



Dartford

SCIENCE & TECHNOLOGY COLLEGE

STEM at DSTC



Introduction:

The country and indeed Europe has a shortage of people well qualified in Science, Technology, Engineering and Mathematics (STEM) subjects. Universities and companies are not able to recruit enough people to these hugely important areas.

Dartford Science and Technology College offers a broad and balanced curriculum for all students with a STEM offer. Our aim is for DSTC students to leave school with a combination of excellent examination results, personal skills to succeed in life and a unique STEM based skill set.

Education for a strong STEM economy is built on strong subject teaching. Dartford Science and Technology College offers some of the best teaching in the area for the STEM subjects. Our students are taught by award winning, highly skilled and passionate teachers in all departments. DSTC provides CPD to support Teaching and Support staff in their delivery of the STEM curriculum. We place huge emphasis on upskilling, supporting and nurturing our STEM workforce to ensure that all students have access to trained STEM professionals to help them with their career aspirations.

One challenge for STEM teaching is to help young people recognise how the Science, Design & Technology, Computer Science, Engineering and Mathematics that they study at school or college can lead to rich and varied career pathways. At DSTC we inspire our students through our varied co-curricular STEM programme.

Our students also benefit from working with organisations such as University of Kent, The Royal Air Force, Ford, Shell, EDF Energy, IRIS, University College London and Transport for London. Some of these organisations host competitions and DSTC have achieved very well at these.

At DSTC we offer opportunities for all of our students to see the links that STEM subjects have in all aspects of society and employment.

Our Curriculum:

STEM is a curriculum based on the idea of educating students in four specific disciplines in an interdisciplinary and applied approach. We offer Science, Technology and Mathematics as part of our everyday curriculum and have built Engineering into these and across other subjects such as Geography. It teaches students computational thinking and focuses on the real world applications of problem solving. STEM also supports literacy, numeracy and the arts.

At DTSC, our STEM education begins with our primary liaison programme and continues through to KS4/5:

- Primary School — As part of our taster day programme and summer school, primary school students experience a variety of STEM activities and challenges both at DTSC and provided as outreach activities. We focus on the introduction of problem-based learning as well as awareness of the whole variety of STEM fields and occupations.
- KS3 — At this stage, our STEM offer becomes more rigorous and challenging. Student exploration of STEM related careers begins at this level through Extended Learning projects (ELP's). Students are also introduced to our STEM Diplomas - a series of challenges and activities that they participate in to make them more STEM aware. Students have the opportunity to attend extracurricular activities, trips and visits and work towards their CREST awards.
- KS4 & 5 — Courses and pathways are now available in STEM fields and occupations, as well as preparation for post-secondary education and employment. More emphasis is placed on bridging in-school and out-of-school STEM opportunities such as STEM careers days.

Sample activities and clubs for each year group are listed in the tables below.

YEAR 7

Activity	Description	Who runs this?	Who oversees this?
Science Club	Hands-on fun science activities and experiments that enable students to complete their CREST Star Investigators.	NJO	DoL Science
STEM ELP	STEM Extended Learning Project (ELP). Floating Garden House Challenge - Students learn about the difficulty that farmers in Bangladesh and the UK experience trying to grow crops on land that is regularly flooded. They then take up the challenge to make a model of a floating structure/garden that farmers can grow their crops on.	EDU	JDO
STEM Diploma	Students are introduced to the STEM diploma, a series of STEM related activities that students complete in their own time to earn Bronze, Silver, Gold or Platinum Awards.	STEM team	JDO
International Women's Day events	A global day celebrating the social, economic, cultural and political achievements of women especially related to STEM. Students will celebrate women's achievements and raise awareness about women's equality.	STEM team	JDO
British Science Week	A ten day celebration of all things Science! Students go on trips, have guest speakers, get involved in competitions and complete fun experiments both in lessons and around the school.	Science department	DoL Science/JDO
I'm a Scientist!	I'm a Scientist is an online, student-led, science engagement activity where students connect with working scientists and ask them questions about their research, supporting 7 of the 8 Gatsby benchmarks.	EDU	JDO
House Pi Day competition	Students compete in a house event to remember Pi to as many digits as possible. Other exciting activities are scheduled in maths lessons.	EOA	DoL Maths

International Women in Engineering Day	International Women in Engineering Day - INWED. Students learn about and celebrate the amazing work that women engineers around the world are doing. Activities usually involve guest speakers (STEM ambassadors) and trips and visits.	STEM Team	JDO
End of year STEM days	Students spend 2 days off timetable completing activities related to STEM. They get to go on trips and visits, complete STEM challenges such as the STIXX challenge and marble run, participate in STEM workshops and enjoy a variety of workshops.	Whole-school team	JDO

YEAR 8

Activity	Description	Who runs this?	Who oversees this?
Science Club	Hands-on fun science activities and experiments that enable students to complete their CREST Star Investigators.	KOS/Trainees	DoL Science
STEM ELP	STEM Extended Learning Project (ELP). Students research a variety of STEM careers and then present to their form about the careers they have chosen and why. Students are given an award based on the quality of the presentation.	EOA and Form Tutors	JDO
STEM Diploma	Students are introduced to the STEM diploma, a series of STEM related activities that students complete in their own time to earn Bronze, Silver, Gold or Platinum Awards.	STEM team	JDO
Barclays Money Matters	Communication, leadership, teamwork and resilience are among the top personal skills employers look for when recruiting, with each skill being used differently depending on the industry, role or context. Students can identify which of these skills they already possess and how they can be adapted.	EOA	JDO
International Women's Day events	A global day celebrating the social, economic, cultural and political achievements of women especially related to STEM. Students will celebrate women's achievements and raise awareness about women's equality.	STEM team	JDO
British Science Week	A ten day celebration of all things Science! Students go on trips, have guest speakers, get involved in competitions and complete fun experiments both in lessons and around the school. Year 8 specifically design and run a Science Fair for Year 7 and our local primary schools.	Science department	DoL Science/JDO
I'm a mathematicia	I'm a Mathematician is an online, student-led, engineering engagement activity where students connect with working	EOA	JDO

n!	mathematicians and ask them questions about their research, supporting 7 of the 8 Gatsby benchmarks.		
Maths Challenge	House maths Challenge. The Junior Mathematical Challenge is a 60-minute, multiple-choice competition aimed at students across the UK. It encourages mathematical reasoning, precision of thought, and fluency in using basic mathematical techniques to solve interesting problems.	EOA	DoL Maths
Bank of England Speaker	Bank Ambassadors talk to the students about the economy, what the Bank of England does, and share their own career stories.	EOA	JDO
International Women in Engineering Day	International Women in Engineering Day - INWED. Students learn about and celebrate the amazing work that women engineers around the world are doing. Activities usually involve guest speakers (STEM ambassadors) and trips and visits.	STEM Team	JDO
End of year STEM days	Students spend 2 days off timetable completing activities related to STEM. They get to go on trips and visits, complete STEM challenges such as the spaghetti tower, participate in STEM workshops and enjoy a variety of workshops run by STEM ambassadors.	Whole-school team	JDO

YEAR 9

Activity	Description	Who runs this?	Who oversees this?
Engineering Club	Join the Engineering Club and participate in the First lego league - using Lego to understand the basics of STEM and apply their skills in an exciting competition.	NJO	ELA/JDO
STEM ELP	STEM Extended Learning Project (ELP). Send a pringle through the post! Students design and make an envelope/contraption that will send a pringle through the post to arrive in one piece!	DOY	JDO
STEM Diploma	Students are introduced to the STEM diploma, a series of STEM related activities that students complete in their own time to earn Bronze, Silver, Gold or Platinum Awards.	STEM team	JDO
BEIS STEM event	The Department of Business, Energy and Industrial Strategy deliver workshops to Year 9 students on ways that they are tackling climate change, unleashing innovation and making the UK a great place to work and do business. Students learn about the department and the different careers pathways.	JDO	JDO
International Women's Day events	A global day celebrating the social, economic, cultural and political achievements of women especially related to STEM. Students will celebrate women's achievements and raise awareness about women's equality.	STEM team	JDO
British Science Week	A ten day celebration of all things Science! Students go on trips, have guest speakers, get involved in competitions and complete fun experiments both in lessons and around the school. Year 9 specifically look at 'smashing stereotypes'.	Science department	DoL Science/JDO
I'm an Engineer!	I'm a Engineer is an online, student-led, engineering engagement activity where students connect with working	DOY	JDO

	engineers and ask them questions about their research, supporting 7 of the 8 Gatsby benchmarks.		
Maths Challenge	House maths Challenge. The Intermediate Mathematical Challenge is a 60-minute, multiple-choice competition aimed at students across the UK. It encourages mathematical reasoning, precision of thought, and fluency in using basic mathematical techniques to solve interesting problems.	Maths Department	DoL Maths
International Women in Engineering Day	International Women in Engineering Day - INWED. Students learn about and celebrate the amazing work that women engineers around the world are doing. Activities usually involve guest speakers (STEM ambassadors) and trips and visits.	STEM Team	JDO
End of year STEM days	Students spend 2 days off timetable completing activities related to STEM. They get to go on trips and visits, complete STEM challenges such as the army challenge, participate in STEM workshops and enjoy a variety of workshops run by STEM ambassadors.	Whole-school team	JDO

YEAR 10

Term 1			
Activity	Description	Who runs this?	Who oversees this?
CREST Club	Join the CREST Club and participate in a project to earn the prestigious CREST award.	Post 16 Leadership Team	JDO
STEM ELP	STEM Extended Learning Project (ELP). Students who complete a STEM work experience placement, fill in their work experience logs about their experience to be shared during Form Time.	Form Tutors	MAL/JDO
Armed forces Careers day	Workshop run by the armed forces regarding the different types of STEM careers that can be found in the armed forces. Students learn about the values of having females in the armed forces.	JDO	JDO
ECO car competition	The Shell competition brings students from across the globe together to design, build and operate some of the world's most energy-efficient vehicles. All in the name of collaboration and innovation, as students' bright ideas help to shape a lower carbon future for all.	JDO	JDO
International Women's Day events	A global day celebrating the social, economic, cultural and political achievements of women especially related to STEM. Students will celebrate women's achievements and raise awareness about women's equality.	STEM team	JDO
British Science Week	A ten day celebration of all things Science! Students go on trips, have guest speakers, get involved in competitions and complete fun experiments both in lessons and around the school. Year 10 specifically looks at the science behind the beauty industry.	Science department	DoL Science/JDO

Maths Challenge	House maths Challenge. The Intermediate Mathematical Challenge is a 60-minute, multiple-choice competition aimed at students across the UK. It encourages mathematical reasoning, precision of thought, and fluency in using basic mathematical techniques to solve interesting problems.	EOA	DoL Maths
International Women in Engineering Day	International Women in Engineering Day - INWED. Students learn about and celebrate the amazing work that women engineers around the world are doing. Activities usually involve guest speakers (STEM ambassadors) and trips and visits.	STEM Team	JDO
End of year STEM days	Students spend 2 days off timetable completing activities related to STEM. They get to go on trips and visits, complete STEM challenges such as the army challenge, participate in STEM workshops and enjoy a variety of workshops run by STEM ambassadors.	Whole-school team	JDO

YEAR 11

Term 1			
Activity	Description	Who runs this?	Who oversees this?
CREST Club	Join the CREST Club and participate in a project to earn the prestigious CREST award.	Post 16 Leadership Team	JDO
STEM Careers	Students will attend focussed meetings regarding STEM careers to give them a better insight into how to get into the career that they desire.	External	MAL/JDO
STEM revision workshop	Students go to London to attend an interactive STEM revision workshop to aid them with their revision for their future exams.	Science/Maths Department	DoL Science/Maths
ECO car competition	The Shell competition brings students from across the globe together to design, build and operate some of the world's most energy-efficient vehicles. All in the name of collaboration and innovation, as students' bright ideas help to shape a lower carbon future for all.	JDO	JDO
International Women's Day events	A global day celebrating the social, economic, cultural and political achievements of women especially related to STEM. Students will celebrate women's achievements and raise awareness about women's equality.	STEM team	JDO
British Science Week	A ten day celebration of all things Science! Students go on trips, have guest speakers, get involved in competitions and complete fun experiments both in lessons and around the school. Year 11 specifically looks at how we can reduce our carbon footprint.	Science department	DoL Science/JDO

Maths Challenge	House maths Challenge. The Senior Mathematical Challenge is a 60-minute, multiple-choice competition aimed at students across the UK. It encourages mathematical reasoning, precision of thought, and fluency in using basic mathematical techniques to solve interesting problems.	EOA	DoL Maths
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POST 16

Activity	Description	Who runs this?	Who oversees this?
Sports Science	In this workshop students explore the ways in which scientific research has a direct impact on the performance of elite athletes. They learn more about the physiology of breathing and find out how methods of measuring, diagnosing and treating breathing problems have helped athletes achieve Olympic success.	JDO	JDO
Maths masterclass	A chance for students to attend a maths masterclass run by the Royal Institution. These include sessions on how data science is used to fight disease, the billion-dollar algorithm behind Google, and how the physics underlying ice sculptures influences pure mathematics.	JDO	JDO
International Women's Day events	A global day celebrating the social, economic, cultural and political achievements of women especially related to STEM. Students will celebrate women's achievements and raise awareness about women's equality.	STEM team	JDO
International Men's Day events	A global day celebrating the social, economic, cultural and political achievements of men especially related to STEM. Students will celebrate men's achievements and raise awareness about equality.	STEM team	JDO
British Science Week	A ten day celebration of all things Science! Post 16 students help the Science team run engaging and exciting events and practicals for students during Science Week.	Science department	DoL Science/JDO

Maths Challenge	House maths Challenge. The Senior Mathematical Challenge is a 60-minute, multiple-choice competition aimed at students across the UK. It encourages mathematical reasoning, precision of thought, and fluency in using basic mathematical techniques to solve interesting problems.	Maths Department	DoL Maths
International Women in Engineering Day	International Women in Engineering Day - INWED. Students learn about and celebrate the amazing work that women engineers around the world are doing. Activities usually involve guest speakers (STEM ambassadors) and trips and visits.	STEM Team	JDO
End of year STEM days	Students spend 2 days off timetable completing activities related to STEM. They get to go on trips and visits, complete STEM challenges such as the army challenge, participate in STEM workshops and enjoy a variety of workshops run by STEM ambassadors.	Whole-school team	JDO