



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 DSTC 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

Term 1			
Activity	Description	Who runs this?	Who oversees this?
Science Cafe	A chance for students to get together to complete homework and chat about science, have debates and look at Science in the news!	Post-16 students studying Science subjects	DoL Science
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). 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.	Whole Science department	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 teams	JDO
STEM Lecture	Students can experience a fun and informative lecture on a variety of different subjects, usually led by a prominent Science figure.	JDO	JDO
Term 2			
Science Cafe	A chance for students to get together to complete homework and chat about science, have debates and look at Science in the news!	Post-16 students studying Science subjects	DoL Science
Science Club	Hands-on fun science activities and experiments that enable students to complete their CREST Star Investigators.	KOS/Trainees	DoL Science

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.	Science Department	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.	Maths Department	DoL Maths
Term 3			
Science Cafe	A chance for students to get together to complete homework and chat about science, have debates and look at Science in the news!	Post-16 students studying Science subjects	DoL Science
Science Club	Hands-on fun science activities and experiments that enable students to complete their CREST Star Investigators.	KOS/Trainees	DoL Science
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.	JDO	JDO
STEM	Students are awarded their certificates for their involvement	JDO	JDO

diploma Awards day	in the STEM diploma.		
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

Term 1			
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.	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 teams	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.	JDO	JDO
STEM Lecture	Students can experience a fun and informative lecture on a variety of different subjects, usually led by a prominent Science figure.	JDO	JDO
Term 2			
Science Club	Hands-on fun science activities and experiments that enable students to complete their CREST Star Investigators.	KOS/Trainees	DoL Science
International Women's Day	A global day celebrating the social, economic, cultural and political achievements of women especially related to STEM.	STEM team	JDO

events	Students will celebrate women's achievements and raise awareness about women's equality.		
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 an Engineer!	I'm a Engineer is an online, student-led, engineering engagement activity where students connect with working engineers and ask them questions about their research, supporting 7 of the 8 Gatsby benchmarks.	Science/Technology Department	JDO
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.	Maths Department	DoL Maths
Wates Engineering Challenge	A fun and interactive day run by the team from Wates construction. Students will design and make local and National landmarks in a House engineering challenge.	Technology Department	JDO
Term 3			
Science Club	Hands-on fun science activities and experiments that enable students to complete their CREST Star Investigators.	KOS/Trainees	DoL Science
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.	JDO	JDO
International	International Women in Engineering Day - INWED.	JDO	JDO

Women in Engineering Day	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 diploma Awards day	Students are awarded their certificates for their involvement in the STEM diploma.	JDO	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

Term 1			
Activity	Description	Who runs this?	Who oversees this?
STEM Club	STEMettes Club - a club run by the students for the students. Become trained as a STEMette and then lead a group to help students learn and get into the STEM industry – chat with your peers and get advice directly from TeamStemette.	STEMette Student team	JDO
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.	Technology Team	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!	Science and Technology department	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 teams	JDO
Debunking Science stereotypes workshop	Workshop run by the Institute of Physics and Louise Archer from UCL regarding the myths surrounding Science stereotypes. Students learn about the values of having females in engineering careers and positions of responsibility.	JDO	JDO
Shell Bright Ideas	The Bright Ideas Challenge, Shell's cross-curricular schools' competition, invites young people aged 11-14 to use their creativity, problem solving, teamwork and STEM skills to devise innovative solutions that could power cities of the future.	Science 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
STEM Lecture	Students can experience a fun and informative lecture on a variety of different subjects, usually led by a prominent Science figure.	JDO	JDO
Term 2			
STEM Club	STEMettes Club - a club run by the students for the students. Become trained as a STEMette and then lead a group to help students learn and get into the STEM industry – chat with your peers and get advice directly from TeamStemette.	STEMette Student team	JDO
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.	Technology Team	KFO
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	Science/Technology Department	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
Tech Girls Engineering Challenge	A 3-session workshop consisting of an introduction to how technology is used in engineering design, a session on coding and hacking and a final presentation by a guest speaker about their work in engineering.	Technology Department	KFO
Term 3			
STEM Club	STEMettes Club - a club run by the students for the students. Become trained as a STEMette and then lead a group to help students learn and get into the STEM industry – chat with your peers and get advice directly from TeamStemette.	STEMette Student team	JDO
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.	Technology Team	KFO
IET visit	Visit from the Institute of Engineering and Technology who come in to introduce their Faraday Challenge - Based on a real-world problem, the Faraday Challenge brings together STEM subjects (science, design and technology, engineering and maths) in an engaging way and encourages the development of young people's problem solving and communication skills.	JDO	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.	JDO	JDO
STEM diploma Awards day	Students are awarded their certificates for their involvement in the STEM diploma.	JDO	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.	Technology Team	KFO
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
STEM Lecture	Students can experience a fun and informative lecture on a variety of different subjects, usually led by a prominent Science figure.	JDO	JDO
Term 2			
CREST Club	Join the CREST Club and participate in a project to earn the prestigious CREST award.	Technology Team	KFO
International Women's Day	A global day celebrating the social, economic, cultural and political achievements of women especially related to STEM.	STEM team	JDO

events	Students will celebrate women's achievements and raise awareness about women's equality.		
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.	Maths Department	DoL Maths
IRIS research group	The Institute for Research in Schools (IRIS) develops opportunities for secondary students from all backgrounds to participate in authentic research in school and make valuable, recognised contributions to the scientific community. Students will participate in research projects and get used to conducting their own research.	ARU	JDO
Brilliant Club	Students are invited to participate in the Brilliant Club, a project whereby students will attend university style lectures on a STEM related subject and then produce a dissertation and attend a graduation ceremony.	JDO	JDO
Term 3			
CREST Club	Join the CREST Club and participate in a project to earn the prestigious CREST award.	Technology Team	KFO
Cyber prevent	CyberFirst is developing the UK's next generation of cyber professionals through student bursaries, free courses and	JDO	JDO

workshop	exciting competitions. The programme provides opportunities for young people to explore their passion for tech by introducing them to the fast paced world of cyber security.		
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.	JDO	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.	Technology Team	KFO
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
STEM Lecture	Students can experience a fun and informative lecture on a variety of different subjects, usually led by a prominent Science figure.	JDO	JDO
Term 2			
CREST Club	Join the CREST Club and participate in a project to earn the prestigious CREST award.	Technology Team	KFO
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.	Maths Department	DoL Maths
IRIS research group	The Institute for Research in Schools (IRIS) develops opportunities for secondary students from all backgrounds to participate in authentic research in school and make valuable, recognised contributions to the scientific community. Students will participate in research projects and get used to conducting their own research.	ARU	JDO

POST 16

Activity	Description	Who runs this?	Who oversees this?
Science Cafe	A chance for Post 16 students to run an extracurricular club for year 7 students and increase their skills ready for their UCAS applications.	Post-16 students studying Science subjects	DoL Science
Medics Society	A chance to join a group focussing on what it takes to get into medicine at university and helping to prepare for the medic exam.	CSN	CSN
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
Biosciences: Design a superhero	In this workshop students learn about the principles behind CRISPR-Cas9, which is currently the simplest and most versatile way to edit the genome. They find out how scientists use CRISPR-Cas9 to change the base sequence in DNA and use their understanding to answer the ultimate question: Could gene editing be used to make Captain America real?	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
STEM	Students can experience a fun and informative lecture on a	JDO	JDO

Lecture	variety of different subjects, usually led by a prominent Science figure.		
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
IET visit	Visit from the Institute of Engineering and Technology who come in to introduce their Faraday Challenge - Based on a real-world problem, the Faraday Challenge brings together STEM subjects (science, design and technology, engineering and maths) in an engaging way and encourages the development of young people's problem solving and communication skills.	JDO	JDO
International Women in Engineering	International Women in Engineering Day - INWED. Students learn about and celebrate the amazing work that women engineers around the world are doing. Activities	JDO	JDO

Day	usually involve guest speakers (STEM ambassadors) and trips and visits.		
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