear systems and communication. This is essential in ensuring trainees receive the best support, training and outcomes as they enter the profession. The course directors and partnership lead will maintain a broad overview of trainees’ progress and the course impact.

|  |  |
| --- | --- |
| **Who?** | **Key roles** |
| Programme Director | Oversee the trainee cohort and ensure that all course compliance aspects are adhered to for trainees to be complete the course and be recommended for QTSMeet with trainees who are experiencing significant difficulties or are at risk of not completing the course or school placement, using the warning system where necessaryLiaise with School Liaison Officer (SLO) team, Professional Mentors and others around any issues emerging from specific trainees, schools or mentors |
| School Liaison Officer (Team)  | Oversee the partnership as a whole and support the current cohort of trainees to meet the school placement and course requirementsMonitor and QA the partnership, report back to programme director, advisory boards and, where necessary, specific school partnersContribute to Partnership Committee to share appropriate updates and developments with partner schools to maintain the collaborative partnershipSupport schools, professional tutors, mentors, and trainees to resolve any issues that may be a barrier to a trainee making successful progress  |
| Subject tutor | To be the main point of contact for their trainees and their placement schools, and be involved with the placing of trainees to ensure they meet the placement requirementsSupport schools, mentor and trainees during school placements including regular visits, moderation observations, file checks and meetings with mentors/trainees Support trainees and/or mentors having trouble or barriers to progress to resolve issues and improve trainee outcomes, through setting up and agreeing action plansOversee the assessment of trainees in line with UoM curriculum and Teachers’ Standards |
| Trainee \* | Meet the expectations outlined in the Secondary handbook and subject handbook, in terms of professionalism, teaching and record keepingTo be responsive to feedback and open to being mentored to improve their professional skillsRepresent the university and the expectations of the course to a high standard. |
| Professional Support Staff  | Support trainees in all compliance and registration checksCommunicate notices from The University of Manchester to trainees, such Blackboard notificationsDeal with day-to-day enquiries Help with assignment submissions.The PS staff are a vital component of the successful running of this course.  |

**Mathematics Tutors**

There are four University tutors, all of whom are qualified and experienced teachers:

Rosa Archer (Programme Director) C2.17 rosa.archer@manchester.ac.uk

Siân Morgan (Team Leader) C2.17 sian.morgan@manchester.ac.uk

David Swanson C2.17 david.swanson@manchester.ac.uk

Mark Williams C2.17 mark.williams-6@manchester.ac.uk

Guiding your development into a teacher is the most important role your university tutor has. You and your tutor will develop a strong relationship throughout the year and in most cases remain in contact after you have qualified. Your tutor will act as a mentor, friend, assessor, and lecturer and will have a variety of responsibilities over the year to aid your teaching and development.

Some of the roles your university tutor has:

* Arrange placements and train mentors for your school experience
* Plan and deliver University subject sessions and EPS sessions
* Complete tutorials on a termly basis
* Go through assignments with you and make sure you are progressing well on the academic course
* Visit trainees in schools and complete observations to ensure you are developing well
* Review your evidence of teaching and assess it against the Teachers’ Standards at the end of the programme
* Mark and assess any academic work
* Monitor wellbeing and provide pastoral support
* They also spend a lot of time answering your emails and questions!

**Rosa Archer** Secondary PGCE Lecturer in Mathematics s PGCE (PhD, MSc, BSc (Mathematics and Physics), QTS.) **rosa.archer@manchester.ac.uk**

Rosa has many years teaching experience in both the secondary and sixth from sector and was graded outstanding on two occasions by Ofsted. Rosa graduated in Mathematics and Physics from the university of Rome. She completed a PhD in Pure Mathematics, Algebraic Topology at the University of Warwick. Before taking a post as a PGCE lecturer at St Mary’s University in Twickenham Rosa was a head of department in a sixth form college in Reading. On this occasion Rosa guided the department to move from an Ofsted grade 4 to grade 2 in the space of two years. Rosa moved to Manchester in 2011 where she took the post of Team Leader for the Secondary Mathematics PGCE, where she is now Programme Director, she also teaches a year 3 course in the school of mathematics and on the Subject Knowledge Enhancement Course.

Rosa is passionate about mathematics and about teaching. All of her research is aimed at making the learning experience a good one for young people as well as teachers.

Currently Rosa is researching Lesson Study (a professional development technique for teachers) in the context of Initial Teacher Education. She has also worked with an international team researching issues related to subject knowledge for mathematics teaching.

**Siân Morgan**, Secondary PGCE Lecturer in Mathematics and Team Leader. (MSc in Educational Research, PGCE, BSc (Hons) in Mathematics) **sian.morgan@manchester.ac.uk**

Siân taught for several years in various secondary schools across Greater Manchester. Following this, she continued to share her passion for mathematics teaching as a mathematics consultant for a local authority. Since 2011, Siân has been part of the secondary mathematics tutor team at the University of Manchester and currently leads the secondary mathematics team. In 2015 she was awarded an MSc in Educational Research with lesson study as the main research focus.

Her current research interests continue to involve lesson study, but also professional development and mathematical pedagogy. She is also a CPD trainer and facilitator who works closely with the NW1 Maths Hub (having previously worked at the school). She supports colleagues in school and has delivered courses, in addition to NW1 Maths Hub, to NCETM and the Prince’s Teaching Institute (PTI).

**David Swanson**, Secondary PGCE Lecturer in Mathematics (PhD in Educational Research, PGCE, MA and MSc in Mathematics). **david.swanson@manchester.ac.uk**

Following an MA in Mathematics and an MSc in the Mathematics of Non-Linear Models, David completed his PGCE in Secondary Mathematics at The University of Manchester. He taught mathematics for 15 years in further education before returning to the University, gaining his PhD and joining the PGCE course as a tutor.

Alongside his work on the PGCE he is heavily involved in developing and delivering professional development courses for mathematics teachers with the NW1 Mathematics Hub, alongside work on research projects at the University. Projects he has been involved with include; Teleprism, The Royal Society Vision project, NCETM’s Multiplicative reasoning project, an ESRC IAA Q-Step/Core Maths, and a project on mathematics anxiety for the British Academy.

His main research interests are in the theory and practice of mathematical concept development and pedagogy using a Vygotskian framework; lesson study; and social issues in mathematics education from a critical perspective. As well as publishing on these themes he tries to bring the understanding developed through his research into the PGCE course in forms that are practical for the classroom.

**Mark Williams** Secondary PGCE Tutor in Mathematics and Science. (PGCE, BSc Hons Chemistry)

Mark has been in the classroom for a decade, having completed his Secondary PGCE at the University of Manchester in 2012.

He has taught in several schools across Greater Manchester during this time, having coordinated teaching and learning in departments and working as a head of year. Currently, Mark works part time at Withington Girls’ school as a chemistry teacher alongside working as a tutor on the maths and science PGCE courses.

Mark is passionate about teaching and learning and continues to deploy current research and strategies in his classroom, and aspires to conduct research of his own. His passion lies in the importance of an effective year 7 curriculum, metacognition, and high quality questioning in the classroom.

**Your role as a PGCE Mathematics trainee**

PGCE trainees have specific expectations and duties for both University sessions and for school placements. For clarity, these are listed below. We expect all our students to act responsibly and to maintain high standards of professional conduct throughout the course. This aspect of your practice is hugely important and underpins your ability to meet Teachers’ Standard 8 and part 2 of the Teachers’ Standards. Fulfilling both is fundamental to gaining Qualified Teacher Status (QTS). Student teachers are expected to maintain high standards of attendance and punctuality, and to treat fellow students, staff, and pupils with dignity and respect. You will be expected to follow school policies and procedures rigorously.

Trainees are expected to:

* Attend all University seminars and lectures, informing your University Tutor of unavoidable absence.
* Make constructive contributions to all University sessions.
* Be punctual to all University sessions and in all school, experiences including teaching, meetings, professional development sessions and to report your absence following professional procedures
* Set a good example in the way you present yourself, be that appearance or manner in a professional environment
* Carry out, in a professional manner, tasks required by the headteacher, mentor and the University
* Maintain confidentiality always exercising tact and respecting the confidentiality of both children and teachers
* Establish professional and effective relationships with staff, parents, careers and pupils and other agencies responsible for the education and welfare of pupils
* Plan and prepare lessons and resources in advance, to a good standard and in close liaison with the mentor. We expect trainees to share lesson plans and resources with the host class teacher 48 hours before the lesson.
* Mark work promptly in accordance with school policy and quickly seeking advice when needed
* Understand their pastoral responsibilities including the health and safety of pupils and dealing with bullying, safeguarding or equal opportunities issues as they arise
* Become involved in the general and corporate life of the school attending staff meetings and school events by invitation, including parents’ evenings
* Maintain the RoAD in an up-to-date fashion using a Google drive, which is shared with Tutors and others when required.
* Listen to constructive advice and act upon it to the best of their ability.
* Take responsibility for their own professional development
* Seek to further their experiences, respond to professional targets, and evaluate their own performance honestly
* Demonstrate, and collect evidence of, achievement of the standards for QTS by completing relevant sections of the RoAD
* Return any resources or materials belonging to the school at the end of the professional placement
* Be aware of the wider context of education and that learning takes place both in and out of school
* Be expected to willingly display the attributes of wanting to complete the PGCE training year
* Be involved in wider Mathematics associations, independently seeking to broaden your experience of debates around Mathematics education

**An overview of your Mathematics School Experience: what to expect, to do and to keep a record of.**

Your school experience is crucial in your training be a good Mathematics teacher. You will use what you have learnt in university sessions and apply them to your school setting. You will also learn exactly how Mathematics departments teach, what resources they have and experience what a career in teaching will look like. It is immensely rewarding. This is what you can expect from your Mathematics school experiences be that for 1,2 and 3.

**What Key stages will I get to teach and qualify in?**

All Mathematics trainees will gain an overview of Key Stage 2 in Primary School Placement (PSP). During secondary school/college placements, they will gain experience of teaching Key Stage 3 and Key Stage 4 classes. Key stage 5 experience will be gained either whilst on placement, or if this has not been possible by attending a short separate placement at a school or a Sixth Form college, as a minimum you need to evidence a minimum of 6 hours A-level planning, teaching, and assessment across your placements. Most UoM PGCE Mathematics trainees will qualify with the 11-19 track for QTS, however you can choose to follow an 11–16 teaching track.

**Placements and School Experience**

Practical teaching experience is provided through three teaching placements which typically take place in two institutions. The first of these (Placement 1) takes place during Term 1 and will normally be in an 11-16 or 11-18 school. Placement 2 will be completed in a contrasting school or college; this could be contrasting in terms of geographical location, school intake, department structure, Ofsted rating or curriculum model. Depending on your professional needs, you will normally return to your first placement for placement 3. Only one term can be spent in a Sixth Form College or in Alternative Provision if you have been placed in one. Th subject leader and your tutor are responsible for your placement allocation and will take into careful account issues such as transport links and commute times.

**Primary School Placement**

Youneed to arrange a 5 day placement in a primary school for yourself in a school in England. It is an integral part of the PGCE Secondary course and a valuable part of your introduction to the English school system.

**Core PGCE trainees:** the planned dates for the PSP are the week beginning 4th September 2023 or week beginning 17th June 2024.

**School Direct trainees:** Arrangements for your PSP may differ slightly from Core trainees and will be made with your SD Lead School.

You should spend at least 50% of the time in Key Stage 2 classes, because transition to high school is an important focus.

All suitability processes must be underway for you as a prospective trainee, and your DBS must at least be ‘in progress’ before you can start the primary school placement. If you have any doubts about this, contact the PGCE office.

The assignment includes a form at the back for completion by the headteacher or a member of staff designated by her/him. Please scan this and paste it into the back of this document. All this should be submitted as a Word document.

The completion of this booklet comprises the PSP assignment, which is a requirement of the PGCE. Upload your completed task booklet to Blackboard by **28th September**, or within a week after you have completed the placement if that is later. Please notify your tutor that you have submitted it, so that it can be assessed in a timely manner.

**Transition Placement**

Near the end of the course, trainees spend four days in their employing school (if they have secured a teaching post by that time). Alternative placements to address specific areas of interest may be discussed with tutors closer to the time. The transition placement is a great way to prepare for your ECT year and to orientate yourself within the department you will be working in.

**Your School Timetable**

There will be a gradual build-up of teaching load, and you should start with some team teaching. There should be provision for you to observe lessons throughout the placement both within Mathematics and in other curriculum areas. This allows you to focus on your emerging targets/areas for development.

In Placement 1 you should be teaching 8-10 hours per week. In Placement 2 this increases to 10-12 hours per week. For placement 3 you should be teaching 12-14 hours per week. Your teaching experience should be across all key stages. There can be a gradual build-up of teaching load and some paired or team teaching; however, you are advised to get to your required teaching load as soon as you can (discuss this with your mentor). You will be expected to observe teaching in areas other than Mathematics; watching high-quality practice in other subject areas is an excellent way of improving your own repertoire of strategies and approaches.

**Planning Expectations**

All your lessons should be planned using the UoM PGCE lesson plan template and submitted to the class teacher a minimum of 48 hours in advance of the lesson. Protocols may vary from school to school, so it is important to get clarity on this when you begin placement at a new school. It is vital that you stick to this deadline as it allows time for the teacher to provide feedback on the lesson and for you to make any modifications they suggest. Trainees need to do some planning even where resources exist to show evidence of originality. The minimum expectation is of 1 class per week in Placement 2, and 2 classes per week in Placement 3. Following each lesson, you should (briefly) evaluate it using the reflection template by ticking the appropriate boxes, we require weekly a more in-depth reflection for two of your lessons. Take the time to reflect on what went well and as you expected, and those areas that require further development. Over time this will allow you to see how you are progressing. It is common for the expectations for submitting individual lesson plans to be relaxed during Placement 3 once you have illustrated, they can consistently plan to a high standard. You will be notified when this is the case.

**Attendance and Punctuality**

Trainees are expected to attend for the whole of each school or college day. Trainees should arrive in good time, and they should be ready to stay for meetings, parents’ evenings and extracurricular activities when required. You may have to take some time off school. If you are absent from your placement school or university sessions, you must email both your tutor and school subject mentor. If you are absent during your school placement you must set cover work if you can do so, this is the accepted practice for all teachers. When you are ready to return, ensure you contact your subject mentor to discuss when you can resume teaching and where your classes are up to. If you have missed too much school experience, then you may be asked to extend school placement to meet The Teachers’ Standards.

**Record of Achievement and Development (RoAD)**

The RoAD is the central record of trainees’ achievements and progress towards the Qualified Teacher Status and is a good way of tracking your progress over the course of the year. It will be shared with your subject mentor and your tutor, as well as SLOs from UoM (School Liaison Officers) who visit schools to make sure you are being well supported. The RoAD will contain:

* Mentor/class teacher observation notes for each lesson observed.
* Notes on weekly meetings with mentors.
* Tutor observation notes for each lesson observed.
* A Progress Report from the trainee’s mentor, completed at the end of each placement.
* The Progress Matrix for each placement.
* The ITAP log for each placement

**Mentor Observations and Meetings**

Trainees’ teaching will normally be observed formally at least once per week during placements by the subject mentor who will provide written feedback on the UoM pro forma for lesson observations. Additionally, you can expect to receive feedback from teaching colleagues on the other lessons you teach. Trainees will also meet with their mentor once per week to discuss progress and to review and agree targets. This meeting is accompanied by a pro forma that trainees fill in to summarise what has been discussed. All related documents can be found in the RoAD file.

**Tutor Observations and Feedback**

Tutors normally visit each trainee once per placement to observe a lesson and give verbal and written feedback. The subject mentor or class teacher will observe the lesson with the tutor. Observations are always accompanied by a pre- and post-observation discussion. The purpose of observations is not to make a sweeping judgement based on one, ‘high stakes’ observation; rather it is a formative process to identify your strengths and areas to develop. You should ensure that lesson plans are available for tutors and mentors in advance of the lesson. Make sure that your RoAD folder, including your School File, are available to be seen online (or otherwise).

For you to maximise your progress feedback from colleagues is vital. Whilst it is encouraging to receive positive feedback, it can be challenging when things have not gone well. Everyone wants you to be successful; hence, we will always be honest. Please remember that if you receive feedback that feels negative it is not personal and is there to help you to improve. If you are unsure of what you can do to develop, ask for clear strategies and how you can implement them in the classroom.

**Subject knowledge Audits**

Your Mathematics subject knowledge will grow over the course of this year. It is important to be aware of those areas in which you are strong and where there are gaps you need to address. At the start of the course you will be provided with a document to allow you to audit your subject knowledge and you are expected to update this as the year progresses. We will guide you as to the steps you can take to develop your subject knowledge.

**The Role of the Subject Mentor**

Your relationship with your mentor is one of the most valuable you will have this year on the PGCE. Mentors are generally experienced teachers who will help and guide you in your first steps in teaching Mathematics, through to the end of the course when you will be more confident. All mentors should have attended mentor training sessions at the University of Manchester, many of them also completed their PGCE with us. It is important to remember that mentors are busy teachers themselves; managing expectations of one another is very important.

The mathematics mentor’s main role is to act as a critical friend during your early steps as a teacher. It is part of their role to support you and to try to ensure that you develop as a teacher. At times it may seem that the feedback you receive is rather negative, this may be the case even if a trainee is doing well. This is perhaps a result of mentors and tutors wanting to support you to reach the potential they can see and forgetting that you may not realise the progress you are making. Working with feedback can be a challenge but how we respond to feedback is often one of the defining factors in career progression and improvement as a teacher. Be open-minded and willing to discuss the feedback you receive.

As well as supporting trainees throughout the placement, we ask mentors to write a progress report at the end of each term. This will be used to highlight your strengths and to help you to set targets for your future development. The Progress Report will be based on your whole placement and in you mentor meeting you will have the opportunity to discuss it. Advice about writing reports is given to mentors.

**Weekly mentor meeting**

You should expect to have a timetabled weekly meeting with your mentor that lasts approximately one hour. This will provide you with the time each week to review and discuss your progress. Trainees are asked to let us know immediately if they are not getting this. You are expected to keep a record of this meeting by completing the ‘mentor meeting form’ in the RoAD file. We feel that it is important that this meeting has some structure that is set out or agreed at the outset, otherwise it is easy to fill the time focusing on the detail of teaching particular classes or even individual students without considering your overall progress. An important question trainees should continually be asking is, “What can I learn in general from my experiences and how can I apply this across all of my teaching?”

Mentors are aware of the assessed tasks trainees do each term, they will expect trainees to discuss this with them and ask for help when needed.

Some good things to discuss with your mentor in meetings. Primarily follow on the guidance on each Weekly Mentor meeting form which as suggested areas of focus.

* Review how your teaching is developing over the last week against your targets.
* Discuss any successes and challenges you are facing with some of your classes.
* Discuss what you will be teaching next week and be aware of subject knowledge and resources you’ll need.
* Discuss any university assignments you need to complete which your mentor might be able to help you with.
* Ask about any whole school activities that may disrupt your teaching such as fieldtrips or exams
* Set the focus of your next observation, what do you both agree should be the focus for example, Mathematics subject knowledge, pace, timings, assessment etc.
* Ask about opportunities for getting involved in whole school/extracurricular activities.

**Addressing Problems**

The University of Manchester PGCE is a collegiate course, but sometimes problems and differences in opinion do occur. Although it may not seem so at the time, these events are also developmental and from our experiences most problems are easily resolved through clear communication. The following advice is not set in stone, for Mathematics trainees, speak to whoever you feel most comfortable with.

If problems do occur, try talking to other Mathematics trainees to get their opinion on the matter, they may interpret the issue a different way to how you see it. If school/college-based problems arise, the first point of contact is your subject mentor. However, depending upon the nature of the issue, trainees may feel more comfortable talking with their University tutor or professional mentor. For university-based issues, trainees should first discuss with their tutor. If problems remain unresolved, trainees should discuss with the secondary PGCE course leader.

**Appendix 1: Reading List**

Some of these are available online and can be found in the University library but having personal copies of some books is essential.

**Core texts**

Archer, R., Morgan, S., Swanson, D. 2020, Understanding lesson study: A Practical Guide for Improving Teaching and Learning, London: Routledge

Johnston-Wilder, S, Johnston-Wilder, P, Pimm, D and Westwell, J (2005)*Learning to Teach Mathematics in the Secondary School* (Second Edition), London: Routledge

Please note that during the course it is an expectation that you will carry out a considerable amount of independent reading (of both books and academic papers). In most of your assessed assignments you will be required to provide a number of academic references to support your statements and assertions. During the weeks in university we will provide you with several articles that we feel are relevant to the university sessions.

Below is a selection of books you might find useful.

**Essential companions in becoming a good mathematics teacher**

Boaler, J. (2015). *Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching*. John Wiley & Sons.

Brown, L. and Coles, A., (2008). *Hearing silence: Steps to teaching mathematics*. Black Apollo

Burton, L (1995) *Thinking Things Through: Problem Solving in Mathematics*, Oxford: Nash Pollock

Chinn, S (2012) *The trouble with maths: a practical guide to helping learners with numeracy difficulties*, London: David Fulton

Coles, A., (2015). *Engaging in Mathematics in the Classroom: Symbols and Experiences*. Routledge.

Coles,A., [Barwell](http://www.routledge.com/books/search/author/richard_barwell/), R., [Cotton](http://www.routledge.com/books/search/author/tony_cotton/), T.,  [Winter](http://www.routledge.com/books/search/author/jan_winter/) J., Brown, L., (2013) *Teaching Secondary Mathematics as if the Planet Matters.* Routledge

French, D (2005) *Teaching and Learning Algebra*, London: Continuum

Graham, A (2006) *Developing Thinking in Statistics*, London: Sage Publications

*Hyde, R., Edwards J\_A., Mentoring Mathematics Teachers Supporting and inspiring pre-service and newly qualified teachers,* Routledge

Johnston-*Wilder*, S and Mason, J (eds.) (2005) *Developing Thinking in Geometry*, London: Sage

Leslie, D., & Mendick, H. (Eds.). (2013). *Debates in mathematics education*. Routledge.

Mason, J (1985) *Thinking Mathematically*, Harlow: Addison Wesley

[Nelson](http://www.google.co.uk/search?tbo=p&tbm=bks&q=inauthor:%22David+Nelson%22), D, [Joseph](http://www.google.co.uk/search?tbo=p&tbm=bks&q=inauthor:%22George+Gheverghese+Joseph%22), GG and [Williams](http://www.google.co.uk/search?tbo=p&tbm=bks&q=inauthor:%22Julian+Williams%22), J (1993) Multicultural Mathematics, Oxford: OUP

Ollerton, M and Watson, A. (2001) *Inclusive Mathematics 11-18,* London: Continuum

Ryan, J and Williams, J (2007) *Children's Mathematics 4-15: Learning from Errors and Misconceptions***,** Buckingham: Open University Press Shan, S-J and [Bailey](http://www.google.co.uk/search?tbo=p&tbm=bks&q=inauthor:%22Peter+Bailey%22), P (1991) Multiple Factors: Classroom Mathematics for Equality and Justice, Stoke on Trent: Trentham Books

Skemp, R (1993) *The Psychology of Learning Mathematics*, London: Penguin

Watson, A., Jones, K., & Pratt, D. (2013). *Key Ideas in Teaching Mathematics: Research-based guidance for ages 9-19*. OUP Oxford.

Southall, E., 2017. *Yes, but why? Teaching for understanding in mathematics*. SAGE.

**Ideas for the classroom**

Bills, C. (2004) *Thinkers*, Derby: ATM

Lucas, V., (2004) Mathematical Team Games: Enjoyable Activities to Enhance the Curriculum, Tarquin

Lucas, V., Mathematical treasure hunts, Tarquin

Lucas, V., (2004) [Mathematical Merry-go-round: Whole Class Oral Activities to Enhance the Curriculum](http://www.amazon.co.uk/Mathematical-Merry-go-round-Activities-Enhance-Curriculum/dp/1899618597/ref%3Dsr_1_1?s=books&ie=UTF8&qid=1372760896&sr=1-1&keywords=mathematics+merry+go+round),

*Tower of Hanoi: Martin Gardner's First Book of Mathematical Puzzles and Games*, Cambridge: Cambridge University Press

Watson, A and Mason J (1998) *Questions and Prompts for Mathematical Thinking*, Derby: ATM

Whieldon, J., (2014) *Mini mathematical murder mysteries*, Tarquin

**Using ICT in Teaching Mathematics**

Johnston-Wilder, S and Pimm, D (2004) *Teaching Secondary Mathematics with ICT (Learning and Teaching with ICT)*, Buckingham: Open University Press

**Popular mathematics books; for recreation, history and inspiration!**

Abbot, EA (2002) *Flatland: A romance in many dimensions*, Oxford: Perseus Press

Barrow, JD (1992) *Pi in the sky*, Oxford: Clarendon Press

Bellos, A (2010) *Alex’s Adventures in Numberland*, London: Bloomsbury

Derbyshire, J (2004) *Prime Obsession: Bernhard Riemann and the Greatest Unsolved*

*Problem in Mathematics*, Washington: Joseph Henry Press

Devlin, K (2001) *The* *Maths Gene: Why Everyone Has It, But Most People Don't Use It*, Phoenix

Devlin, K (2003) *The Millennium Problems: The Seven Greatest Unsolved Mathematical Puzzles of Our Time*, Basic Books

Maor, E (2009) *e: The Story of a Number*, Princeton University Press

Paulos, JA (1990) *Innumeracy: Mathematical Illiteracy and Its Consequences* London: Penguin

Singh, S (2002) *Fermat's Last Theorem: The Story of a Riddle That Confounded the World's Greatest Minds for 358 Years*, London: Random House

Singh, S (2002) *The Code Book: The Secret History of Codes and Code-breaking*, London: Fourth Estate

Tahan, M. *The man who counted: a collection of mathematical adventures*, Edinburgh: Canongate Press

Wells, D (1986) *The penguin dictionary of curious and interesting numbers*, London: Penguin

Wells, D (1991) *The penguin dictionary of curious and interesting geometry*, London: Penguin

**Journals:**

Mathematics Teaching (a journal of the Association of Teachers of Mathematics)

Mathematics in School (a journal of the Mathematical Association)

Educational Studies in Mathematics

Journal for Research in Mathematics Education

**Websites**

Association of Teachers of Mathematics. Here you will find resources ideas and easy to read articles. [www.atm.org.uk](http://www.atm.org.uk)

British Society for Research in learning Mathematics. Has research papers in mathematics education. [www.bsrlm.org.uk](http://www.bsrlm.org.uk)

National Centre for Excellence in Teaching Mathematics. This is the government funded CPD provider for mathematics. You will find lots of ideas and articles as well as support for teachers. [www.ncetm.org.uk/home](http://www.ncetm.org.uk/home)

NRICH. You will find many excellent activities to support learners in developing deep mathematical understanding. No worksheets here (an this is a good thing!) [www.nrich.maths.org](http://www.nrich.maths.org)

**Nuffield.** They aim toimprove social well-being through education, research and innovation [www.nuffieldfoundation.org](http://www.nuffieldfoundation.org)

Bowland maths. You will find many excellent activities and engaging projects to support learners in developing deep mathematical understanding [www.bowlandmaths.org.uk](http://www.bowlandmaths.org.uk)

National STEM centre. Anything that ahs ever been written about mathematics education can be fond here. [www.nationalstemcentre.org.uk/elibrary/maths/](http://www.nationalstemcentre.org.uk/elibrary/maths/)

Maths careers [www.mathscareers.org.uk](http://www.mathscareers.org.uk)

Maths Genie. For GCSE and A-levels revision ideas, including past papers. <https://www.mathsgenie.co.uk/gcse.html>

Corbett Maths. Lot of videos explain maths topics and worksheets. <https://corbettmaths.com>

Underground maths. You will find here many excellent activities to support A level and Core maths learners in developing deep mathematical understanding <https://undergroundmathematics.org>

Variation theory. Ideas about intelligent practice. <https://variationtheory.com>

**Appendix 2: Guidance for Lesson Observation**

**Observing other teachers**

This is a key part of a trainee’s on-going professional development. It is not an opportunity to be critical of the teaching of other members of staff. *Be appreciative, but please keep your opinions to yourself.*

Trainees should aim to observe staff both within and outside of the department. Who to observe might be best advised by the trainee’s mentor or Professional Mentor.

Trainees should think about how their activities align with the University of Manchester Curriculum. These are listed under the key curriculum areas for PGCE practice:

**Planning, Teaching and Learning**

* Love of learning- how do teachers enthuse their students?
* High expectations- what evidence is there of this in the classroom? In teacher comments to learners? What evidence is there that teachers have high expectations of themselves? Is this done via Churchillian oratory or more subtly?
* Learning goals - what are they and how are they communicated to students?
* Lesson structure - how long does each aspect of the lesson last? How does one aspect link to another?
* Knowledge of students- how does the teacher use evidence on current progress, achievement, home circumstances and multiple intelligences to inform planning?
* Inclusion- what adjustments are made for students with a learning difficulty/disability? Do classroom examples reflect the diversity of the group, e.g. in terms of social class, religion and ethnicity?
* Pace of the lesson- how quickly do the students and teacher get through activities.
* Questioning- how is this used to differentiate? Does the teacher use open or closed questions? How does the teacher ensure most of the talking is done by the students?
* Maintaining interest- what methods does the teacher use to stimulate and engage learners?
* Scaffolding and consolidation- how do later activities in the lesson build on what it began with? Is there a recap of the previous session and a review of the learning goals?
* Secure learning environment- what does the teacher do to ensure students all feel comfortable to make contributions? How does this link to classroom discipline?
* Behavior management- what strategies does the teacher employ? How ordered and structured are the tasks? How does differentiation inform this? What evidence is there that the teacher ‘knows their students’?

**Assessment**

* Checks for understanding - how regular are these within the session and how do they take place? Questioning? Reading written answers? Peer assessment?
* Methods of assessment- which ones are used in class and why?
* Feedback and measures to secure progress- how is ‘precise praise’ ensured and how do students know they are making progress?
* How does the class teacher know pupils are making progress?
* How does s/he use the assessment evidence gained in class to help make this decision and how does this influence future planning?
* Are students of all attainment making progress?