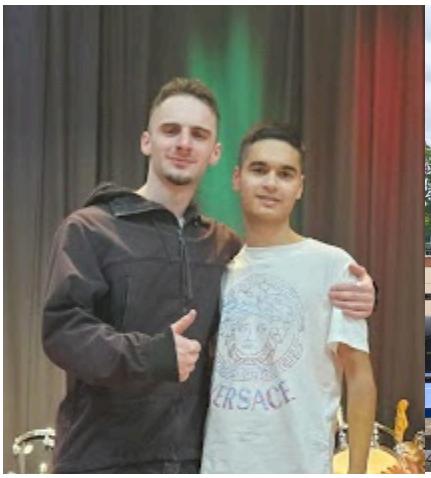
PARMITER'S SCHOOL STEM Newsletter

Spring Term 2025

Greetings from the STEM Committee Editorial Board...



Welcome to the second edition of the STEM Termly Newsletter for the spring term of this academic year - your place to go for an informative termly update of all things Science, Technology, Engineering, and Maths, integral parts of our flourishing school.

Here we recognise and celebrate the amazing communities and opportunities STEM has provided that help our students thrive at Parmiter's. This newsletter is part of the ongoing work of the STEM Committee!

Editorial Board: Richaa Chowdhury, Heighlee Cruz, Ananya Mishra
Committee Founders: Yusuph Choudhury, Arian Krasniqi

Contents

Maths

HFL Year 7 & 8 Maths Challenges

Article By Clem Edwards & Shingo Yamazaki

The Year 7 and 8 Herts For Learning Maths Challenges was a great experience for all the teams. As practice they looked at past challenges from 2024 and answered some of the questions. There were 4 rounds, with round 1 being general mathematics, round 2 being a memory round, round 3 being estimation and round 4 being general mathematics again. For general mathematics, there were questions ranging from division to geometry. For the memory round, a picture was displayed on the board, two people would go up and look at the picture, while the other two faced the other way (they would draw). For the estimation round, there were questions like how long a line on a map was (there was a scale for their reference). Although the Year 7 team did not get into the final this time they demonstrated an amazing show of teamwork. The Year 8 team also worked brilliantly together securing first place in their heat and (at time of writing) waiting eagerly to know if they will receive an invitation to the final. Fingers crossed!

UKMT Intermediate Maths Challenge

Article By Editorial Board

In January of this year, some students from Year 9 and 10 completed the UKMT Intermediate Maths Challenge. It is a great way to challenge yourself outside of the curriculum, or if you are just curious! In the challenge, there are 25 questions with increasing difficulty.
'Of the 61 Year 10 students who took part in the Intermediate Maths Challenge earlier this term, an impressive 48 have been awarded certificates; 20 Bronze, 36 Silver and 24 at Gold level. Particular praise to the 18 highest scorers who progressed to Intermediate Kangaroo. Extra special congratulations to Aris Siamitros and Jack Wei, who were awarded best in school and got through to the Intermediate Olympiad.' - Miss Chapman

UKMT Team Maths Challenge

Article By Jack Wei

On the 5th March, I attended the Team Maths Challenge with Richaa Chowdhury, Sancheyan Thushyanthan, and Andrea Anton - a team of two Year 8 and two Year 9 mathematicians - and we represented Parmiter's for the first time since the pandemic. It consisted of four rounds - the Group, the Shuttle, the Crossnumber and the Relay - which tested our maths, teamwork and communication skills. We were up against 15 other schools, and the competition was extremely tough, but I am pleased to report that we did manage to get on the podium with third place, losing only 6 points throughout the entire competition. Despite coming third, our still impressive score means we were invited to compete in the national finals, which are set to take place in London on 16th June. Overall, this was a fun and enjoyable experience, and I would recommend it to anyone in Year 8 or 9 who is interested in working with others on challenging maths problems.

Quick questions!

Sources from UKMT website, written by the Editorial Board

Here are two questions taken from the UKMT Junior Maths Challenge 2016. The UK Mathematics Trust (UKMT) is a registered charity whose aim is to advance the education of children and young people in mathematics. The UKMT organises national mathematics competitions and other mathematical enrichment activities for 11-18-year-old UK school pupils.

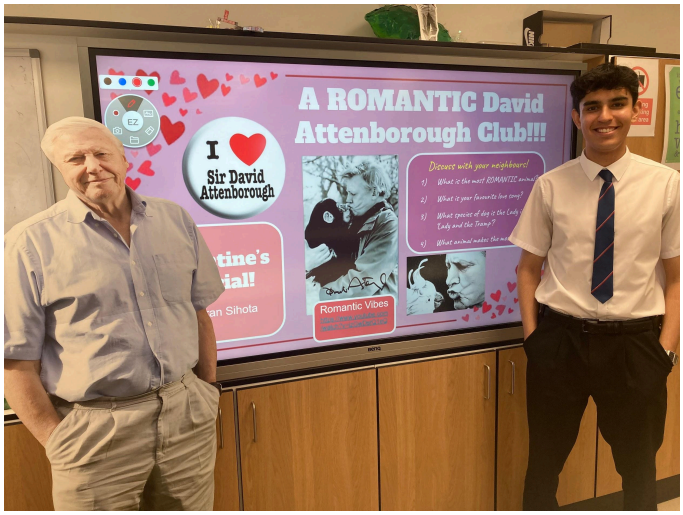
1. In January 1859, an eight-year-old boy dropped a newly-hatched eel into a well in Sweven (apparently in order to keep the water free of insects). The eel, named Åle, finally died in August 2014.
How many years old was Åle when it died?
A) 135 **B)** 145 **C)** 155 **D)** 165 **E)** 175

2. One of the three symbols +, -, × is inserted somewhere between the digits of 2016 to give a new number. For example, 20 - 16 gives 4.
How many of the following four numbers can be obtained in this way?
36 195 207 320
A) 0 **B)** 1 **C)** 2 **D)** 3 **E)** 4
(Answers at the end, no cheating!)

Science

Attenborough Club

Article By Aaran Sihota



Do you have an incredible passion for wildlife? Are you an absolute DIE-HARD David Attenborough fan? Well look no further my friend, because S2 at 1:50PM every Tuesday lunchtime is the place you need to be.

David Attenborough society is a popular student-led club that attracts students from all the different year groups. Every session, we have the opportunity to learn about different animal species in an exciting and interactive way, while also following in the footsteps of arguably the most famous naturalist on the planet - a truly UNIQUE species - Sir David Attenborough!

The Seasonal Specials are especially popular with the students. These have included the Christmas Special 🎅 (all about Reindeers), Halloween Special 👻 (all about the FREAKIEST animals) and most recently, the David Attenborough Club Valentine's Special ❤️ (where we learnt about LOVE in nature!).

The Valentine's Special was even more lovely as it attracted a WHOPPING 41 students! - a new Attenborough Club RECORD!!! (bear in mind that there are only 32 seats in the classroom!).

ORBYTS Astrophysics Project

Article By Divyashi Patel & Siani Tanna

This year a group of ambitious Year 10s have embarked on the exciting astrophysics-based ORBYTS project. This project is an educational initiative which empowers students to do scientific research beyond the curriculum. With the support of university researchers, they publish it in scientific papers and present it to others. Allowing students to gain practical skills and further develop professional research skills, this project emphasises inclusivity and opportunity.

Selected schools across the UK participate in this project, advancing their scientific knowledge and connecting them to research in fields of exoplanet, molecular physics and astrophysics studies. This year, the project aims to contextualise exoplanet host star observations and paint a dynamic picture of it. . When this group of Year 10s have completed their research, they will

present their findings and conclusions at UCL to various other schools who have also participated in this project. From coding to critical thinking, this project enhances students' analytical and collaborative skills preparing them for their future careers and professional endeavours and creating the next generation of researchers.

Silver Crest Award

Article By S Ratnayake

The Silver Crest Award is an enrichment program run by the British Science Association where students in year 8 to 11 dedicate their time to complete this project. It provides an opportunity for students to lead their own STEM projects, developing skills such as independent research, problem solving, and critical thinking. The award is also highly valued in university applications.

The students chose the topic 'Drugs and Alcohol', aiming to focus on the forensic aspect of science. Throughout the year students did practicals such as 'Fraud Detection using Paper Chromatography and Chemical Tests'. For each of the practicals completed, they had to do independent research within their groups and come to a conclusion, with students thoroughly enjoying all of them.

Catrinel Munteneau, a student who has completed the Silver Crest Award states
" Silver Crest is an amazing way to connect with other people with the same interests and ideas as you - it opens so many future opportunities for you as well as always being a great way to spend time."

Furthermore, selected students did a presentation in front of the former Headmaster Mr. Jones as well - summarising the concept and findings of the course. During this half term, students started to finish up their booklets with the completion of all the practicals for this topic. They additionally created eye-catching front covers and produced a booklet containing all the research, practicals, hypotheses and conclusions as well as a summary of their main aim of this project. Designed to inspire the youth, Silver Crest encourages students to find and embrace their passion for STEM.

Science Fact!

Fact By Natesinee Piper

Did You Know? The Earth is Warming Faster Than Ever!

Over the past century, global temperatures have risen by about 1.1°C, mainly due to human activities like burning fossil fuels, deforestation, and industrial pollution. While this might not sound like much, even small temperature changes can have big consequences for our planet. One of the most alarming effects is happening in the Arctic, which is warming nearly four times faster than the rest of the world. As a result, ice caps and glaciers are melting at record speeds, leading to rising sea levels that threaten coastal communities worldwide. Scientists estimate that

if all the ice in Greenland melted, sea levels could rise by up to 7 meters—enough to flood major cities!
But it's not just ice melting—extreme weather events like heat waves, storms, and wildfires are becoming more frequent and intense due to climate change. In 2023, for example, parts of Europe and North America experienced record-breaking heat waves, with temperatures soaring above 40°C in places that rarely see such heat.

What Can We Do?
The good news is that we can all help slow climate change with small everyday actions! Here are a few simple ways to make a difference:
🌱 Reduce waste – Recycle, compost, and cut down on single-use plastics.
🚲 Choose greener transport – Walk, cycle, or use public transport instead of cars when possible.
🔌 Save energy – Turn off lights and electronics when not in use.
🥦 Eat sustainably – Reducing food waste and choosing locally sourced foods can lower carbon emissions.
Even small changes can add up to a big impact—let's work together to protect our planet for future generations! 🌍💚♻️

Cooking and chemistry - A tasty recipe for all STEM lovers!

Sourced from Flawless Food written by Sisi Bademosi & Lily Whittick

Most people wouldn't immediately link cooking to STEM, but science - specifically chemistry - is a key part of the way we prepare our food. Because of this, we are including a recipe in this article of the STEM newsletter, with a scientific explanation of the ingredients' purposes and how they benefit you at the end. We hope you enjoy it!

A recipe to try at home - Flapjacks (approx. 6 servings):

Ingredients:

- 100g Light Brown (or Demerara) Sugar
- 125g Butter (or Margarine)
- 2 ½ tbsp Golden Syrup
- 175g Oats (any sort)

Equipment:

- Baking Tin
- Greaseproof Paper
- Large Pan
- Mixing Spoon & Spatula
- Knife

Method:

1. Preheat the oven to 180℃ / 160℃ fan / gas mark 6. Line the baking tin with the greaseproof paper.

2. Put the butter, sugar, and syrup into the pan.

3. Melt the butter and mix the ingredients on a low heat. DO NOT allow it to boil.

4. Once fully combined, turn off the heat and add the oats.

5. Stir in the oats until it forms a sticky oat mixture. Transfer this mixture to the lined baking tray and spread/flatten evenly with the spatula
6. Bake for approx. 15 - 20 minutes or until golden and bubbly around the edges. The flapjacks will still be soft but they will firm up as they cool. DO NOT be tempted to cook for longer as they will overbake!

7. Once baked, remove from the oven and cool for a few minutes, before cutting into small squares or rectangles.

8. Best served at room temperature! Enjoy!!

<u>The science behind it</u>

Making:
Butter and syrup serve as binding agents in the flapjack mixture. The golden syrup is a thick liquid sugar, while butter is a soluble fat. This combination allows the butter-sugar-syrup mix to function like glue, helping to hold the oats together.Oats are rich in soluble fiber, which not only contributes to the texture but also helps bind the ingredients together. When oats are combined with butter and syrup, they swell and absorb moisture, creating the classic chewy consistency of flapjacks. However, thicker flapjacks may require raising agents to prevent them from sinking in the middle. It is crucial not to let the sugar boil, as this can cause it to crystallize, resulting in hard bits in the flapjacks!

Minerals / Vitamins:
Flapjacks contain oats, a brilliant source of fiber, something that is very important for your digestive system to function properly. Glucose - found in the syrup - is a type of sugar molecule, used in respiration to help produce energy for your body. This energy is then used for many other tasks, helping to provide you with enough energy to complete all the tasks you need to, demonstrating the importance of sugars in a healthy diet. Fats are often considered unhealthy, but there are two types of fats: saturated (unhealthy) and unsaturated (healthy) fats. Fat helps to protect bones and organs and is also used in making cholesterol, an essential part of all cell membranes. However, (like most things) it can also be very dangerous when consumed in excess!

An at home experiment for you to try!

By Sienna Vagadia

Grow Your Own Crystals

Ingredients

Salt
Water
Paper clip
Straw
Elastic band
A glass/jar
Cotton string

Method

1. Boil your kettle and let it cool. Ask an adult to help you fill a jar or glass with warm water.
2. Add several teaspoons of salt to the water and stir until all the salt has dissolved. Keep adding, a teaspoon at a time, and repeat this until no more salt will dissolve.
3. Tie a paper clip onto the end of a piece of string and wrap this around a straw. The straw will be what hangs your paperclip in the water to form the crystal. Bend the straw so that it hangs over the jar, and put an elastic band around the top of the jar to hold it in place.
4. The paper clip should hang in your crystal solution for around a week, don't touch! Observe after a week, and leave for longer if needed.
5. The process of crystallisation has occurred! Observe your crystal closely.

Computer Science

Sixth form interviews

Article By Keya Patel and Vaishnavi Sriram

We had some insightful interviews with three amazing Computer Science students - Taylor Gudka, Kai Young and Vedant Bonde. They shared their experiences and reflections on the A-Level Computer Science course, and their responses were both interesting and beneficial for any potential students considering an A-Level in Computer Science. It was great to be able to hear these people's thoughts and viewpoints, and we think you'll find them just as engaging.

Taylor Gudka shared that this course builds on the GCSE Computer Science curriculum with new topics such as binary maths. When asked, 'Is the programming side more difficult than expected, and which languages do you use?', Taylor answered with 'It was about what I expected, not too easy but not difficult, I would say, and I used Python, SQL, JavaScript'. Taylor described the course as split evenly between theory work and practical work. Taylor prefers the more hands-on coding element of the course. Alongside, describing the course as more logic-based than maths-based. The hardest topic was object-oriented programming, and the easiest and most interesting was binary maths and web technologies. Lastly, a piece of advice given by Taylor was to prioritise coursework. This could be some valuable advice for anyone looking to take Computer Science for A-Levels.

Kai Young also pointed out that there was more of a jump in complexity at A-Level, especially with new topics like OOP, Binary Maths, Software Development Methodologies (Waterfall, Agile), Web Development and more. He found that the programming side was a lot harder than expected, while using a range of languages including PHP, Python, HTML (ish), JavaScript, CSS, and SQL. Kai prefers theory because it's more hands-on. He also added that this course was more logic-based, more conceptual and found that you used more knowledge application rather than maths. Kai found OOP particularly difficult, as he said that he had never tried it before. On the other hand, the easiest topic was Web Development, and the most interesting topic was Software Development.

Vedant Bonde offered an insightful experience in the A-Level Computer Science course. Some of the new topics that weren't taught at GCSE level were: types of Processors e.g. CISC and RISC, GPUs, Harvard architecture & Contemporary architecture, scheduling e.g. Round Robin, First Come First Served etc., Interrupts and their role within the FDE cycle, software development methodologies e.g. Waterfall, Spiral etc, modes of memory addressing e.g. Direct, Indirect etc, object oriented programming with an understanding of encapsulation, polymorphism, abstraction and inheritance and much more. He then expressed his thoughts on the programming side of the course, where he said' The programming side is not as difficult as one would think. The primary programming language used is Python, however, many questions may also ask for the code to be written in Pseudocode. There is also some JavaScript taught, which is a scripting language used for website design. This goes hand in hand with the CSS and HTML that is taught as well, so that you can learn how to successfully create a fully functional,

customisable website. He also added that, ‘About half of the time spent is entirely coursework, where you get to work on a programming project of your choice in a language that you choose. This is certainly quite a fun project to do however, it requires time, dedication and careful documentation to achieve the top marks. This coursework contributes to 20% of the overall grade. The theory is also interesting to some extent, however, topics such as ethics are less interesting, while topics such as sorting algorithms and pathfinding algorithms are much more engaging.’ He also added that it's generally more logic-based; however, a basic understanding of mathematics, such as floor division and remainder knowledge, is required. There are no calculators allowed in the exam, so good mental maths will be crucial to solving questions quickly and efficiently. The hardest topic for Vedant was the fetch, decode, execute cycle. Yet the easiest was databases, as this is a topic that is quite intuitive, and there are also many fun websites, such as "SQL Murder Mystery", to practise the SQL theory that is taught.

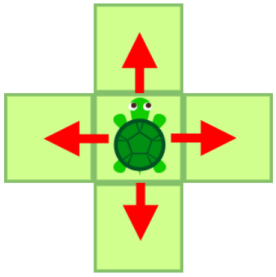
Quick question!

Sources from Bebras website, written by the Editorial Board

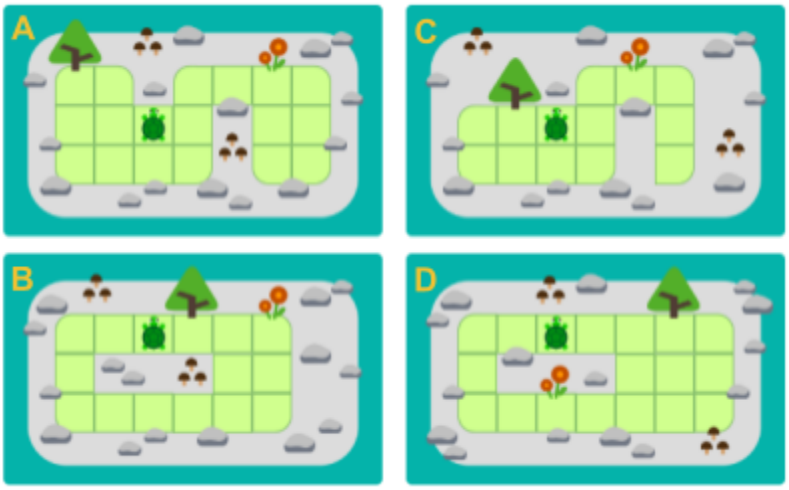
This is an example question from the Bebras challenge, taken from the 2021 Inters challenge. It is a fun and rewarding challenge that introduces you to computational thinking and lets you solve problems using your logic and computational thinking skills.

Tortoise Path

Tortoises live in small gardens. Each garden is divided into grass squares, surrounded by a stoney area. The tortoises cannot cross the stoney areas but they can move from one grass square to the next, as shown here:



Each tortoise would like to take a perfect feeding path in its garden.
A perfect feeding path is one where the tortoise can move to all the grass squares, while visiting each of them only once.
Question:
Which one of the four tortoises shown below cannot take a perfect feeding path?



(Answers at the end, no cheating!)

D&T

This edition of the STEM Termly newsletter introduces a new section featuring Design and Technology.

West Herts College, Food Tech trip

Article By Catrinel Munteanu

Food tech students visited West Herts College on January 22, 2025, to work in an industrial kitchen and experience working in one while acclimating to larger ovens and refrigerators. They also learnt how to use more sophisticated cooking techniques the school does not offer, like deep frying, griddles, burner stoves, and prep stations. Students learnt how to fillet fresh mackerel and flatfish using the equipment and under the supervision of Chef Pedro. They also learnt that the way fish swim affects how they fillet them. They made breaded goujons and saw the filleted flatfish by coating it in flour, egg, and breadcrumbs, then deep-frying it to get a crispy exterior. In the meantime, the mackerel was prepared by putting it in a frying pan with hot oil and cooking it until it was done. The students were then shown by the chef how to prepare and garnish the plate so that it was visually appealing and ready for serving.

"Learning how to fillet a fish was entertaining and fascinating, and I believe it will be very helpful in the future when we need to apply these skills." -Kaya Patel

“The trip was wonderful! The environment was so inspiring and the kitchen was very professional with a welcoming atmosphere.It was an amazing opportunity to learn how to fillet a whole mackerel and flatfish but also an amazing educational experience.The chef was incredibly skilled & patient, guiding us through each step thoroughly so we would get the hang of it.” -Pin Piper

Interviews with A-Level DT Students

Article By Keya Patel

We recently got the opportunity to speak with a few of the A-Level DT students about their DT projects and we learnt about some of their personal experiences and insight during this process. It was great to hear about their different viewpoints, and I think you’ll find their thoughts just as interesting. Here are some of the things they had to say!

Syan

Firstly, we have Syan Vadgama, a Year 13 A Level D&T student whose final product is a go-kart. He stated that he wanted to become an engineer in the future. We started by asking him to give us a basic introduction about the process of A Level D&T, to which he responded with ‘ it is 50% theory, 50% coursework, the coursework you can make whatever you want, everyone has a client and they have to solve a problem for them.’ Next, in response to our question about what

inspired him to choose this project, he responded with ‘F1 and other homemade go-karts’. We then wanted to know more about his thoughts and reflection on his project, so we asked what he would want to change about his project and why, Syan responded with ‘Add a motor, at the moment it goes quite fast but to make it go faster I think a motor would be ideal to use’. Finally, we ended our first interview by asking why he chose to take D&T as A Level subject, to which he said, ‘It's been my favourite because you can make anything and 3D design whatever you want and make it is quite cool.’

Akshith

Moving on to our next talented interviewee, we have Akshith Regavan. Akshith is a Year 13 student who took maths, physics and D&T for A Levels. His final project is a ‘transforming alarm clock’, the clients he chose were teenagers aged between 11 and 18 years old. He chose these subjects because he stated that he wanted to become an engineer in the future. We started again by asking for a basic introduction about A Level D&T, in which he said, ‘ 50% NEA is like 40-50 pages of making a product from scratch, the other 50% is a written test, one of the easiest tests you will ever write in your life’. We then asked what had inspired him to create his project, to which he responded with ‘I like transformers’. Moving on, we asked about how long his project took him and how he designed and manufactured his project, his response to this was that ‘Designing took about a month, and manufacturing took about a month and a bit’. Then we asked him to reflect on his project by asking if he would make any changes, and if so, what they would be. He says, ‘Change the colours, currently looks very evil, change the wheels and add more colour to the final piece’. To inspire students who are considering taking D&T as an A Level, he stated that, ‘The experience will teach you a lot, unlike other subjects they will make sure you hand your work in on time and that the work is of the best quality it can be. The teachers will help you, but take your time to create the best piece of work and put in the effort because at the end of the day if you put in the effort the outcome will automatically be a hundred times better and the best advice is to make sure you are having fun!’. Finally, we ended our second interview by asking what he enjoyed the most during this process, he said,’ Drawing would be a highlight because in DT they don’t care about the quality of a drawing, it's more about the quantity of what you’re showing.’

Prince

Our final interview was with Prince Dike, another Year 13 student who aspires to be an architect. He is currently studying business, sociology and D&T. His project is a chair that focuses on comfort as well as aesthetics, so a perfect balance of both. We started by asking him to briefly explain the D&T A Level process, ‘It consists of sketch work, it is also very feasible in terms of how you can translate your sketches into an actual product, and a very creative subject as well as being technical at the same time’ he says. We then moved on to ask him how long his project took him and what his project was about. He replied to this with ‘The design took longer as I spent more time exploring different methods and materials as well as designing concepts before I got into the final stage. The manufacturing process had some challenges throughout the process, which did set me back and extended the time I took to make it.’ We then drifted back to

the start and asked what inspired him to create this project, to which he said, ‘Exploration, trying to work with different types of materials and experimenting with different media’. We wanted to hear some of his own opinions on his project, so we asked if he could change some aspects of his project, and what it would be. He responded to this question with ‘I think I wouldn’t change anything, it was more about the progress, as there were some setbacks but overall helped improve the product in the end’. Most importantly, we asked him what he enjoyed the most about studying D&T, he said ‘The theory was very interesting, and I researched quite a bit into it because I’m very passionate about that part but the technical side was also very engaging’. Finally, we ended our final interview by asking him for any advice he had for someone interested in D&T. He responded to this with ‘The main idea would be to be passionate about it, if you're not passionate about it it can get very stressful’.

Answers

Bebras: **B**
UKMT: Question 1: **C**
Question 2: **E**