

# UNIVERSITY OF LIVERPOOL

## **MATHS SCHOOL**

EDUCATION FOR 16-19 YEAR OLDS

The University of Liverpool Mathematics School has two vacancies for September:

- Teacher of Mathematics September 2021
- Teacher of Computer Science September 2021

The University of Liverpool Maths School teaches mathematics, physics and computer science to talented and motivated 16 to 19-year-old students from a wide variety of backgrounds. We also deliver an outreach programme, providing additional support in all our core subjects to a large number of students across Merseyside. We plan to significantly increase the reach and range of our outreach offer over the next few years, supporting teachers and schools to provide excellent STEM education through delivering CPD, alongside developing our activities with students across the region.

Our mission is to enable young people with a strong interest and high potential in the mathematical sciences in the Liverpool City Region and the north west of England to make a national and global impact through their work, learning and research in the mathematical sciences. We are particularly interested in widening participation in the mathematical sciences by supporting students with talent who have faced disadvantage in their lives and education so far and providing equality of access to STEM degrees and careers.

We opened in September 2020 and, have already made excellent progress with our objectives:

- Over 400 students were involved in our pre-opening outreach programme.
- 37% of our cohort are female, against a national backdrop of 28% female participation nationally.
- Offers for significant additional support and support coming from a variety of sources.

For all teaching roles at ULMaS we are looking for people who will:

- enjoy tackling difficult, unseen problems and open-ended research projects;
- enjoy supporting and inspiring talented young people on the verge of adulthood;
- enjoy supporting students preparing for challenging university admissions tests;
- enjoy learning both within their main specialism and beyond;
- want to widen participation in the mathematical sciences;
- develop and deliver outreach activities as an ongoing element of their role; and
- want to work with similarly minded, highly motivated colleagues in a close-knit team finding imaginative ways to deliver an excellent education to all our students.

Furthermore, full time teachers will have a strong emphasis on outreach, and the successful applicants will be expected to design and deliver outreach activities across Key Stage 3 and 4 maths or all levels of computer science. As we are seeking, if possible, to appoint a teacher of computer science who also teaches

maths, the ideal candidate for this role would be experienced in teaching Maths, Further Maths and Computer Science upto A Level.

### Our relationship with the University of Liverpool

The University of Liverpool is our key supporter, providing significant assistance and expertise and holding a key role in our governance structure. We are a separate entity from the University, with the school being owned and run by the *University of Liverpool Mathematics School* trust, which is a Single Academy Trust. The school's employees are employed by the ULMaS Trust and not by the University of Liverpool.

### Employees' Terms and conditions

The school has its own pay scale and terms and conditions. Classroom teachers' pay is currently aligned with the main national scale. Further details of pay, contract and benefits will be provided at interview.

The school's calendar is available on the website [here](#). Our school holidays are based on Liverpool Local Authority term dates but with an earlier end to the summer term. Students finish the year in the first week of July, and most members of staff finish a week later. Teachers will sometimes be required to work some days during school holidays and occasional evenings and Saturdays in order to

- support student admissions,
- deliver outreach to students in other schools,
- teach taster sessions for prospective students, and
- support CPD for staff in other schools.

We anticipate that the successful candidates will deliver outreach sessions on two evenings per week, as part of their planned timetable. Flexible working patterns are available, and will be discussed with applicants individually.

The standard teaching allocation for a full-time classroom teacher is normally 22 hours per week. Wherever possible we make teachers' roles as flexible and family friendly as possible.

Our staff members see working at this school as a privilege which offers unrivalled opportunities to teach and learn alongside like-minded colleagues and students. We plan to recruit colleagues who will continue to build and enjoy that great sense of teamwork and job satisfaction

### Mathematics Schools

To get an idea of what maths schools are all about we recommend that you have a good look at our website [liverpoolmathsschool.org](http://liverpoolmathsschool.org) and our [YouTube channel](#).

It's also worth investigating the websites for our fellow maths schools in [Exeter](#) and [King's College, London](#). ULMaS is a Single Academy Trust and not formally linked to EMS and KCLMS. Nonetheless the existing English maths schools have been hugely supportive of our development and we have borrowed many ideas and approaches from them.

Maths schools first originated in Russia in 1963 with the Kolmogorov School, part of the University of Moscow. Several more were soon established across Russia and the idea of mathematical sixth forms strongly linked to university mathematics departments has since spread across Europe. Some useful background can be found here: <http://education.lms.ac.uk/wp-content/uploads/2012/02/FMSh.pdf>

Mathematics Schools are not about elitism but instead set out to include those who are disadvantaged or excluded from opportunities. They aim to develop talent and potential wherever it is found, and our outreach programme and admissions process are designed to help search out potential and widen participation in STEM. Although maths schools are selective, the aim of selection is to ensure that the

students admitted are those who will benefit most from the education offered. Widening participation and developing potential are central to our mission.

### Curriculum Time allocation

Subject	Timing	Comments
Mathematics A-Level MEI OCR (B)	5 hours of teacher time	Following the Exeter Maths School model, it is intended that the fifth hour of teaching is allocated to reviewing and feeding back on students' homework and providing an opportunity to work with small groups of students who need additional support on areas highlighted by the homework tasks.
Further Mathematics A-Level (MEI OCR (B))	5 hours of teacher time	As above, fifth hour allocated to diagnostic feedback.
Physics A-Level (AQA)	5 hours of teacher time	As above, fifth hour allocated to diagnostic feedback.
Computer Science A-Level (OCR)	5 hours of teacher time	As above, fifth hour allocated to diagnostic feedback; with the opportunity for individual coaching on coding projects.
Aspiring Mathematician's Programme	1 hour of teacher time 1 hour of PhD Researcher time	PhD mathematicians and scientists will be brought in to support students with STEP and other university preparation, following the King's Maths School model. This could be during the extra-curricular slot at the end of the day.
Personal and Pastoral Enrichment Programme	1 hour of teacher time and 1 hour of organised sport  Additional hours of extra-curricular time, often supported by volunteers and paid university undergraduates	It is intended that suitably screened and selected undergraduate students will assist with language clubs and other societies.

### A typical teacher's timetable

A typical full-time classroom teacher will teach 22 one-hour lessons each week including up to 8 hours of after-school outreach per fortnight. In the immediate term, outreach will be predominantly through online lessons and teachers are expected to design and deliver their own outreach courses to complement our outreach offer. When conditions allow, this is likely to involve some evening teaching in school as well as occasional face to face sessions at weekends and during the school holidays.

## A typical student's timetable

	Monday	Tuesday	Wednesday	Thursday	Friday
09:30:00					
09:45:00	[Staff Meeting/ CPD]	Maths (Core Units)	Computer Science	Physics (Feedback Lesson)	Maths (Applied Units) Feedback Lesson
10:00:00					
10:15:00					
10:30:00					
10:45:00	Maths (Core Units)	Computer Science Feedback Lesson	Physics	Maths (Applied Units)	AMP/ PPEP / Individual Study
11:00:00					
11:15:00					
11:30:00					
11:45:00	Break	Break	Break	Break	Break
12:00:00	Computer Science	AMP/ PPEP / Individual Study	Maths (Applied Units)	AMP/ PPEP / Individual Study	Maths (Core Units)
12:15:00					
12:30:00					
12:45:00					
13:00:00	Lunch/ Extra-Curricular	Lunch/ Extra-Curricular	Lunch/ Extra-Curricular	Lunch/ Extra-Curricular	Lunch/ Extra-Curricular
13:15:00					
13:30:00					
13:45:00					
14:00:00	Physics (Feedback Lesson)	Maths (Applied Units)	Maths (Core Units) Feedback Lesson	Computer Science	Physics
14:15:00					
14:30:00					
14:45:00					
15:00:00	Break	Break		Break	Break
15:15:00	Pastoral Period	Pastoral Period	Pastoral Period	Pastoral Period	Pastoral Period
15:30:00					
15:45:00					
16:00:00					
16:15:00	Maths (Applied Units)	Maths (Core Units)	Computer Science	Physics	Extra Curricular - School Sport
16:30:00					
16:45:00					
17:00:00					
	Extra-Curricular	Extra-Curricular	Extra-Curricular	Extra-Curricular	

## The Aspiring Mathematician Programme (AMP)

The AMP is a bespoke programme of activities designed to give students greater depth in their mathematical and scientific understanding, accelerated academic maturity and careers experiences which prepare them for work in STEM careers.

### The aims of the AMP are to:

- Develop a range of academic and vocational skills and knowledge beyond those required at A-level
- Prepare students for the UCAS application process and university interviews
- Push our students' mathematical thinking to the point where challenging assessments like STEP and MAT start to feel like interesting puzzles rather than impossible challenges
- Develop students' experience of solving real life problems as well as examination questions
- Give students opportunities to be inspired by and work alongside academics, current undergraduates and researchers
- Facilitate students in the completion of at least one significant research task which culminates in an evening to showcase their outcomes
- Enhance students' ability to work in group related tasks and projects
- Broaden students' horizons in terms of their future career opportunities/aspirations by giving them genuinely valuable work experience and careers guidance
- Prepare students to take part in mathematics and science competitions like the UKMT Maths Challenges, the British Maths Olympiad and the British Physics Olympiad

The AMP will be delivered through mathematics, physics and computer science lessons as well as during additional periods set aside for AMP content that does not fit in the mainstream curriculum. University of Liverpool researchers will assist ULMaS teachers with supporting students to develop their problem-solving skills and help students to prepare for “challenge” papers such as STEP Mathematics and other university admissions assessments.

## The Pastoral and Personal Enrichment Programme (PPEP)

The PPEP is a bespoke programme of tutorial meetings and group activities designed to meet the pastoral and personal enrichment needs of students in a maths school.

### The aims of the PPEP are to:

- Enable us to closely monitor students’ welfare and personal development so that we can take action as a school where there are grounds for concern about a student’s wellbeing, safety or personal development.
- Ensure that ULMaS students develop the knowledge and skills they need to be safe, healthy, happy and productive in life.
- Facilitate the development of a strong community ethos within the school, in which students support each other and understand the different needs of members of the school community.
- Enable students to enjoy regular physical exercise and a healthy lifestyle and develop positive life-long attitudes to exercise, diet and lifestyle decisions.
- Prepare students for independence, developing good self-management skills and practical knowledge including personal financial management, time and task management, personal care etc.
- Ensure students have the knowledge and attitudes needed to keep themselves safe including sexual health, drug, alcohol and other substance abuse, and awareness and prevention of radicalism and extremism.
- Promote the continued development of students’ cultural capital including reading for pleasure, appreciating the cultural opportunities on offer in Liverpool and more broadly and feeling confident to explore these opportunities as they leave school and move on to university and employment.
- Ensure that our students have a strong general knowledge of politics, economics

### The programme will be delivered through:

- Weekly meetings of tutorial groups of students with Pastoral Tutors, featuring sessions in a planned structure across the year and delivered by school staff and visiting speakers
- Weekly exercise opportunities at Sport Liverpool and other venues
- Opportunities to attend lunchtime clubs such as chess club, bridge club, strategy games club, book club, film club, politics & debating club
- Whole cohort opportunities after school and during the day including extra-curricular sports activities, healthy cooking opportunities, and cultural activities such as art gallery, theatre and concert visits. These will feature a programme of discussion and group-work activities that focus students’ attention on the things they need to know as a part of the programme and foster the development of the school’s intended ethos and community character.
- Fortnightly one to one tutorial meetings between each individual student and their Pastoral Tutor. These will ensure that students are closely monitored and have an opportunity to discuss any concerns they have and request individual support with personal, academic or career issues.

## School organisation

### Groupings

Students will be in class groups of up to 16 members. We do not currently set by ability, but we can amend groupings dynamically to accommodate students' different curricular needs including preparation for specific university entrance assessments. Students are currently grouped into two classes and three separate tutorial groups. They will also have opportunities to work with other students through lunchtime societies and AMP sessions. During the remote teaching in early 2021 we have reorganised the timetable into lectures (all students) and supervisions (small discussion groups), which has worked well.

### School Buildings

The school is housed in the Sir Alastair Pilkington Building on the University of Liverpool campus for the first 2 years of its life before moving to a purpose-built permanent site on the edge of the campus in September 2022. The Sir Alastair Pilkington Building has been refurbished in preparation for opening and is equipped with well equipped physics labs, an ICT suite, student laptops, and classroom audio visual equipment. The temporary building offers ample office and classroom accommodation and a central location. The permanent building design is ongoing and there will be an opportunity for staff and students to contribute their ideas for the design in September.

### Lunchtime and social arrangements

Belonging is an essential part of our ethos as a school, and nothing creates belonging like eating and drinking together, conversing and playing games and sport. An hour or more will be allowed for lunch (see the weekly timetable) depending on the day and there is a range of extra-curricular clubs and activities during lunchtimes to ensure that every student has a society or club to belong to and starts to form friendships and memories that will last a lifetime. We currently run the following clubs; chess, gaming, film, coding, robotics, Star Wars, strategy board games, table tennis and debate. We also have a weekly sports session at the University Sports Centre and can play badminton, basketball, dodgeball and many others.

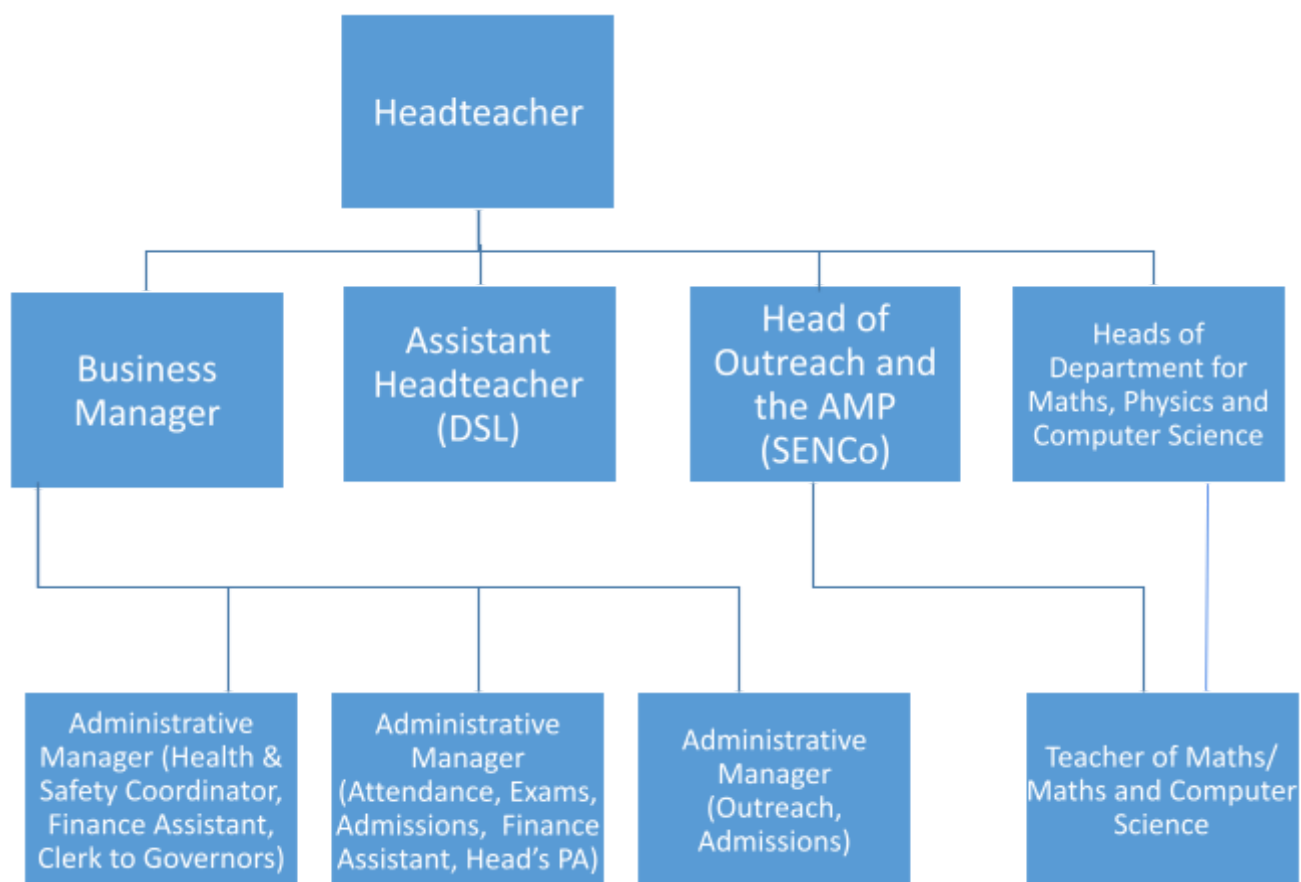
### Staffing plans

The school leadership is already in post, consisting of a Headteacher and Assistant Headteacher, a Head of Outreach and the AMP, and three Heads of Department in Maths, Physics and Computer Science. Our Business Manager leads a team of three administrators, including a dedicated outreach administrator. We are looking to supplement our team with excellent teachers capable of contributing to our curriculum delivery and outreach offering in mathematics and/ or computer science. The varied nature of the role will require a candidate with excellent organisation, who integrates well into established teams and is happy to experiment with different evidence-informed ways of working and approaches to teaching.

In our first year of operation, we have 29 students split over two teaching groups, and anticipate that the incoming class of 2021/22 will introduce at least three new teaching groups from the beginning of that academic year.

We plan to recruit more teachers as the school grows to a full intake of 80 Year 12 and 80 Year 13 students.

Our existing staffing structure for the first year of operation, and where the new teachers will be situated within it, is as follows:





## Person specification: Teacher of Maths or Computer Science

### Applicants must be eligible to work in the United Kingdom

Criteria	E S S E N T I A L	D E S I R A B L E	HOW IDENTIFIED AND ASSESSED AP Application I Interview R References TL Taught Lesson
Education/Qualification and Training			
Excellent grades in A-levels or equivalent linked to some of the subjects delivered at ULMaS.	X		AP
Good honours degree in a STEM or closely related subject, ideally in the subject to be delivered at A Level.		X	AP
Qualified Teacher Status/ Qualified Teacher Learning and Skills Status		X	AP
PGCE		X	AP
Experience			
Successful and recent teaching experience of high-attaining students aged 16-19.	X		AP, TL, R
Successful recent AS- and A2-level teaching in your primary STEM subject (Including Further Maths if applicable).	X		AP, TL, R
Successful experience in assisting department heads or subject leaders with curriculum development and course design.		X	AP, I
Experience of collaborating on curriculum development and course design.		X	AP, I
Expertise in analysing student data on a course by course basis.		X	AP, I
Success in preparing students for university entrance, including supporting UCAS applications		X	AP, I
A commitment to evidence-based CPD.		X	AP, I



Knowledge/Skills			
The ability to deliver maths or computer science to university entrance standards.	X		AP, TL
Precise and analytical self-reflection	X		I, TL
The depth of knowledge and the mental agility to allow flexibility in lessons	X		I, TL
Ability to create effective rapport and a constructive relationship with students and staff, both in and out of school and through a range of mediums including online lessons.	X		I, TL
Ability to create effective rapport with, and inspire the confidence of, external partners such as teachers at other schools, employers, and university departments.	X		AP, I
Excellent communication skills, both written and verbal.	X		AP, I
Excellent organisational skills, including keen attention to detail.	X		AP, I
Excellent IT skills, including the ability to learn new systems quickly and use them intelligently and flexibly.	X		AP, I
Knowledge of research-based pedagogy, and an interest in conducting ongoing action research related to the outreach elements of the role.	X		I, TL
Knowledge of the needs of SEN(D) learners, especially those of learners who are not neurotypical.		X	AP, I
Personal Characteristics/Other Requirements			
Commitment to the educational vision and the mission of the University of Liverpool Maths School	X		AP, I
Profound and continuing interest in the subject(s) to be taught	X		AP, I
Profound and continuing interest in learning, teaching and assessment	X		AP, I
Commitment to self-development	X		AP, I
Capacity to take initiative and to innovate	X		AP, I
Ability to work collaboratively with a variety of subject specialists inside school.	X		AP, I
Ability to work constructively with others outside the school	X		AP, I
Integrity and reliability	X		AP, I

## Job description: Teacher of Maths or Computer Science

Post title	Teacher of Maths/ Computer Science
Responsible to	Head of Outreach and Head of Mathematics / Head of Computer Science

### Role outline

Subject teachers will collaborate on the planning and delivery of an A Level course in their primary subject specialism, and will be accountable for all aspects of their learning, teaching and assessment as well as student outcomes in their classes.

They will be responsible for the delivery of a high quality and enriching curriculum, for ensuring the academic progress of students, promoting the subject more widely and encouraging the pursuit of university degrees and careers related to their subjects as well as supporting university and related applications. Furthermore, the successful applicant will be expected to plan, promote and deliver outreach courses to students across the Merseyside region, designing activities for Computer Science or Maths aimed at Key Stage 3 and 4 students predominantly, including online learning. They will, when the need arises, take charge of the care, guidance and support of a tutor group, and will work collaboratively with all staff to realise the vision of the school.

### Responsibilities and Activities

- To teach ULMaS students, maintaining outstanding standards of teaching and learning
- To deliver engaging and inclusive lessons and other activities as part of the school's Outreach Programme; this could involve working in other schools and delivering teaching online to students from other schools.
- To be accountable for their student outcomes in all areas of the curriculum.
- To assist in developing a rich A level curriculum as well as a programme of challenge and enrichment activities appropriate to a specialist mathematics school.
- To collaborate on and use well-structured and detailed Schemes of Work..
- To follow whole-school learning, teaching and assessment strategies and policies.
- To organise and prepare interim assessments in line with school policy.
- To analyse internal assessment results, reflect carefully and critically on learning and teaching strategies in light of these, and make changes where appropriate with the support of the Head of Department.
- To plan and implement intervention strategies for students who are not making sufficient progress in the subject.
- To attend and participate in meetings planned by the relevant Heads of Department.
- To collaborate on the provision of internal and external CPD, and to contribute to subject and outreach specific professional development in learning, teaching and assessment.
- To undertake any feedback or additional professional development to ensure they are teaching excellent lessons.
- To attend meetings where appropriate between tutors and parents / carers and / or to provide any information required for such meetings.
- To provide good quality advice about the Higher Education options in their subject and related courses.
- To understand in detail the expectations and processes of Oxbridge, Russell Group universities and Sutton Trust top 30 universities around selective admission to their subject and related courses.
- To develop and implement a detailed and developmental programme of preparation and support for students applying to read related subjects at university.

- To be responsible for the quality of subject references for UCAS applications.
- To ensure correct examination entries, and that all aspects of the examination process (external and also internal) are carried out on time and to a very high standard.
- To explain and present the subject at ULMAS Open Events.
- To work with the Head of Outreach to develop a fulsome package of activities to enrich the learning of students in the Merseyside area.

**Other responsibilities:**

- To take responsibility for the care, guidance and support and the academic monitoring of a tutor group, to include tracking and reporting on students' attendance and their academic, social and personal development.
- To contribute to a programme of after-school and lunchtime academic enrichment and extra-curricular activities, which may sometimes require reasonable evening or weekend commitments, some of which will be offsite.
- To participate in recruitment events such as Open Evenings, Taster Days and Interview Days, some of which take place on weekday evenings or at weekends.
- To lead or assist offsite trips and visits.
- To contribute to the establishment and maintenance of a caring, positive, safe and stimulating environment for each student at ULMAS.
- To prioritise at all times the safety and well-being of the students by following the relevant school policies.
- To attend training days in reasonable proximity to the start or end of the ULMAS terms (usually, within four working days of the published term dates) and demonstrating a personal commitment to be fully up to date with training.
- To take a share of the duties around student supervision.
- To provide cover for absent colleagues and participate in arrangements for students' supervision during public examinations.
- To undertake any other duties which may be reasonably required by Senior Leaders.

## Safeguarding

The University of Liverpool Maths School is committed to safeguarding the welfare and well-being of young people and applicants must be willing to undergo child protection screening appropriate to this post, including checks with past employers and the Disclosure and Barring Service. Completion of a self-disclosure form will be required of applicants invited to interview.

## Disclosure

This position is exempt from the Rehabilitation of Offenders Act (1974). As such, shortlisted candidates will be required to declare full details of any criminal background, regardless of whether the conviction is spent. A criminal record will only be taken into account for recruitment purposes where the conviction is relevant to the position being applied for, and even if this is the case will not necessarily bar candidates from employment. Any decision will depend on the precise nature of the work, the circumstances and background to the offence(s).

## Equal opportunities

The University of Liverpool Maths School is committed to enabling diversity in our staff body, on our governing body and in our pool of visiting speakers, who act as role models to our students. We will

engender a positive culture of equality in all areas relating to staff including recruitment, performance management and pay, representation at all levels of leadership within the school. We therefore welcome applications from all suitably qualified candidates.

### Applicants with disabilities

We encourage applications from individuals with a disability who are able to carry out the duties of the post. If you have special needs in relation to your application please let us know so that we can ensure you have fair access to this opportunity.

### How to apply

Applicants should complete the online application form through the TES website/ app.

The application should include a supporting statement explaining how the applicant's skills, qualifications and experience meet or exceed the requirements of the person specification. The statement should explain how your experience and skills meet the requirements of the person specification and what might make you different from other candidates. It should not exceed 1500 words: please be aware that excessively long, overly detailed or repetitive statements will not be read in detail.

The closing date for applications is **9am on Monday 22nd February**.

**Interviews are likely to take place during weeks commencing 1st and 8th March. These will be arranged with shortlisted candidates to fit with their current work commitments, as will teaching and learning tasks and observations. We are conscious that teachers may find it more difficult to get time off school in the current circumstances so we will contact you to discuss when an interview would be convenient.**

**We anticipate first-round interviews taking place on Zoom and these will be recorded for moderation purposes. Recordings will be deleted at the completion of the recruitment process.**

**Second round interviews will hopefully take place on the school premises, circumstances permitting.**

**Some online teaching activities will be included in the selection process.**