Chislehurst & Sidcup Grammar School

ABEUNT STUDIA IN MORES

Full-time Permanent Teacher of Computer Science and Mathematics

Required for September 2019

Information for Candidates

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Our school

The school opened in the Autumn Term of 1931 and has been at three different sites since then. CSGS has been at the current site for over fifty years and has undergone considerable building development, which includes an Art & Technology block.

Chislehurst and Sidcup Grammar School aims to educate and prepare for life able pupils from all backgrounds. This mission is dynamically carried forward within a caring, happy and supportive community. The education that CSGS offers develops its pupils intellectually, emotionally and physically. The ingrained idea of excellence in school life allows pupils to reach the highest academic, sporting, cultural and aesthetic standards. The special quality of learning in the classroom is equally matched by the richness of teaching that pupils experience.

Whilst healthy competition is central to the CSGS ethos, there are also many opportunities for pupils to enter into the wider life of the school. Service to the school and community is enthusiastically performed and high levels of leadership and responsibility are actively taken on by pupils at all levels. There is a supreme belief that building CSGSs' tradition of excellence comes not from dwelling on yesterday's successes but performing tomorrow's tasks.

The continued success of CSGS is matched by an ongoing focus on site development and improvement. Upon extremely attractive grounds, almost unique in the south east of England, a heavy investment programme in new facilities is unfolding. Aside from a range of well-resourced specialist teaching areas, the school continues to add new buildings. Significant enhancements to the Sixth Form Centre have also provided our Year 12 and 13 students with a dedicated study facility closely attached to the school's Learning Resource Centre.

Mission, Aims & Values

Mission

Helping the learners of today become the leaders of tomorrow

This school aspires to educate, in partnership with parents and students, inquiring, well informed and compassionate citizens who will go on to make a better world by occupying positions of responsibility and influence.

Aims

- To teach with high expectations, striving to ensure students fulfil their potential in both the academic and complementary curriculum.
- To develop inquiring, knowledgeable, creative and articulate lifelong learners.
- To encourage students in leadership and other positive contributions to the life of the school and wider community.
- To encourage students to adopt healthy, physically active and safe lifestyles.
- To develop students who are both happy and capable of future independence.
- To develop students who will respect others, take responsibility for their own actions and become good citizens.
- To ensure students display self-discipline and responsible behaviour that makes a positive difference to the life of the school.
- To develop excellent working relationships between all those involved in the life of the school.

Values guiding the work of staff and students

- To be excellent role models in all we do.
- To strive to make a positive difference.
- To ensure that health and safety are never at risk.
- To show respect for the environment.
- To be calm, polite and fair in all our relationships.
- To allow no place for any form of aggression or violence.
- To act with open-mindedness, understanding and forgiveness.
- To ensure the needs of the individual and school community are in harmony.
- To show respect for each person's unique role in the life of the school.

Curriculum

The school's curriculum is designed to:

- prepare students for the opportunities, responsibilities and experiences of adult life

- be balanced, broadly based, relevant and differentiated to match student needs, aptitudes and abilities

- promote the spiritual, moral, social, cultural, mental and physical development of each student

Students have equal opportunities to the curriculum at all key stages; where options are available, every effort is made to provide students with the options of their choice. Student progress is assessed and the results recorded and reported to parents.

Year 7: On entry, our students study the full range of traditional subjects in addition to German, French and Latin as part of Key Stage 3.

Year 8: Students continue to study the full range of subjects as in Year 7.

Year 9: Students continue to study the full range of subjects as in Years 7 and 8. The end of Year 9 marks the end of Key Stage 3 and final assessments are made at that point.

Years 10 and 11: All students take GCSE in Mathematics, English Language, English Literature, the Sciences, Biology, Chemistry, Physics, either as separate subjects or as Double Science, PE, at least one Language subject and RS. They also select their optional subjects (such as Computer Science, Art, Music etc.)

Years 12 to 13: GCE A Level courses are followed by all students in the Sixth Form – it is expected that all students follow three courses from the beginning of Year 12, along with one of AS in English, Maths or Further Maths, or an extended essay. The most able student will study 4 A levels. The range of A Levels offered include, Mathematics, Further Mathematics, English, PE, Drama, Music, Music Technology, Chemistry, Physics, Biology, Business Studies, Economics, Psychology, French, German, Classics, Art, Product Design, Food Technology, Computer Science, Geography, History, Religious Studies (Philosophy) and Government & Politics.

The Computer Science Department

The Computer Science Faculty consists of three teaching staff and supporting ICT technicians. The Curriculum Leader for Computer Science reports to the Head of the ACT (Art, Computer Science and Technology) faculty. There are 4 Computer Science labs and numerous other classrooms in the school that have Computer facilities in them. Each Computer Science lab has an interactive whiteboard, projector and speakers. The machines in the Computer Science labs are replaced regularly meaning that they are always fit for purpose. A wide range of industrial software is available in each room and caters for the needs of year 7 up to and including year 13, where they complete A-Level Coursework elements. The Computer Labs all run MS Windows 10 on PC's. All students have access to an MS Office 365 account, e-mail and a remote login to the school's server so that they can access their work from home. Teachers are provided with a school laptop which also runs MS Windows 10. Some of the supporting software packages used in the department are:

ABTutor Control – to view and lock pupil machines
Python – the primary coding language used from year 9 upwards (TKInter and PyGame are used as the graphical front ends in project work)
Sims – For the schools MIS.
MS Office (365) – where the students are able to access the MS Office suite

The school's externally contracted ICT technicians (Class Technology) are based close to the Computer Science labs which enables any technical support to be provided quickly and effectively. There is a negligible (if any) downtime where the equipment or ICT services are unavailable. There are 2 on-site ICT technicians who are available for technical support.

Pupils are encouraged to develop their analytical and critical thinking skills, by a range of approaches to teaching. Being able to link ideas from different areas of the curriculum and across the different aspects of Computer Science and ICT is also foundational to our approach.

Recent results in the department have been very good.

Our GCSE results for last year showed a pass rate of 98.9% with 47.2% 9-7 grades.

Our A-Level results for last year showed a pass rate of 100% with 75% A*/B grades.

We have worked to increase our numbers at GCSE and at A-Level and have also worked to increase the amount of female students who choose to study this subject beyond KS3. Currently, we have approximately 70 students studying GCSE Computer Science at KS4 for 2019-2021 (35% female uptake) and approximately 20 students choosing to study the course at KS5.

Every year, a large number of students gain places at Universities to read Computer Science, Engineering, Software Development or related subjects. We also have students who move into Degree level apprenticeships with companies such as CAP Gemini.

Computer Science Curriculum Overview

At Chislehurst and Sidcup Grammar School, we have been offering courses in Computer Science for over 18 years. The aim of the department is to provide students with the opportunity to embrace technology and to inspire them in this subject. Our students enjoy the challenge of problem-solving and this subject provides the right forum for them to discover the realms of technology. The department has been recognised as a Lead School in paving the way of how Computer Science should be delivered.

Curriculum Information
The department has three members of staff coming from a wide variety of specialisms within technology, from data-mining to programming.

Each Key Stage 3 class is taught in small groups of 24 pupils, which aids teaching, as it is recognised as a part-theory part-practical subject. The department provides four classrooms fully equipped with networked PCs and a range of industry-standard software. This enables students to be more interactive with the subject, as well as being able to encourage group work and individual tasks to expand their skills.

Due to the nature of the subject, the department constantly evaluates and improves our Key Stage 3 curriculum each year. Our current Key Stage 3 curriculum for Computing is set out below; it aims to challenge our students' abilities and empower them with the confidence and skills required to move forward into an ever-expanding world of technology.

Year 7:
During a weekly 1 hour lesson, they are able to learn an excellent balance of Digital Literacy and Computing skills, necessary to build confidence and form a solid foundation for further development in the years to follow in Key Stage 3.

- E-Safety Media Project incorporating cyberbullying, online safety and computer protection
- Understanding computer operating systems, incorporating graphic design
- Exploring the history of computing, from Charles Babbage to the introduction of the Processor
- An introduction to Computer Programming constructs
- An Introduction to Databases, using logical operators to search
- An exploration into computational ethical, social and moral issues.

Year 8:
Students continue to build on their computing and digital literacy skills with the units of work taught below. Concepts and skills are designed to stretch all abilities during a 1 hour lesson a week, where their knowledge and skills are reinforced and developed further with the projects taught below:

- Introduction to Computer Aided Design, using CAD software
- Design and develop a website, using HTML and CSS code only
- Finding out what algorithms are and how to read and write them
- Exploring Cryptography and producing their own codebreaking mathematical models
- Computer Systems Architecture, in order to gain the knowledge for data representation and the parts that make up a computer. Students will build their own computer in this module, as well as learn how to convert binary into denary and the use of logic gate theory
- Using Object Oriented techniques in game design, using GML GameMaker.

Year 9:
Computer Science is a specialist subject at CSGS, so Year 9 is used to prepare the students for when they choose their options, on whether to choose GCSE Computer Science, which is offered as a full course GCSE option.

- An Introduction to Boolean Logic and how this is used in processor architecture
- Programming using the Python programming language, to enhance concepts such as sequencing, selection and iteration, covered in Year 7 and 8
- Networking and the difference between the Internet and the World Wide Web; looking at light/electricity, packet switching and layering
- Problem-solving skills – how the use of abstraction, decomposition and pattern recognition helps to build more efficient programs
- Creating Android apps for Google Play, using JavaScript on the App Lab area at code.org, which helps to develop students' design and programming skills further.

Key Stage 4 - Edexcel GCSE Computer Science
Students will have experienced some theoretical knowledge of computer systems and basic programming through their Computer Science lessons in Year 9. This course is challenging yet it offers a fun and interesting way to develop skills, which can be transferred to other subjects and applied in day-to-day life.

Students are helped to improve analysis and problem-solving skills through the study of computer programming and computational thinking in the form of abstraction and decomposition.

The course provides excellent preparation for study in higher education and employment in the field of Computer Science, both of which rely on these skills, especially where they are applied to technical problems. Careers include Engineering, Finance, Science and Medicine.

Key Stage 5 – OCR A-Level Computer Science
If students want to go on to higher study and employment in the field of Computer Science, they will find that this course provides a superb stepping stone. Students who study Computer Science, can go on to a career in any aspect of Computer Science, IT or Engineering as well as a wide range of related subjects.

- This course gives learners a real, in-depth understanding of how computer technology works
- Provides excellent preparation for higher study and employment in the field of Computer Science.
- Develops critical thinking, analysis and problem-solving skills through the study of computer programming

This course is made up of 80% theory (across 2 exam papers) and 20% Coursework. The number of students choosing to study this course has doubled over the past few years and continues to grow.

Enrichment

After School Activities:
All the computer suites are available to students before school (from 7:45am – 8:00am) and at lunchtimes (1:05pm – 1:50pm). Teachers supervise these rooms at these times. The students have access to these rooms to complete school work and they have access to the Internet, the CSGS Cloud and also access to black and white laser printers.

Computing Club
Friday After School Club: Aimed at Key Stage 3 students, the club explores different areas of computing, from coding to building computers using Kano Kits.

The Mathematics Department

The department currently consists of twelve members of staff. Some members of the department have other responsibilities in the School. Most mathematics lessons are taught close to the departmental staff room, which includes workstations for members of the department. Access to the school computer network is via a wireless network with a laptop computer provided by the school. There are excellent reprographic and computer facilities within the school and mathematics classrooms.

The department's approach to the teaching of mathematics is very much focused on problem solving rather than rote learning of techniques. Staff are encouraged to discuss the subject and its teaching both informally and in departmental meetings.

Recent results in the department have been very good. Over the last three years, 65% to 70% of students achieved A*-A grades in the GCSE examination. 60% to 80% of students achieved A*-B grades in A Level Mathematics and 78% to 83% of students achieved A*-B grades in A Level Further Mathematics.

Every year, a large number of students gain places at Oxford, Cambridge and other Russell Group Universities to read mathematics or related subjects.

Mathematics Curriculum Overview

Mathematics at Chislehurst and Sidcup Grammar School is taught at a high standard where we aim to develop students' problem solving skills and mathematical reasoning. Our aim is that all students will have the mathematical skills that are required for their future work and life. Key Stages 3 and 4 cover work under the content headings Number, Algebra, Ratio & Proportion, Geometry & Measures, Statistics and Probability. Key Stage 5 covers more advanced areas of both Pure and Applied Mathematics.

Key Stage 3

At Key Stage 3, we focus on developing non calculator skills and the building blocks for the knowledge that is required at GCSE. In year 7, students are taught in their form group, all assessment is non-calculator to develop core skills and improve students' communication of work. In year 8, classes are set by ability and by year 9, the smallest classes have 16 students or less. This means that we are able to provide more individualised support for our students. The Scheme of work for KS3 aims to challenge our students, by exploring the maths they learn, whilst preparing them for their GCSE course. Each half term there is a module assessment as well as a set of problem solving activities; this is then followed by end of year exams in the summer term.

Key Stage 4

At Key Stage 4, we continue to develop the skills learnt at Key Stage 3, whilst exploring more complex problems and extending topics to examination level. Students will continue to develop strong problem solving skills. Students are still set on ability, with the smallest class sizes of 16 students, however all classes are entered for the Higher Paper at GCSE. Students are prepared for their GCSE through regular testing using examination style questions and all students sit full examinations at the end of year 10 and a full mock examination in December of year 11. We enter all students for the Edexcel Linear Syllabus 1MA1 Higher Tier in the summer of year 11. Top set students will also study for the OCR

Additional Mathematics Course and most of these students will be entered for the examination.

Key Stage 5

At Key Stage 5, we are the largest department with 14 sets across year 12 and 13, 10 of which study Mathematics and 4 study Mathematics with Further Mathematics. Students study Edexcel A level Mathematics and the content covers a variety of areas of Mathematics including Pure Mathematics, Statistics, Mechanics and Decision Mathematics. Students are taught six modules over two years for each subject and they currently do three examinations at the end of each year. As with KS3 and 4, we regularly test students and track their progress.

Enrichment

The Mathematics Enrichment programme is thriving in our department and it is considered a very important part of what we do. As well as catering for the needs of our brightest students, we try to encourage as many students (and staff) as possible, regardless of ability, through these events and activities.

The department sets regular problem sets for all students in the Lower school and we look to increase the frequency of this in the coming years. We are also holding the first internal Mathematics cup for year 7 this summer.

Each year, a large number of our students from year 7 to 13 are entered for the UKMT Mathematics challenge at all three levels. Year 11, 12 and 13 girls are entered for the UK Mathematics Olympiad for Girls. They regularly achieve hundreds of certificates with many students progress to the following on rounds of each level. In recent years, we have had students invited to attend the Mathematics summer schools at the University of Leeds and the University of Oxford, the initial Olympiad training camp and the Olympiad training camp in Hungary.

We are keen participants in the Team Mathematics Challenges. Teams from Chislehurst and Sidcup Grammar School compete in the regional finals annually with increasing success. This year, the Senior Team came 22nd nationally, the year 10 teams won most of the rounds in the year 10 team challenge and the Junior team came 3rd in the regional final.

The department runs a comprehensive mentoring scheme where year 8 to 11 students are exposed to areas of Mathematics that are not normally taught in the curriculum such Number Theory, Combinatorics and Euclidean Geometry. Year 12 and 13 students meet weekly to prepare for Oxbridge entrance examinations such as PAT, MAT and STEP. A small group of students are coached to Olympiad level.

We organise annual trips to attend enrichment events such as those at the University of Oxford or Cambridge, the Maths Inspiration Lectures, mathematics lectures at local schools and universities. We are also in the process of organising an oversea trip to explore Mathematics in different cultures. The prospective candidate will have the possibility of taking part in this trip.