

Exeter Mathematics School

16 to 19 academy

Inspection dates

24–26 January 2017

Overall effectiveness		Outstanding	
Effectiveness of leadership and management	Outstanding	16 to 19 study programmes	Outstanding
Quality of teaching, learning and assessment	Outstanding		
Personal development, behaviour and welfare	Outstanding		
Outcomes for learners	Outstanding		
Overall effectiveness at previous inspection		Not previously inspected	

Summary of key findings

This is an outstanding provider

- The school's core vision and values, as established at its foundation by Exeter University and Exeter College, are meticulously designed to cultivate the talents of young mathematicians and scientists.
- As a result of the culture that governors and senior leaders have developed, learners and staff pursue their passion for mathematics and science creatively by experimenting, challenging, debating and collaborating with each other.
- Senior leaders use frequent discussions about teaching, insightful feedback and effective professional development to ensure that teaching is of the highest quality.
- Senior leaders successfully recruit young people who have not previously had the opportunity to fulfil their potential in mathematics and science. They use the temporary grant for bursaries well to recruit learners who come from disadvantaged backgrounds. Currently, the number of female learners is slightly below that of males.
- The school provides very good residential accommodation for learners who cannot travel daily to the school; as a result, learners improve their independence and ability to care for themselves.
- Learners make excellent progress and secure A-level grades well above those expected, given their prior achievement.
- Outstanding teaching, learning, assessment and support ensure that learners develop high levels of confidence and enthusiasm for their studies and that they work hard to achieve excellent problem-solving skills.
- All learners progress to university or into employment befitting the skills and knowledge they have developed at Exeter Mathematics School.
- Learners undertake inspiring projects that extend their skills and knowledge significantly beyond the demands of their A-level courses.
- The excellent projects set by industry and academics ensure that learners develop the ability to work independently, carry out research assiduously and present their findings confidently.
- Teachers and support staff employ their excellent knowledge and understanding of each learner to provide outstanding pastoral and academic support, which contribute to learners' excellent attainment of high grades in examinations, and significantly improve their personal skills.

Full report

Information about the provider

- Exeter Mathematics School is a state-funded sixth form. It was founded in 2014 by Exeter University and Exeter College to provide education for the most able mathematicians in four counties: Cornwall, Devon, Somerset and Dorset. All learners study A levels in mathematics and further mathematics, and follow a project-based programme devised and delivered in collaboration with Exeter University. In addition, they study A levels in physics and/or computer science, as well as a fourth AS or A level in a subject of their choice at Exeter College. The school provides residential accommodation for learners who cannot travel daily to the school.
- The school has approximately 60 learners in each of two year groups. Learners are recruited from all four counties with the highest proportion coming from Devon. Approximately 20% of learners are from deprived backgrounds and over 25% have a learning difficulty and/or disability. The proportion of learners of Black or other minority ethnic heritage is similar to the south west average. Thirty-two learners are in residential accommodation. Ofsted inspected the school's residential accommodation in June 2016. Overall effectiveness, safeguarding and leadership and management were judged to be good. Outcomes for learners and the quality of service were judged to be outstanding.

What does the provider need to do to improve further?

- Retain the vision and mission of the school by ensuring that learners in receipt of bursaries for accommodation are able to continue their studies once the temporary grant for these ends, and that similar bursaries are available to future learners.
- Ensure that leaders take further actions to increase the proportion of female learners so that it matches that of male learners.
- Reduce timetable constraints so that more learners may participate in their preferred extra-curricular activities.

Inspection judgements

Effectiveness of leadership and management

Outstanding

- The school has very clear aims as a result of the care taken by Exeter College and Exeter University to identify how a new specialist institution could best serve the south-west of England. Their extensive knowledge of the local economy, and the specific requirements that industry and higher education have for highly skilled mathematicians, were fundamental to establishing a school that enables learners to flourish.
- The school aims to identify mathematically able young people throughout the four counties, and to improve the supply of capable mathematics undergraduates. School leaders successfully recruit talented learners, including those from disadvantaged backgrounds and learners who have a flair for mathematics that has not been fully nurtured. They provide excellent equality of opportunity through financial, academic and personal support for those who have the potential to benefit from the school.
- The school's aims include a commitment to improving the teaching of mathematics in the south west and improving links between industry and mathematics education. These aims are met through developing a resource of expertise at the school and providing professional development for teachers in other schools. The school successfully involves industry through representatives on the governing board and through the extremely high quality of the projects set for learners by a wide range of industries.
- School leaders' success in meeting these aims, at a point when the school has existed for under three years, is the result of the determination of staff and governors to adhere to the school's vision and mission, and the university's and college's continued commitment to, and support for, the school.
- Staff and governors unwaveringly place the development of the whole learner at the heart of all activities. While a high value is placed on success in examinations, the development of learners' confidence, independence, creativity, aspirations and understanding of the world around them are pre-eminent. As a result, learners are very well-prepared for progression to university or employment.
- Senior leaders use the temporary government-funded grant for accommodation bursaries very successfully, to ensure that learners from lower-income families are not excluded from applying, and that they remain on their course.
- Staff from the college and the university have supported school leaders in establishing very effective processes to manage the school, thereby enabling them to concentrate fully on the quality of education. Services such as human resources and support for information technology and communication are provided by the college. The informative website is maintained by the university.
- Staff from the college and the school work very closely to ensure that learners who study an A level at the college are successful and enjoy their time there. Managers from the college and the school meet frequently to review learners' progress. The college provides a wide range of extra-curricular activities that learners take part in; however, some learners are not able to attend as many of these as they would like, due to timetable constraints.
- School leaders maintain high standards of teaching by ensuring that meetings and

training concentrate on discussing and improving the quality of teaching. They monitor and improve teachers' performance by involving them in professional discussions about their teaching and using observations to focus on specific aspects of their practice that they want to improve. Teachers, as well as learners, are encouraged to experiment and learn from their mistakes. Governors and senior leaders produce an insightful evaluation of the school's strengths and areas for improvement, which has led to the rigorous implementation of an improvement plan.

- Senior leaders monitor learners' progress on their courses and their development of personal and social skills very closely. They meet frequently with teachers to review learners' work, and agree strategies for improving progress where necessary. School leaders analyse data about learners' progress closely, and use it to refine the curriculum. In the small number of cases where learners make no more than the progress expected of them, school leaders carefully consider the reasons for this. For example, in further mathematics, they have changed the order in which some parts of the course are taught.
- Staff pay a great deal of attention to ensuring that the curriculum develops learners' personal and social skills as well as preparing them for employment or progression to university. Learners recognise their progress through regular self-evaluations of their personal skills, such as their literacy and their confidence in presenting to an audience.
- The curriculum is very carefully planned. Senior leaders pay detailed attention to the quality and delivery of individual modules for each course. They use information about learners' progress, teachers' reflections and feedback from learners and parents very well to fine-tune the courses so that learners face as few barriers as possible to achieving their potential.
- Staff provide a wide range of support activities to schools in the four counties that are designed to improve mathematics teaching in the south west. For example, they deliver courses on teaching mathematics to teachers, and provide additional classes for pupils aged 14 to 16 who have the potential to achieve high grades in mathematics at GCSE.
- The school recruits a high proportion of learners from disadvantaged backgrounds and learners with learning difficulties and/or disabilities. The proportion of female learners has increased from a fifth to a third, but this is still below the school's current target of 40% and the national average for female learners taking mathematics A level. However, it is well above the national average for their participation in physics and further mathematics.
- Senior leaders have taken effective steps to keep learners safe from radicalisation and extremism.

The governance of the provider

- Governors provide excellent support to school leaders. They scrutinise learners' progress very closely, and ask challenging questions. For example, in November 2016, they wanted a clear explanation of the reasons for under-achievement by any learners who were not achieving the grades that might be expected in early assessments, and have probed to understand the reasons why progress in mathematics is stronger than in further mathematics.
- As a result of their wide range of skills and experience from industry, mathematical research and school, college and university education, governors have made invaluable

contributions to shaping the school's highly responsive curriculum.

Safeguarding

- The arrangements for safeguarding are effective. The school provides very high-quality support and care for its learners. Staff quickly identify any concerns about learners because they know them very well. Staff act quickly and effectively to work with other agencies when serious safeguarding concerns demand it. They share information with staff and other agencies with careful regard to its sensitivity, and consistently work in the best interests of the learners.
- School leaders use the governors' experience and knowledge of safeguarding well to oversee the arrangements for keeping learners safe. In addition, Exeter College provides excellent support to the school's designated professional lead for safeguarding.
- School leaders acted quickly on the recommendations of the inspection of the school's residential provision. Documents and policies are now on the college's website, and training for staff providing support for welfare or in residential accommodation has taken place and more is planned.

Quality of teaching, learning and assessment

Outstanding

- Teachers place very high expectations on their learners through providing tasks and projects that are highly challenging. As a result of these, learners develop an eagerness for mathematical and scientific skills, knowledge and understanding; they work hard and with great enthusiasm to meet the demands placed upon them.
- Teachers plan courses that extend learning far beyond the requirements of the qualifications, resulting in learners acquiring extensive skills and knowledge for a career in mathematics or science. In a survey, one learner said, '(The school) doesn't focus on exam results; it wants you to be a more rounded individual...'
- Teachers carefully plan their teaching of the high-level skills of research, analysis and communication by setting their learners tasks that emulate industry-based mathematical and scientific investigations. For example, in a physics lesson, learners were tasked with deriving an equation to calculate the radius of the path of alpha and beta particles in a magnetic field. They were given no more advice and had to call upon their knowledge and understanding of different physics topics to solve this. Learners responded very well in small groups to tackle this challenging problem. The teacher responded to questions that learners asked, by posing the learners questions in a very effective coaching style, so that learners had to arrive at a solution for themselves.
- As a result of consistently high-quality teaching, learners apply themselves diligently to challenging work and make very good progress. Teachers expertly incorporate opportunities to consolidate, transfer and deepen knowledge and skills. They skilfully judge when to give more time to deepening learners' understanding of a topic.
- Teachers assess learners' work accurately, and provide very valuable feedback that helps learners to make rapid progress. They are particularly effective at checking learners' understanding, and encouraging them to decide how best to approach problems. Teachers have a very clear understanding of learners' progress towards target grades, as

well as their acquisition of non-examined skills such as confidence, independence and presentation skills. Teachers encourage learners to assess and learn from each other well. For example, in a history lesson, learners accurately assessed each other's work against an awarding organisation's assessment scheme, which helped them to understand better what they needed to do to achieve high grades.

- Teachers very effectively support the high proportion of learners who need extra help as a result of a learning difficulty and/or disability. The support they provide to learners for whom social interaction is a specific challenge is particularly effective.
- Teachers and learners make very good use of technology, for example algebraic modelling software, to assist in experimenting with different solutions to problems. Many learners develop excellent skills in programming, and use these when carrying out tasks such as creating models of orbits of satellites.
- Teachers develop learners' oral skills particularly well by expecting them to explain and justify their solutions to problems and by making regular presentations. These include presenting their research findings to academics and representatives of industry in a large lecture theatre at Exeter University, an activity that learners find daunting but of great value.
- All learners have achieved a grade C or above in GCSE English. However, teachers recognise the need to improve further learners' literacy, and have taken effective action to achieve this. Learners present their written answers very clearly and many learners are developing skills in using very sophisticated software to present their project work in the professional style used by scientific journals.
- Parents and carers are kept well informed about learners' progress. Parents report that the teachers really know their children and value them as individuals. A parent commented 'my child comes home buzzing' because their lessons are 'amazing'.

Personal development, behaviour and welfare

Outstanding

- Learners become extremely confident mathematicians and scientists and develop an excellent attitude to learning. Learners behave very well and have excellent attendance. They demonstrate an unrelenting commitment to solving complex problems and are not afraid to fail when attempting these. Teachers ensure that learners value failure as an integral part of learning and achieving excellence. For example, two learners working on a programming challenge in their own time did not resolve the problem at the first attempt. They quickly went back over their calculations and were joined by other learners keen to work out what had gone wrong.
- Learners apply their skills to open-ended research tasks set by local companies and the scientific community. For example, learners have worked for the Hydrographic Office on projects to analyse marine traffic records using statistics and programming. They carry out research for a manufacturer of vacuum cleaners on improving the meshing of gears for its motors, and they are contributing to research for the space industry by calculating the effect of environmental heating on a satellite.
- As a result of the teaching and curriculum design, learners develop an excellent ability to question what they are told, to adopt a scientific approach to assessing information, and to develop a healthy scepticism to material available on the internet.

- Learners are very well prepared for their next steps. They take full advantage of the excellent support from undergraduate and post-graduate mentors who introduce them to the rigours of university research and assist them with developing and presenting projects. Learners gain a very good insight into higher education through experiencing aspects of campus life at Exeter University and inspirational lectures by university academics. Learners also receive very good advice on vocational options and higher apprenticeships.
- Teachers promote respect and tolerance very well through the tutorial programme, assemblies and their daily interactions with learners. Learners respond well by engaging in discussions with passion and researching data to support arguments about, for example, privacy of personal data and extremist activity in the south west. Learners are highly respectful of each other, and challenge each other if their peers use inappropriate language or stereotypes. Staff listen to learners' views well, and encourage them to influence the management of the school. For example, learners reviewed the draft anti-bullying and harassment policy and proposed revisions. Learners demonstrate a good knowledge of how to stay safe online.
- Teachers provide very good initial advice and guidance, through taster days and interviews, to ensure that learners are very clear about the requirements of the school and, when relevant, the challenges of living away from home.
- Learners benefit from very good pastoral support, and teachers take great care to support learners' emotional well-being. Residential learners are well cared for, and benefit from high-quality student accommodation. They prepare and cook their own food, which is healthy and of a high quality. These residential learners undertake a food and hygiene qualification that helps them with their food preparation responsibilities. Residential learners also develop independent living skills, such as cleanliness and living with others, very well.

Outcomes for learners

Outstanding

- Learners make excellent progress; they achieve grades in their A levels that are very high compared to learners in other provision with similar GCSE results. Learners who completed A levels in mathematics and physics in 2016 achieved grades that are particularly high, when taking into account their prior achievement. In all other subjects, learners make at least the progress expected of them. A very high proportion of learners achieve high grades in their A levels. Over half the grades awarded at A level were grades A* or A.
- All learners who started AS levels in 2014/15 successfully completed A levels in 2016. In 2015/16, a very large majority of learners who started at the school progressed on to the second year. Of the very small number of learners who left, most were from the group of learners who travel long distances to attend the school.
- All learners who completed their course progressed to university or employment with training. A very high proportion of those progressing to higher education are studying in universities that recruit the most talented mathematicians and scientists. The school promotes a wide range of destinations, and a few learners have progressed to degree level apprenticeships or employment.

- The school successfully nurtures learners' enthusiasm for mathematics and science. Nearly all learners progressing to university are studying science, technology, engineering or mathematics subjects. Of the two learners who chose not to go to university after completing their course in 2016, one is studying to be an accountant and the other is employed in computer science.
- No significant differences in outcomes exist between different groups of learners. For example, learners from lower-income families, who are in receipt of a bursary to subsidise the costs of living away from home, achieve as well as other learners.
- Current learners are making excellent progress towards their targets, with learners studying computer science making better progress than those in the previous year. Learners with lower attainment in their GCSEs, who are now in their AS year, have made rapid progress and are now producing work that is of a much higher standard than expected.

Provider details

Unique reference number	140971
Type of provider	16 to 19 academy
Age range of learners	16 to 18
Approximate number of all learners over the previous full contract year	94
Headteacher	Kerry Burnham
Telephone number	01392 429 020
Website	www.exetermathematicsschool.ac.uk/

Provider information at the time of the inspection

Main course or learning programme level	Level 1 or below		Level 2		Level 3		Level 4 or above	
	16–18	19+	16–18	19+	16–18	19+	16–18	19+
Total number of learners (excluding apprenticeships)	-	-	-	-	118	-	-	-
Number of apprentices by apprenticeship level and age	Intermediate		Advanced		Higher			
	16–18	19+	16–18	19+	16–18	19+		
	-	-	-	-	-	-		
Number of traineeships	16–19		19+		Total			
	-		-		-			
Number of learners aged 14 to 16	0							
Number of learners for which the provider receives high-needs funding	1							
Funding received from:	Education Funding Agency							
At the time of inspection, the provider contracts with the following main subcontractors:	Not applicable							

Information about this inspection

The inspection team was assisted by the headteacher as nominee. Inspectors took account of the provider's most recent self-assessment report and development plans, and the inspection report on the school's residential accommodation. Inspectors used group and individual interviews, telephone calls and online questionnaires to gather the views of learners and parents; these views are reflected within the report. They observed learning sessions. The inspection took into account all relevant provision at the provider.

Inspection team

Steven Tucker, lead inspector	Her Majesty's Inspector
Roger Pilgrim	Ofsted Inspector
Louise Rowley	Ofsted Inspector
Martin Watson	Ofsted Inspector

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