

'The richest experiences in our lives are when we're listening to our own voice doing something that matters, doing it well, and doing it in the service of a cause larger than ourselves.'



The
Pinnacle



Issue 27 | Spring 2020

Showcasing exceptional work by pupils from Princethorpe College, Crackley Hall School and Crescent School.



Princethorpe College



LETTER

FROM THE EDITOR

The world has witnessed unparalleled technological advancement in recent years. We may wonder what the coming decade will bring: bionic eyes; diagnostic health tracking devices; smart contact lenses engineered to pick up early indicators of cancer and diabetes; ID chips under the skin to hold a patient's medical records. These are just some (medical) inventions nudging ever closer to production that will change the world for the better. Never before has STEAM - the intersection of Art, Science, Technology, Engineering and Maths - been quite so dynamic. Don't mistake it for a typo - the 'A' in STEAM is intentional. STEAM is taking the foundation of STEM to the next level. Here the focus becomes the *application of science, technology, engineering and maths through art and design. It's a multi-disciplined approach to exploring new and creative ways of problem-solving, displaying data, and innovating.*

Princethorpe College actively supports and devises regular STEAM-related opportunities for our students and you'll see a number of these initiatives documented in this and future issues of *The Pinnacle*. From Arkwright Scholarships and guest speakers, to national Art and Maths competitions and research projects across all age groups, STEAM is a priority for our school.

Over Christmas, I read *Drive* by Daniel Pink (a recommended read from Mr Hester), and I'd like to share with you some of the highlights, because it links to the A in STEAM (as outlined above) as well as the Learning Skills programme we deliver in Tutor Time.

The work we do or learn in school can be divided into two categories: algorithmic and heuristic. 'An algorithmic task is one in which you follow a set of established instructions down a single pathway to one conclusion. That is, there's an algorithm for solving it. A heuristic task is the opposite. Precisely because no algorithm exists for it, you have to experiment with possibilities and devise a novel solution. During the twentieth century, most work was algorithmic, but today it's racing offshore to wherever it can be done the cheapest'. Nowadays, the largest percent of job growth comes from heuristic work. 'A key reason: Routine work can be outsourced or automated; artistic, empathetic, non-routine work generally cannot'.

Pink believes that the implications for motivation are vast. Researchers have found 'that external rewards and punishments can work nicely for algorithmic tasks. But they can be devastating for heuristic ones. An incentive designed to clarify thinking and sharpen creativity ends up clouding thinking and dulling creativity. Why? Rewards, by their very nature, narrow our focus'.

Conclusion? 'For artists, scientists, inventors, school children, and the rest of us, intrinsic motivation – the drive to do something because it is interesting, challenging, and absorbing – is essential for high levels of creativity.' Counter to what you might think, extrinsic rewards often stifle, rather than stir creative thinking. 'Adding monetary incentive doesn't lead to more of the desired behaviour (i.e. creativity). It leads to less. The real ingredients of genuine motivation are autonomy, mastery, and purpose. When the reward is the activity itself – deepening learning, doing one's best – there are no shortcuts.

Pink concludes that 'the secret to high performance is our deep-seated desire to direct our own lives, to extend and expand our abilities, and to live a life of purpose. We are not destined to be passive and compliant. We're designed to be active and engaged. And we know that the richest experiences in our lives aren't when we're clamouring for validation from others, but when we're listening to our own voice - doing something that matters, doing it well, and doing it in the service of a cause larger than ourselves'.

And so, I urge you to work towards mastering the thing you love, for its own sake. And if you can do so in the service of some greater objective, you will achieve even more. In the spirit of *Drive*, in this magazine, we celebrate creativity, intrinsic motivation and mastery from across the Foundation. Well done everyone!

Thanks go to: staff at Princethorpe College; staff at Crackley Hall School (co-ordinated by Cat Hardwick); staff at The Crescent (co-ordinated by Sarah Webb); the Marketing Team; photography by Helen Stephenson and design by Debbie at Dam Design Creative.

SEE YOU NEXT ISSUE!

HELEN PASCOE-WILLIAMS
EDITOR & CO-ORDINATOR OF THE
DA VINCI PROGRAMME



PRESENTATION EVENING

Monday 10 February saw the launch of our inaugural STEAM Presentation Evening when parents and industry experts were invited to support our Sixth Form students in their STEAM-related projects.

First, the guests were invited to watch three ten-minute presentations delivered by our Upper Sixth Extended Project students on STEAM-related projects that they have completed. Following this, guests were given the chance to wander around the atrium, where pupils in Lower Sixth presented their work in progress for their Extended Project and Design Technology investigations.

Thank you to all who attended and played such an active role in giving valuable feedback to the students. The evening really helped them develop their work so that they may consider further study of STEAM subjects and progression into related careers.



FUTURISTIC SCIENCE

Learning & Memory

by Anna Johnson

...Scientists are now claiming that it will be possible to have a brain-computer interface where the senses (visual, auditory, olfactory, tactile, taste, gustatory) are bypassed and information can be directly loaded into the long-term memory. Futuristic science could lead to human learning being fully computerised, with information downloaded directly into the brain, and the face of education could radically change.

This futuristic system of learning information could mean that humans are provided with pre-prepared messages that instructs us to know the difference between the right and wrong answer in many situations. It could mean that criminality could be stopped in the world. A study by Wynn and Logie (1998) showed that two people will recall information about the same event very differently. They both believed that their version of events was correct.

This is because the memory is altered by the person's prior knowledge, emotion and senses at the time of the event. The brain-computer interface would ensure that recounts would be based on exact facts. Therefore, a person's ability to recall the accurate information would be far greater than if they learnt through own experience and senses. If our actions weren't affected by emotion, personality or background but based purely on correct information people may be less likely to take the wrong decisions and commit a crime.

On the other hand, it could be argued that this futuristic invention could allow certain individuals to gain power and control over others. If this chip was used to download the wrong information, it could lead to catastrophic events. In the psychological Stanford University prison experiment (1971), results showed that when people are told information that they are a powerful and an authoritative person then they will believe this and take action in line with it. In this certain experiment, the students who were acting as prison officers, were physically attacking and mocking the volunteer prisoners and the experiment had to be stopped within one week. This suggests that if information downloaded by the chip was corrupt then individuals would start to believe and act upon it. Therefore, if the science behind this invention fell into the wrong hands, it could be harmful to both individuals and society.

Anna Johnson in Year 7 is one of the best English students Mrs Baker has ever met! Here's her work on neuropsychology. She also made a model of the brain (with light up sensors) to accompany her essay and PowerPoint. Superb work, Anna.



The Junior Academy



The Junior Academy is an elite group of problem solvers made up of talented students, STEM experts, and companies around the world dedicated to designing innovative solutions to global challenges.

Each year, they invite students ages 13–18 to join The Junior Academy. Successful applicants gain lifelong access to exclusive educational opportunities and a remarkable global STEM network through *Launchpad*, a virtual collaboration platform.

Students develop advanced research, innovation, and collaboration skills with best-in-class learning resources and leverage these skills to compete in 70-day challenges sponsored by industry-leading companies.

If you are interested in becoming a Junior member, start putting together your application now and visit https://gsa.smapply.io/prog/student_programs/ to begin the application process.

Application Requirements

The ideal Junior Academy participant is an enthusiastic learner and problem solver with a passion for Science, Technology, Engineering and Maths (STEM). He or she has a desire to learn more about the universe, and aspires to help address the world's most pressing challenges through research and collaboration.

- ✳ **Age:** Students must be 13–18 years old.
- ✳ **Location:** The program is virtual and open to students anywhere in the world. All participants must have access to a computer and a reliable internet connection.
- ✳ **Language:** All program content and communication is in English, and a strong level of English proficiency is required. Students' English proficiency will be assessed before they are accepted into The Junior Academy.
- ✳ **Time Commitment:** Students are expected to dedicate approximately two hours per week during challenge periods.
- ✳ **Cost:** None. All costs are covered by generous funders.

Contact: thejunioracademy@nyas.org

**Wednesday
11 March
7:00-8:30pm
Clarkson
Theatre**

**Sign up on
*The Flagpole***

**STEAM Lecture:
“Exo-Planets: Famous
Firsts, Boisterous Births,
and Destructive Deaths”**

Guest speaker: Dr Dimitri Veras, an Astrophysicist in the Department of Physics at the University of Warwick who researches the contents of exo-planetary systems in a wide variety of contexts, across both time and space.





AN INCREDIBLE WEEK AT CERN

During the summer holidays, I had the fantastic opportunity to spend a week at CERN, in Geneva, as part of my work experience.

You might be wondering how this came about - in a nutshell,

I asked politely (as a very long shot), and they said yes! Using LinkedIn, I researched the names of some people who work in areas I was interested in, and speculatively contacted a shortlist, along with my CV and potential dates. I was very fortunate; Ben Todd replied quickly, letting me know that a work shadow could be arranged.

I remember being incredibly nervous during the short journey to CERN on the first morning. I wasn't sure

what to expect, and had vague ideas of huge, futuristic buildings like something from a sci-fi novel, and very important people in suits. On the contrary,

the site actually looks quite industrial from the outside, and people were strolling around in shorts and T-shirts (although the temperature was over 30°C all week!).

The first person I met when I arrived was Ben, my supervisor for the week. He immediately made me feel at ease by being so friendly and approachable – he also has a great sense of humour.

It took nearly ten minutes to drive to the part of the campus where Ben works (in France, which meant that I crossed the French/Swiss border several times a day!). When we arrived, the first thing was to get me up to speed, firstly on the whole site, and then on the department I would be based in for the week. I was then introduced to the team, and each person gave me an overview of their current projects.

Ben is the leader of his section – the Converter Controls Electronics section. This section specialises in electrical power conversion, which means they design and test parts for power converters. These are then used to supply the right kind of power to the particle accelerators at CERN, such as the Large Hadron Collider (LHC). The power supplied must be very stable, therefore the power converters must be very accurate (and also be able to work while exposed to radiation).

After being sufficiently impressed, we all went to lunch. This is when I began to get an idea of the friendly and relaxed atmosphere of CERN, and the informal dress code I'd seen earlier began to make sense. The conversations in the canteen during the extended lunches throughout the week were very interesting and exciting. They ranged from chats about the previous weekend, to a debate about bitcoin, to intelligent discussions about each other's work, where everyone would put in their thoughts and advice. Of course, half of the speaking was in other languages, so with just my GCSE French and German, I couldn't hope to understand everything – I did learn plenty of new vocab though!

Over the course of the week, I began to realise that the environment at CERN is more like that of a university campus than a business, and is surprisingly relaxed.

Lauren is also a member of the 1,000 Girls, 1,000 Futures Global Science Programme. She used their 5 Steps to Critical Thinking approach to answer the question: **Would it be beneficial to me to take an EPQ along with my four A-levels of Maths, Further Maths, Physics and Chemistry next year?**



5 STEPS FOR CRITICAL THINKING

Step	Your Notes
1 Formulate Your Question – Clearly know what you're looking for.	<i>My question is:</i>
2 Gather Your Information – Use your question to determine what is relevant.	<i>The facts and information that I need to consider include:</i>
3 Apply the Information – Ask critical questions.	<i>What concepts are at work?</i> <i>What assumptions exist?</i> <i>Is my interpretation logically sound?</i> <i>What else should I consider?</i>
4 Consider the Implications	<i>What are all of the consequences of a particular decision?</i>
5 Explore Other Points of View	<i>What are other alternatives?</i> <i>Is my choice the best option despite the alternatives?</i> <i>Why?</i>

TO SEE WHAT SHE DECIDED
SCAN THE BARCODE...

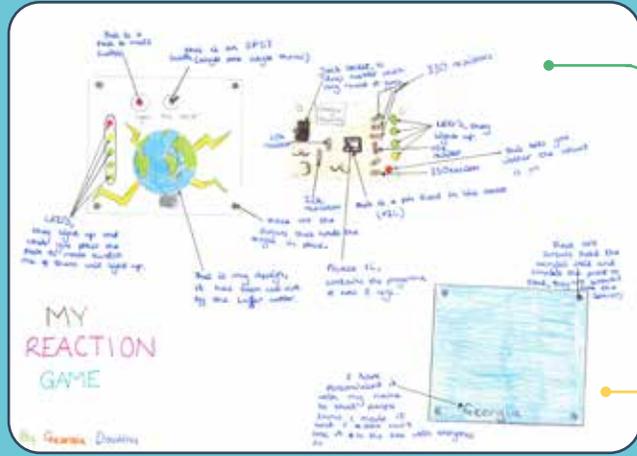
PINNACLE ONLINE
TO READ MORE OF
LAUREN'S
WORK
SCAN THE
CODE



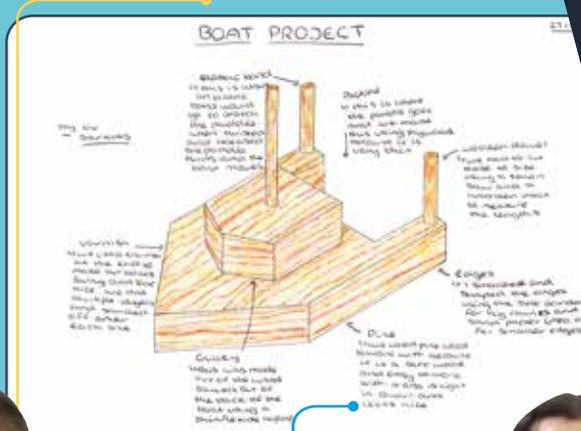
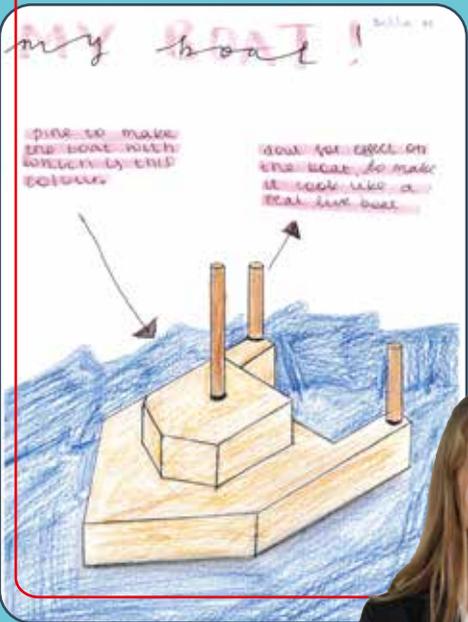
TECHNOLOGICAL TRIUMPHS

Year 8 Design Technology pupils were asked to produce a presentation drawing of their completed pine boats. They could draw it in 2D or 3D. Liv, Georgia and Bella chose to use isometric grid paper as a guide and then rendered the drawing to look like pine.

Georgia produced an information sheet about her completed Reaction game project.



GEORGIA DOWLING, Y8



BELLA HOLT, Y8



LIV SARKIES, Y8



Being Scientific

A collaborative project launched by the Science Department and the Library generated some superb work last term. The scheme of work was based on the broad topic of the 'Solar System' and sought to help Year 7 pupils acquire and practise skills in information literacy (the ability to locate pertinent information, evaluate its reliability, analyse the information to construct personal meaning and apply it to informed decision-making).

Pupils completed and presented their projects after a number of weeks of independent work at home and guided library sessions to support. The final work included posters, leaflets, formal presentations, models and cakes!

Here are some examples of the wonderful work they produced:



SUPER POWERS

Super powers come in all forms through history and in current affairs. Though one might assume the size and scale of the British Empire would absolutely highlight a country that was, at one point, a super power, we could also argue that Boris Johnson's large Conservative majority in the Commons in December 2019 could make him and his party a more modern, and smaller-scale version, of a very powerful government. Students have been getting stuck into the transformative nature of this power and what it takes to achieve and maintain it.



A superpower is a nation with the ability to project its influence anywhere in the world and become a dominant global force. Current super powers include the USA and the European Union. Former super powers include Japan, USSR and the UK. The UK was removed from superpower status post the cold war in 1991 and post World War Two due to declining control and power.

At its peak, the British Empire was the largest formal empire and its power and influence stretched over one globe (containing 20% of the world's population). By 1920, they formed many colonies and demonstrated cultural imperialism. One British colony is India. The British influenced India's culture largely by introducing government, the English language, cricket etc. The British constructed infrastructure symbols of power such as the presidential palace in Delhi. India also highlighted their wealth. They improved education systems but they have also been accused of introducing racism in colonies through the slave trade. However, post World War II in 1945, the British Empire began to collapse. This was partly due to economic reasons such as a lack of finance to run its colonies and to being bankrupt when rebuilding alongside having massive loans from the USA. Britain after the world war, the rise of USA and the Soviet Union provided competition which limited Britain's influence. Another significant reason is the independence movement by colonies due to a lack of desire from being controlled. India was one of the first to become independent on 15 August 1947.

The British Empire demonstrated colonialism which was direct power in the form of political control but nowadays, neo-colonialism is rising. This is indirect control through trade and independence and it is more subtle to detect. One example of neo-colonialism is in Africa where Asian countries (particularly China) have used Ethiopia's land for

BY RAJPREET BIRDI, U6

"The campaign is the most important factor in determining the results of general elections in the UK"



In the UK, general elections are held to elect Members of Parliament in every constituency and ultimately decide who will be the Prime Minister of the country. Prior to polling day, each party embarks on a long-fought campaign in which they spread their political messages and ideologies in an attempt to persuade the electorate to vote in their favour. Although many voters do predominantly base their choice on the campaign, there are other factors which are far more important when determining the results of general elections.

Although, one could still argue that the campaign is the most crucial element in determining the results of general elections due to its significance in previous years. For instance, the 1997 election saw a 6-week campaign with the leaders touring different marginal seats throughout the country on their party planes and buses. During the campaign, Labour exposed the sleaze and financial corruption taking place within the Conservative Party and so were able to brand themselves as the 'anti-sleaze' party.

BY JAMES GALLAGHER, L6

How has power shifted over time? 12 marks

Over time, the way that nations have interacted with each other and have had power and influence over each other has changed significantly over time.

At its height, the British Empire consisted of 23% of the world's population at its height after being established in the early 17th century through small colonies. The largest empire in history and maintained through trade links and imperial control, the British Empire was described as 'the empire on which the sun never sets', as a result of its expansiveness and reach across the world. In the 1930s the British Empire covered 36,000,000 square kilometers.

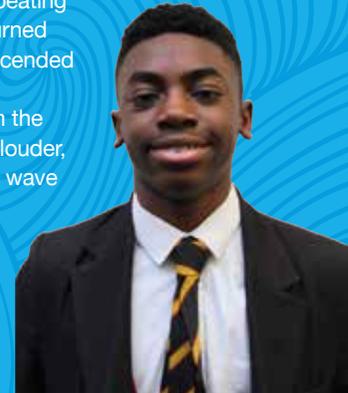
BY HANNAH OWENS, U6



Dangerous Depths

Year 8 English students have been busy practising their descriptive skills. Here is a particularly evocative piece by Academic Scholar Anjola Okusanya:

CRASH! The countless waves continued to beat the lighthouse. It howled and shrieked like an injured wolf whilst the thunder boomed and growled. Made from bricks, the dull looking lighthouse had remained a beacon of hope for many ships and for many years. Sailors had grown accustomed to the lighthouse. They saw it like it was a part of the ocean. The vicious waters could take all of that away. The water ricocheted off the walls of the lighthouse, wearing them down. For a moment the entire structure looked as though it would collapse and give up to the dangerous depths, but held on. Rain was beating down heavily as the waters churned underneath. Pieces of rock descended from the side of the lighthouse. Suddenly, there was a roar from the ocean and the thunder howled louder, the wind grew stronger and the wave arose from what seemed an infinite amount of water that stretched forever on the right, left and all sides. The watery killer rushed at the lighthouse and made contact.



OXBRIDGE OFFERS FOR HIGH-FLYING PRINCETHORPE GIRLS

Three recent Princethorpe College Sixth Formers are thrilled to have received unconditional offers for places at Oxford and Cambridge Universities.

Former Head Girl, Lizzie Carr, 19, will be reading English Language and Literature at Christ Church College, Oxford, she will be joined by Amy Field, 18, who has an Open Offer to read History at Oxford too, and Daisy Vucevic, 19, will read Theology, Religion and Philosophy of Religion at Selwyn College, Cambridge.

The high-flying girls all received outstanding A-level results last summer and on the back of that success made the decision to apply to the UK's two most prestigious universities.

Oxbridge places are highly oversubscribed and increasingly competitive, the talented trio faced a tough selection process consisting of pre-tests, intensive scrutiny of their academic and personal achievements and rigorous interviews before receiving the good news. Throughout the process they were supported and encouraged by the Sixth Form team, Oxbridge Co-ordinator, Mrs Hester and their Princethorpe subject teachers, who provided individual guidance over the past few months.

Princethorpe College Head of Sixth Form, Ben Collie, commented, "These three girls have earned this outstanding success. During their time at Princethorpe College they applied themselves not only to their academic studies, but also to developing themselves as confident and mature young people. Applying to Oxbridge is an extremely rigorous and character-testing experience that seems to get tougher every year. We were delighted to support them with their applications and are exceptionally proud of all their achievements."

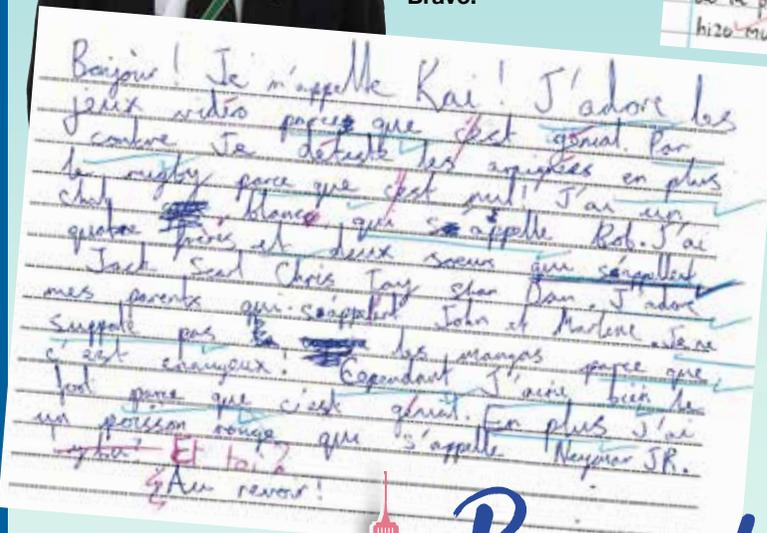


"THESE THREE GIRLS HAVE EARNED THIS OUTSTANDING SUCCESS."

LINGUISTIC LEADERS



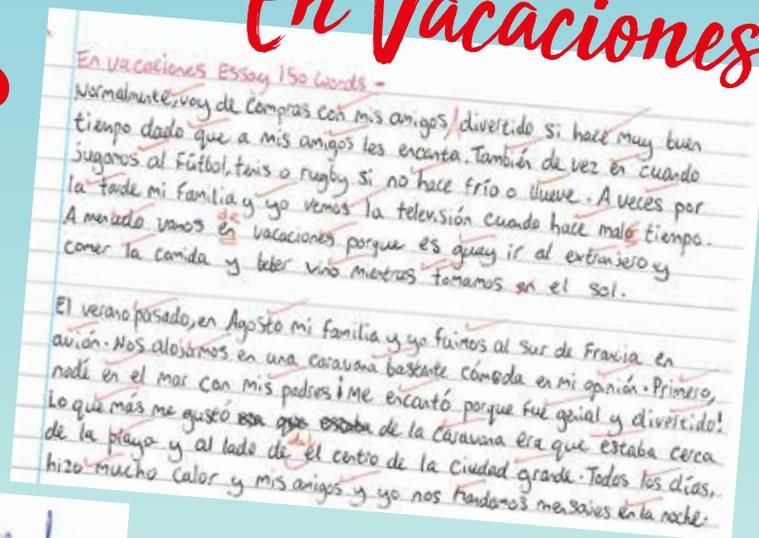
Year 8 pupil, Kai McNamara, achieved 100% in his recent French assessments. Bravo!



Bonjour!

Bravo!

En Vacaciones



Hola

Mrs Keenan's Spanish class were asked to revise the whole topic of 'Holidays' over the half-term, without knowing the exact title of the essay until a couple of days beforehand.

Sixteen-year-old John Rabeti went on to achieve full marks for his 150-word essay completed under exam conditions. John had clearly revised over half-term and exploited the previous half-term's work to the maximum. Outstanding!



Proactive or Reactive?



Are you reactive, in that you only complete the work set for you? Or are you also proactive, in that you set yourself work, independently?

Year 8 Academic Scholar Amaanya Bose achieved a da Vinci in Design Technology for her proactive design of an eleven-page Step-by-Step Guide on How to Make an LED Reaction Game. Well done Amaanya, these are the hallmarks of a true scholar.



STRICTLY COME SKATING



Eleven-year-old Liv Fox is mad about roller skating and she's getting rather good at it.

This diminutive Year 7 has taken Princethorpe by storm since joining the College in September, coming first in the U13 National Artistic Roller-skating Competition with a two-minute choreographed piece full of breath-taking jumps and spins.

Liv has been training for two years at the Midlands Roller Arena and at Rugby College with her club LGRSC, but this was her first national competition for novices and she has every right to be proud of her achievement. Training every Saturday for six hours, every Wednesday evening and again for two hours on alternate Thursdays, Liv was delighted when all her hard work paid off and she was awarded her trophy and medal for first place. We certainly wish her all the very best with this endeavour and look forward on reporting on future accomplishments. **Very well done Liv!**



THE BEAST

Here is the first part of Year 7 pupil, Andrew Gordon's, sci-fi story. His teacher thought it was very mature and had some lovely vocab choices. Well done Andrew!

Maude had had an unremarkable day. She had woken up, most reluctantly, as normal. She had dragged her leaden limbs to the small bathroom mirror to tame her unruly red curls. She pulled on her favourite pair of worn patchwork jeans and a stripy colourful top. As she stared out of the window it reminded her of why she had bought the house, for the view was terrific. She could see over the tops of all of the trees and, she thought that on a clear day you could even see the amazing skyscrapers in London.

That night she had stayed slightly later in the lab to complete some experiments, for she was a scientist. Once she had finished, she was feeling rather exhausted so she decided to fold up her bicycle and catch a taxi back home. As she entered the house a peculiar feeling pierced her mind that she was being watched. She turned and looked and only seeing a slight gleam of lights she dismissed it as the wake of the departing cab. Poor Maude, if she had looked closer she might have seen that it was the wicked glint of a curved claw cutting through the night like a scythe.

As she woke the next morning she knew something was going to be different although she didn't know whether it would be for good or bad.

Back on the bike she exhilarated in the fresh air and the autumnal blast of leafy colour as she sped by. She reached the heavy old oak door of her lab and was glad to see its familiar solid shape. As she dismounted her bike she sensed a disturbing, seemingly unearthly presence. Goosebumps rose on her skin and a shiver sliced down her spine.

A beast emerged from the deathly silent forest just a few steps away.

The beast was jerking involuntarily as it ineptly staggered forward, its repulsive face carpeted with scars and stitches, screwed up in belligerence. A grotesque hand plunged into its belt and withdrew a rusted sword. The cyborg convulsed into a forward charge towards her and as the cyborgs other arm clasped her shirt it growled in a metallic voice "Look what you've done". As the cyborg drew her in she saw its eyes, the pupils as narrow as a tapered blade.

Suddenly she felt a sharp pain in her left arm and saw the ancient weapon protruding from her arm. Opening her mouth wide she let out an ear-piercing scream that ripped through the damp air. Her adversary laughed deeply and crazily. Suddenly she felt the need just to lie down and go to sleep. She realised as her eyes were closing that the sword must have been coated in a sedative.

Her heavy eyes finally opened. She took a look around and suddenly found that she was unable to move. Looking down she saw thick cuffs pinning her to the table, and last of all, the worst thing, the abhorrent face of the cyborg glaring at her from behind the control panel.

By Andrew Gordon, Y7

