Issue Number 27 July 2024

Stem stimulator

This term we celebrated our students creativity and innovation at the STEM fair. It was wonderful to have so many students presenting their inventions to the judges and getting involved with a range of challenges along with student friend, parents and governors visiting the fair.
This year we introduced two new categories to our competition - MUSIC—musical instrument inventions and English– Science fiction writing challenge, which were very successful, alongside our 5 other subject STEM invention challenges.
Our Judge Mr Wright was extremely impressed with the quantity, quality and variety of the students work. He thoroughly enjoyed the evening talking to the students about their work.

Congratulations to the winners;
Invention Challenge– Joshua 8A and Lachie 8A
Lego Challenge– Niamh 7A
Cake challenge Lucy 8C and Phoebe 8A
Recycling Challenge– Olivia 8A
Art challenge– Kamile 12Arn and Buddy 7C
Music Challenge Jack 8A
Science fiction challenge Charlotte 8A

Overall STEM fair winner: Jo 9A and Tom 8C

All students who took part should be extremely proud of their achievements and will receive certificates for entry and a STEM prize. A very successful evening for all involved and we look forward to building on this STEM success into next year
Miss Scanlan

STEM Fair: The Winner– Jo and Tom

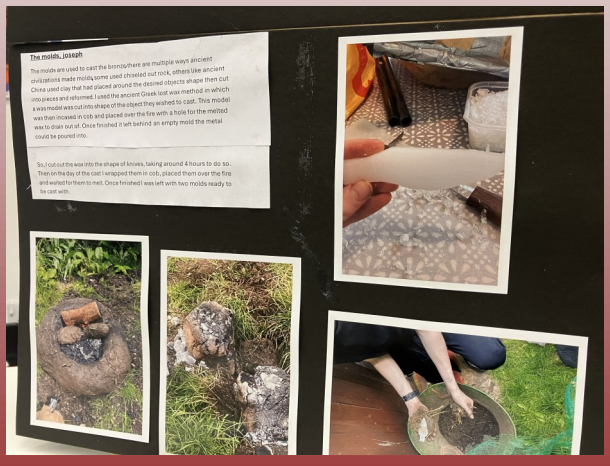
The crucibles, Joesph

The crucibles are used to heat up and transport the molten metal therefore it was a priority of mine to make sure they were of a good quality. This was probably the hardest part of the project as making the crucibles was not only labor intensive, taking around a week and half to finish fully, but it also was very difficult to fire them without the crucible cracking.

I made four of them in total in each one a change the amount and type of temper, the length at which I heated it and the quality in the clay. Firstly, I would use the Kento technique to make the clay crucible have its shape. This works by pushing the clay into a bowl with a piece of fabric covering it then taking out the clay when it was dry leaving behind a bowl shape. Then I would wait around 4 days to let all the moisture in the clay evaporate, excess water in the clay expands at a faster rate when heating causing the clay to explode.

After the clay dried, I would fire it; for it to fire properly, it must reach 1,200-1,300c. This is by no easy task by the end I had done multiple things to maximins the fire tringle to produce the most heat. For example, tom made bag bellows to add more oxygen to the fire. I also changed the method. I would start with a small fire and wait till it became embers and then place the heated crucible, which had been warmed by the fire to remove water. On top of it I would then slowly cover the whole thing with wood. This allowed for a much more controlled increase in heat preventing thermal shock and therefore cracks. Once the fire had died down, I would wait for it to cool. As rapid change in temperate creates cracks because different parts cool and shrink at different rates. So, I would have to wait for a while in order to avoid this. I believe most of my failed attempts were due to it cooling too quickly. This is primary because it's far harder to control.

So, after I thought it was sufficiently cooled, I would take it out and look for cracks if there were none, I could use it.



STEM Fair: The Winner– Jo and Tom

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The Cob. Cob was used as a construction material throughout history, its earliest origins being the Sumerians. I like to view it as an ancient equivalent of concrete as it's used in similar ways. In the project I used it for the moulds and for the furnace. I was very much impressed with the results. I made it with one part clay, part sand and one part straw. The sand provides thermal mass, the clay helps to insulate heat and bind the whole thing together and the straw acts like a sort of rebar giving the cob structural integrity. Once I mixed these with water, it was finished.

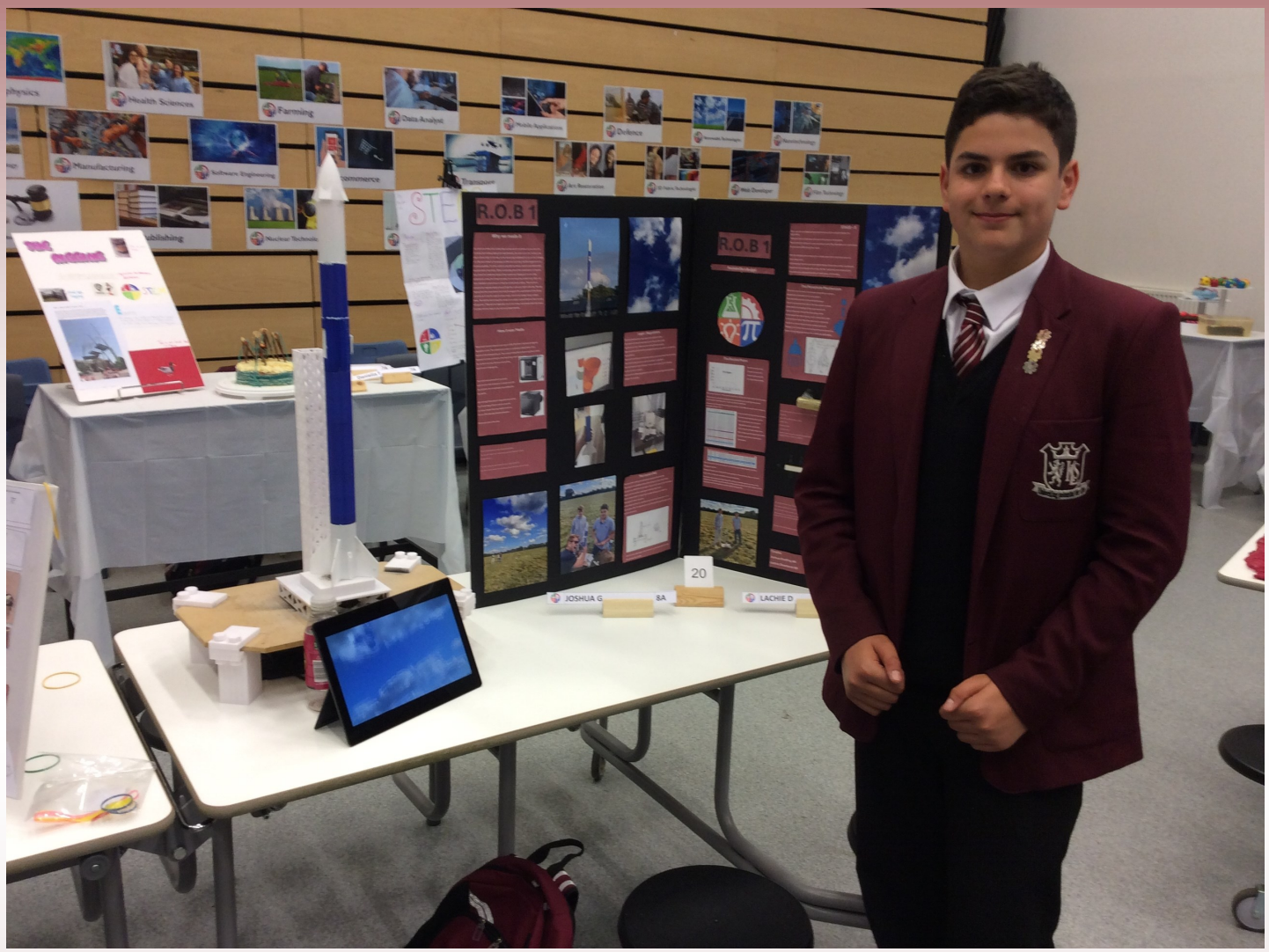
The furnace is used to minimize heat loss as the bronze must reach 1,100c to melt and be cast every degree counts. So, by having insulation and losing less heat I make the process much easier. To make the furnace I used cob shaping it into a doughnut and then leaving it to dry for 1 week then I would dig a hole in the ground line it with more cob leaving holes for the bag bellows to fit in and then I added the ring on top. This created a fully insulated furnace ready for casting.

The moulds, are used to cast the bronze there are multiple ways ancient civilizations made moulds some used chiselled out rock, others like ancient China used clay that had placed around the desired objects shape then cut into pieces and reformed. I used the ancient Greek lost wax method in which a was model was cut into shape of the object they wished to cast. This model was then encased in cob and placed over the fire with a hole for the melted wax to drain out of. Once finished it left behind an empty mold the metal could be poured into. So, I cut out the wax into the shape of knives, taking around 4 hours to do so. Then on the day of the cast I wrapped them in cob, placed them over the fire and waited for them to melt. Once finished I was left with two moulds ready to be cast with.

The bronze, is an alloy that contains copper there are many types of bronze such as arsenical bronze, which was used in ancient Egypt, silicon bronze and aluminium bronze to name a few. The bronze we are making, and the type of bronze used in the bronze age is Alpha bronze made with 90 percent copper 10 percent tin. Once I had these, I would first melt the copper as it has a higher melting point at 1085 degrees compared to tins 231 degrees. Once the copper was hot enough, I would add the tin. They then form a homogenous liquid solution. At this point, I poured it into the moulds, unfortunately, the bronze cooled too quickly, not allowing me to pour all the metal. However, the metal that did enter then the solidify creating crystalline structures. Bronze has many interesting properties such as being anti-microbial as when Bactria encounter bronze the copper inside it releases ions that disrupted the cell membrane and proteins of the bacteria leading to its destruction. It's also corrosion resistant which is why we have many bronze artifacts in good condition.

Jo 9A

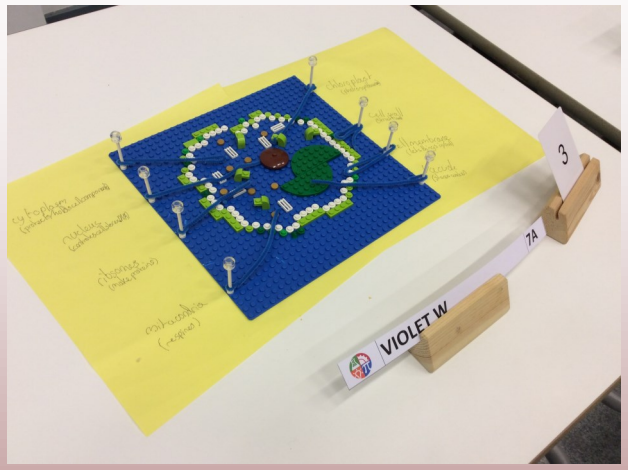
STEM Fair– STEM INVENTION WINNER



Winner: Joshua and Lachie 8A

STEM Fair– Lego Challenge

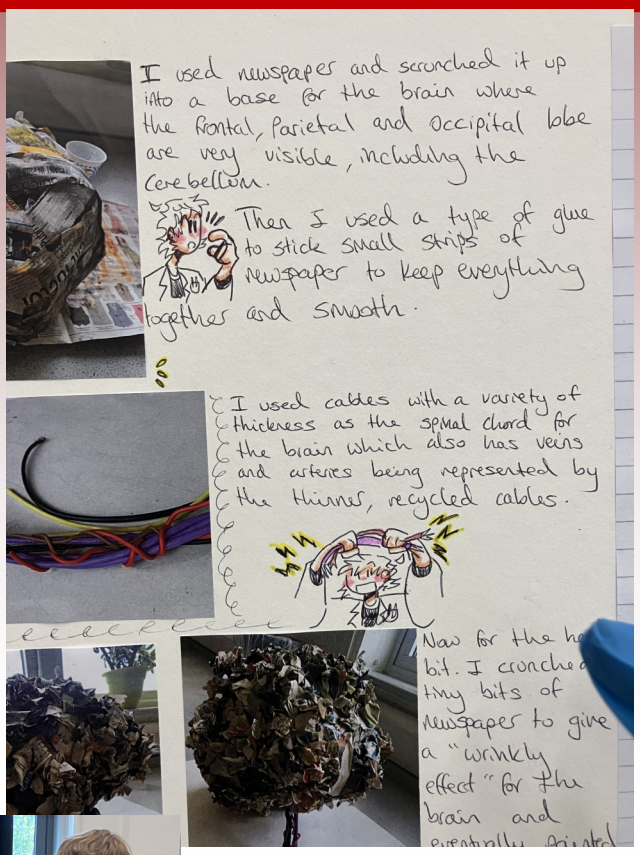
Winner: Niamh 7A

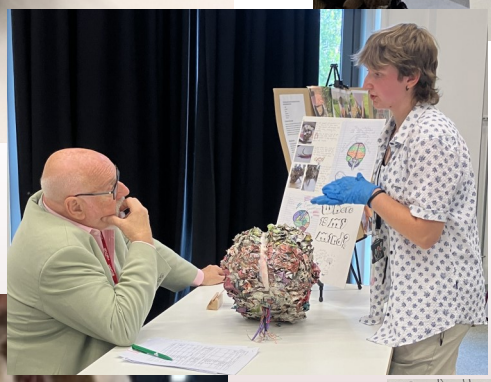


STEM Fair– MUSIC Challenge

Winner Jack 8A

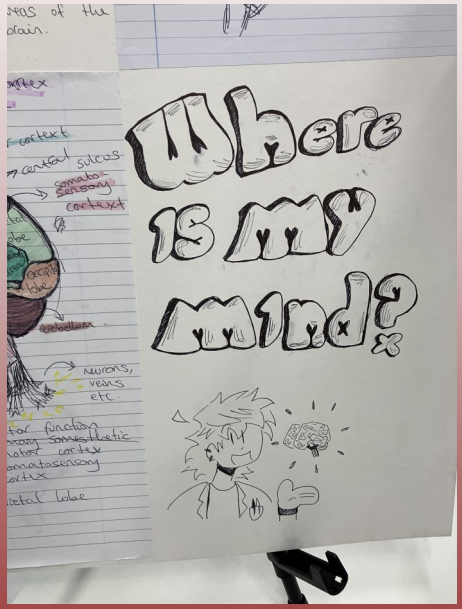
STEM Fair: ART CHALLENGE WINNER



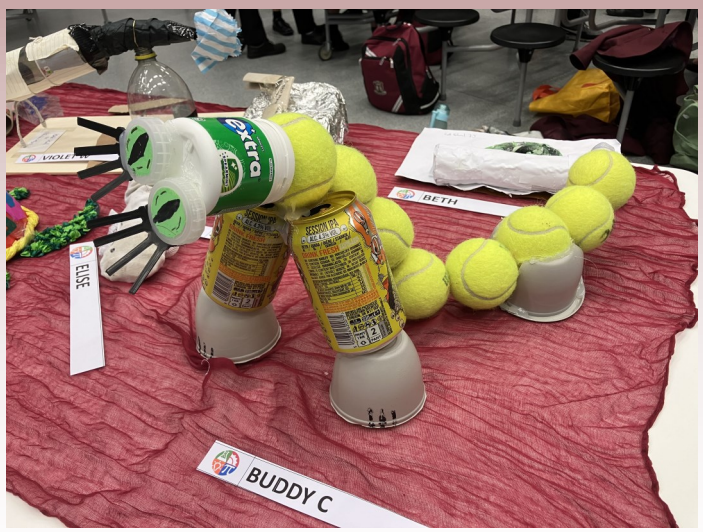


Winner: Kamile

12ARN



STEM Fair: ART year 7 recycling



Winner Buddy 7C

STEM Fair: RECYCLING CHALLENGE WINNER

Olivia 8A

STEM Fair: CAKE CHALLENGE WINNER

Winner: Phoebe 8A and Lucy 8C

STEM Fair: SCIENCE FICTION WINNER

Poem of the Future

Walking in the woods,

Trees being cut,

So quiet you could hear a squirrel drop a nut,

Buildings and houses being built,

On a farmers freshly watered field,

Kids are now sad,

Technology taken over,

Cars now look like decorated range rover,

Food made by robots,

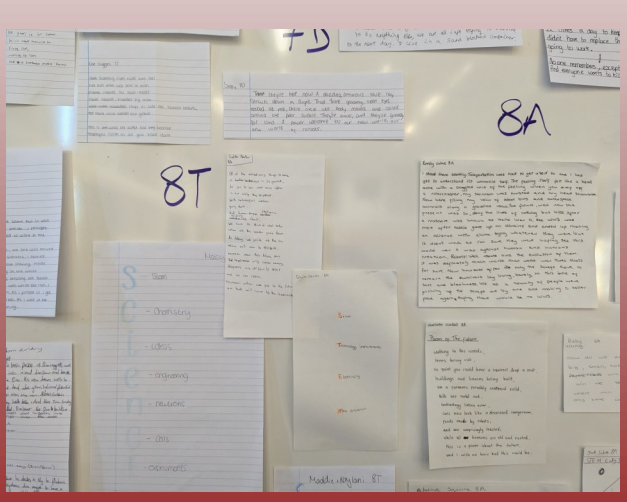
And surprisingly are trusted,

While all human and old and rusted,

This is a poem about the future,

And I wish we knew how bad this could be.

Charlotte 8A



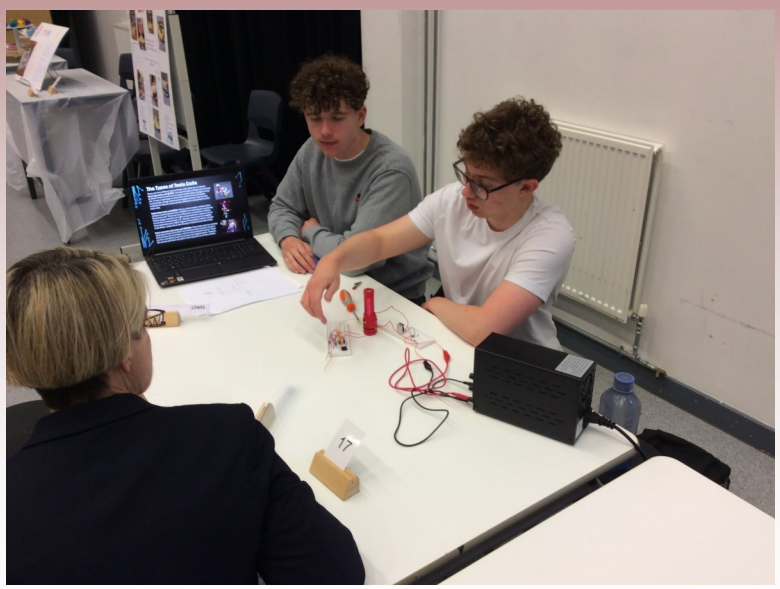
STEM Fair: The cake competition

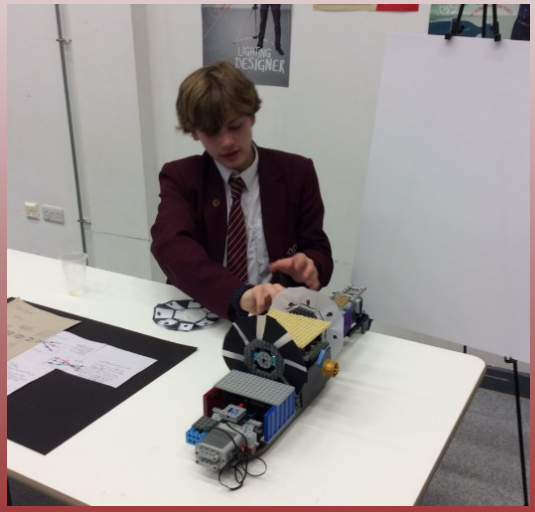
STEM Fair: The Kit Car

The F24 Kit Car Club has been creating our own vehicle since 2022. We made the frame and wiring in the car, the body work and design on it, and worked on sponsorship and branding. After lots of test driving, we have found solutions to the problems we found, and we are now at the final stages of development. We are looking for race events to compete in against other kit cars. Our group has worked hard on the car and spent lots of time testing and improving it. It has been on display at the STEM fair, with members of the club presenting it, and the school governor has visited multiple times to check on its progress. We are proud of what we have achieved and are eager to race in the future. We are always open to any sponsorship deals and would be grateful if someone would assist us by providing/hiring a van to transport the car to race events.

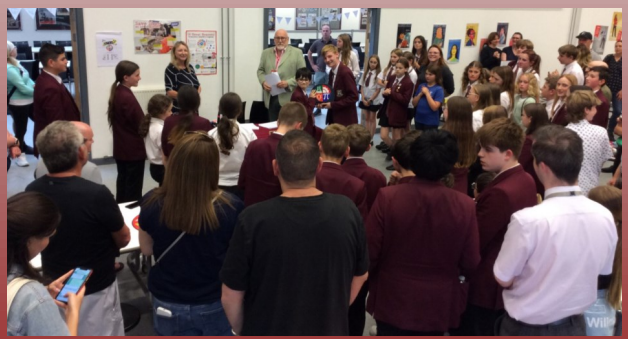
Jake 9G

STEM Fair ENTRIES



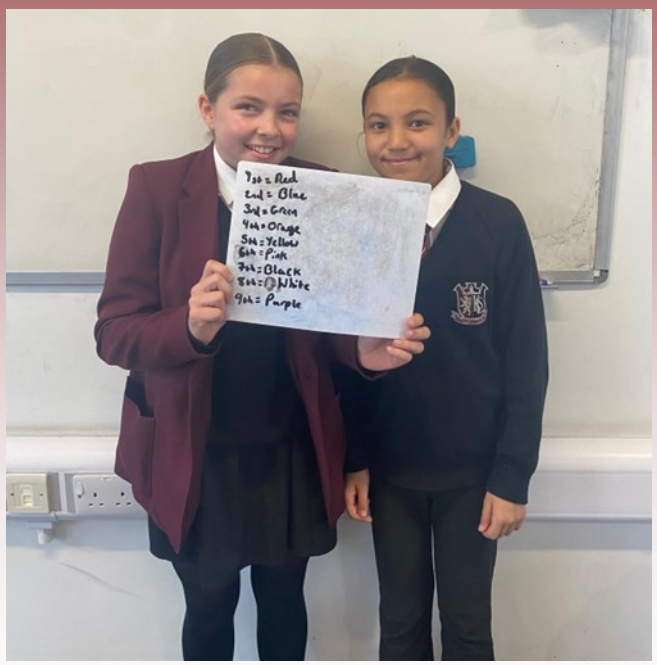


STEM Fair ENTRIES



STEM Maths lessons

For STEM fortnight, our Year 7 and Year 10 students have been challenged with some problem-solving tasks. Both Year 7 and 10 were given a set of cards that pose a problem and contain all the information required to solve it. The first set of cards they were given required them to find the finishing order of different cars in a race. However, some of the cards have irrelevant information on them, therefore student's first job is to find the cards that are useful.



Year 10 then went on to solve a more complicated ordering task, which required them to find out the ages of the students to help put them in order.

Both activities link to problem solving, which both year groups have been looking at in the summer term. The purpose of these activities is to develop more logical and strategic approaches to organising information to help prepare students for problems they may have to solve in further education, but also in real life.

Answer Year 10 Spring UK Intermediate Challenge Question

As x is greater than 2022, then $\frac{x}{2022}$ and $\frac{x+1}{2022}$ are greater than 1, whereas $\frac{2022}{x}$ and $\frac{2022}{x+1}$ are less than 1.

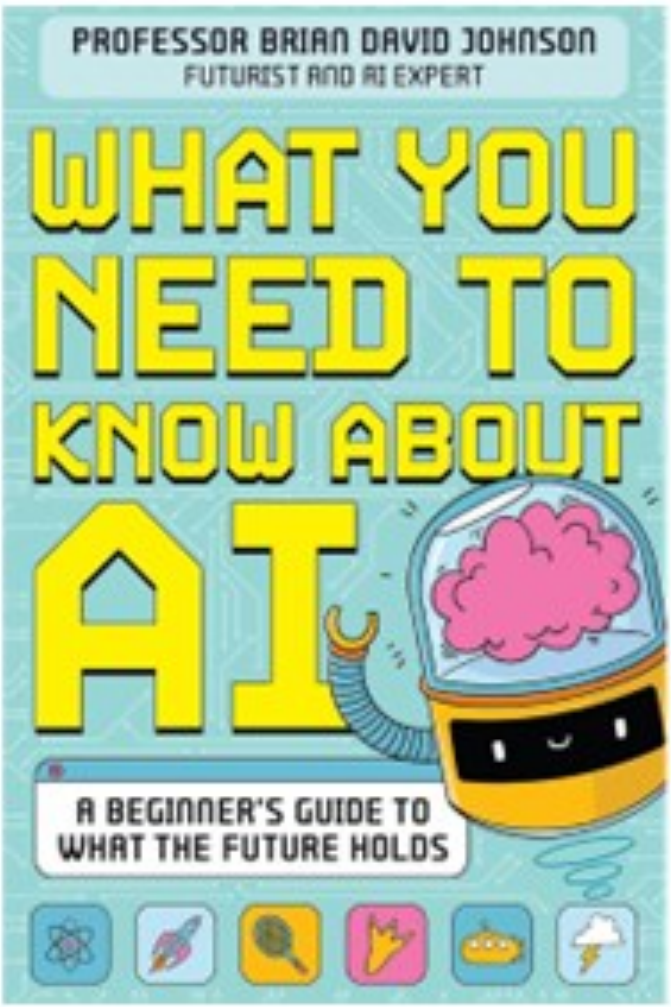
So we can eliminate A and C. As the remaining three fractions all have the same numerator and positive denominators, the smallest fraction is that with the largest denominator, namely $\frac{2022}{x+1}$.

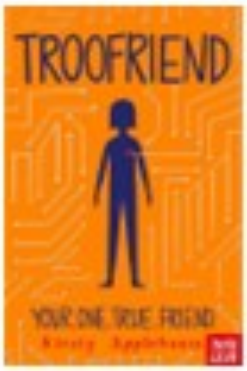
The Library

STEM Reads

Read all about it! Exploring AI

We have several books in the library that investigate, explain, and explore the technology and ideas around Artificial Intelligence.





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STEM Colours

	Bronze	Silver	Gold	Platinum	Diamond
Extra-curricular	Attend one extra-curricular STEM club for two terms.	Attend one extra-curricular STEM club for at least a further two terms	Assist a member of staff in the running of an extra-curricular STEM club for a year term, assuming a role of responsibility.	Plan and run an extra-curricular STEM group for a year.	Take an active role with specific responsibilities for STEM such setting up and leading a STEM activity
Leadership	Become a student leader within an area of STEM, for a minimum of two terms.	Become a student leader within an area of STEM, for a minimum of three terms, taking responsibility for a specific activity/ event.	Become a student leader within an area of STEM for at least three terms, assuming a specific role of responsibility where you contribute to the running of events.	Become a student leader within an area of STEM, for at least two years, assuming a specific role of responsibility where you lead others.	Lead a student group/club within an area of STEM, taking responsibility for its planning, design, content and delivery.
Personal Development	Submit one article to the STEM newsletter or contribute to STEM subject display board **or** Enter at least one STEM form competition	Submit two articles to the STEM newsletter or contribute to STEM subject display board within a school year **or** Enter at least two STEM competitions over the year	Submit one article to the STEM newsletter each term or contribute to STEM subject display board each term **or** Enter at least three STEM competitions (one per term)	Via the STEM newsletter, write an article to be included in local press about a positive aspect of your school **or** Enter the STEM fair individually or as a team	Produce a STEM student magazine for a STEM subject area of the school over a year. **or** Lead a team or support a primary school team to enter the STEM fair
School and Wider Community	Take part in a STEM school or community fundraising event	Contribute to a STEM school or community fundraising event assuming a role of responsibility	Lead a STEM school or community fundraising event assuming a role of responsibility	Organise a STEM school or community fundraising event assuming a role of responsibility	Lead on, or assist the support of students in a STEM fundraising event across the school