What does the term ‘food addiction’ really mean?

What is a “Vocaloid”? And why will you be singing along to one soon?

Why is it so hard to diagnose schizophrenia?

Can a city be mapped in an equation?

When it comes to programming, are the best things in life really free?

Ever wondered what some drivers are thinking?

What does the term ‘food addiction’ really mean?
What is STEM?

STEM stands for Science, Technology, Engineering and Mathematics.

So much of what we take for granted in life today is only available to us because people have learnt about these subjects at school, college and university before going on to work in jobs related to these subjects. Think about your TV, mobile phones, cars, medicines and even the humble washing machine— they all needed someone to imagine or discover them, figure out how they worked and actually produce them. Imagine life without them!

What does STEM really mean to me?

Think of the excitement of working on new discoveries and ground-breaking projects like Bloodhound SSC or London 2012 If that isn’t enough, on average, people working in STEM jobs earn 19% more than other people. Over your lifetime, some STEM jobs mean you could be earning an extra £1million!

Phill Parker
STEM is in everything we do.

STEM subjects don’t sit in a bubble, carefully inured against the cares and concerns of the world. They are living breathing subjects, impacting upon our everyday lives and helping us in ways you wouldn’t ordinarily expect.

At Petroc, we find that taking the subject to schools in the community is an opportunity to engage students of all ages, irrespective of their background, by focusing on how it applies to what they do.

Still, this is all really about problem solving (How does this work? Why? What if we try something different?), but problem solving is not always seen as science... which is odd.

Designing ways to protect an egg falling to the ground, and all the fun that comes from creating parachutes and catching devices, is really about examining forces. Physics. It’s not a huge step from that to examining car safety design at A-level. They are just different points on the same journey.

Over the years, we’ve been involved in a variety of local schools. Whether it is Simon Shipley (our Physics lecturer) exploring the properties of energy, Sharon Hawkins (Photography) using an USB microscope to examine scale, or myself helping pupils to use ultra-violet beads to examine the damage caused by sunlight, it’s about combining the everyday with the stretch and challenge offered by A-levels. And the kids have really engaged with what we do. Although it does help that Physics and Chemistry offer up explosions aplenty and, from a Biologist’s perspective, dissection is always a hit.

Dr. Lynda Broomhead.
Exploring Science

Connie Isaac talks us through her experiences studying Biology at Petroc’s Tiverton-based Mid-Devon campus.

It’s constantly evolving.

Like many students, Connie came to the college without a clear idea of what she wanted to do at university, or afterwards in employment. She had subjects she liked, that she enjoyed studying and indeed excelled in, but she couldn’t highlight one she wanted to pursue.

All that changed when she started studying A-level Biology.

“Science is constantly evolving,” she said. “You are always challenging ideas and trying out new things.”

She had always enjoyed the subject, but the more time she had to focus on it, the more she found fascinating. She found that GCSE, and A-level too, were just the foundations and the more she looked into the subject, the more she became sure of what she wanted to do.

Have no regrets.

In her first year, she took part in the Cambridge Shadowing Scheme, staying in a hall of residence for five days and getting the chance to see what life was like at the university.

Over the time, she was partnered with an existing student who took her to tutorials, seminars and even to see guest speakers. She felt that the time was truly invaluable, firing her desire to achieve by getting a taste of university life. She had the opportunity to see sessions on pharmacology, biochemistry and the history of science (even getting the chance to visit Charles Darwin’s gardens!).

She had admitted that she’d felt very nervous applying at first and feared the disappointment of being turned down but, as she points out, “you can’t regret trying and you never know where it will take you.”

Never done anything like it before.

The British Biology Olympiad seeks to challenge and stretch students, taking them outside their comfort zone and encouraging them to explore beyond the confines of any syllabus that they have studied before. Beyond the event itself, the programme offers the opportunity for students to be selected for the International Biology Olympiad and compete against student from all around the world.

This was just another challenge that Connie took on at Petroc, embracing the chance to explore subjects as diverse as...
genetics, ecology and human biology. “I had never done anything like it before,” she said “but the problem solving was good fun.”

When the dust settled, she had the satisfaction of being awarded a Silver Medal in the British Olympiad and the benefit of broadening her subject knowledge beyond the syllabus.

Very nerve-wracking

During her second year, Connie was accepted for the Nuffield research bursary. For this she became a contributor to current research into the needs of people with diabetes.

For her project, she examined the attendance rates in a diabetes clinic in Exeter. The issue was significant; the symptoms can make it difficult for out-patients to attend, yet the importance of the check-ups could not be over-stated.

As part of the report she produced, she proposed a new process for alerting out-patients to upcoming appointments, ensuring that they would not miss out on the care they needed, and then presented it at the Diabetes Foot Network South West. It was “very nerve-wracking” speaking in front of a hall of all the consultants in the area, but they took her work very seriously. “It never felt like my project was something just on the side,” she said. “I really was seen as contributing and helping them.”

Take every opportunity.

“If I had one piece of advice for students coming to Petroc,” Connie said. “It would be to take every opportunity. Don’t just follow the syllabus; expanding and reading around the subject helps to answer questions and really puts everything into a wider context. Research the bursaries that are available and see what’s out there.

“Don’t give up,” she added. “Once you crack it, it will all fit together, and it will all feel worthwhile because science plays such a big part in everyone’s life.”

Fa’tin Soufieh, an AS Biology student at the Tiverton campus, was a Student Ambassador when Willand primary school visited for July 4th’s ‘Forward Thinking’ Science Day. She helped to guide the year 5 pupils throughout the event, and supported the different tasks they participated in.

“The children really loved it, everything blowing up around us, and I enjoyed it too.

“People usually look at science as something very complicated, something they can’t do and they get intimidated because of it,” she said. “This shouldn’t be the case, especially when you have Lynda as a teacher. Everything gets broken down so everyone can understand and be the clever person they want to be.

“Personally, I can really relate to Human biology,” she added. “For example, I find myself, after studying ventilation and breathing, picturing how my lungs were working, how the simple, everyday processes were happening.”
Can I graph the London skyline using mathematics?

By Mark Andrews

Introduction
Having an interest in both mathematics and art, I wanted to base my extended project on ‘visual mathematics’. At the beginning, I was unsure about how to refine the task, but finally I decided on creating the London skyline using mathematical equations.

Researching Visual Mathematics
Alongside creating the actual skyline, I have also researched examples of visual mathematics. I felt it imperative to research as much as I could about how mathematics complements both the manmade and natural environment. Some areas that I have looked at include the connections between the Fibonacci sequence/Golden Ratio and natural patterns in plants, as well as their relationship to art. Shapes seen in the environment like hanging chains (catenary curve) and interesting light patterns reflecting off of tea in a cup (cardioids) have all been modeled by equations.

Creating the London Skyline:
After researching about visual mathematics I decided that I wanted to create a mathematical ‘art piece’ that could visually depict something that is widely known, but by using the complexity of mathematical equations. After a trip to London I decided to create my art piece based on the capital city’s skyline. I saw that the architecture of the city was extremely diverse, much like the many curves created by mathematical functions. It was this that encouraged me to compile a bank of all the equations I know so far, and begin to research new equations that I could use to map out the skyline.

Looking to see whether this sort of project had been done before, I found multiple examples of where mathematical equations had been used to resemble pictures and logos. Some examples include a batman logo created using the combination of lots of equations, and single curves...
resembling roses and other flowers. However, I believe that I am the first to attempt to draw a skyline using mathematics.

Studying mathematical textbooks and researching online has enabled me to expand my inventory of equations. I discovered an alternative method of formatting equations using “polar coordinates”, and studied epicycloid and hypocycloid curves, all of which produce fantastic shapes, some of which have been used in the skyline.

Creating the skyline itself was very laborious. Every function had to be manually inputted into a program called Geogebra, with the domain of each calculated to almost a six decimal place accuracy. The process of creating each equation in the right location on the plane had me using many algorithms that I have learnt from my maths classes, including calculus and distance/gradient formulae. Deciding what the skyline should look like was one challenge that I faced. I decided to create a piece that contained several landmarks, instead of forming an accurate representation of the skyline, as I wanted to show how mathematics can deviate away from its rule-governed stereotype, thus emphasizing the beauty of the subject.

**Conclusion**
The whole purpose of creating the skyline was to show that mathematics has a place in the visual world. Although the process was slightly arduous, I am pleased with the final outcome. I can say that, yes, I can graph the London skyline using mathematics, and in doing so I have learnt a lot about the complexities and the beauty of mathematics, increasing my excitement to study it further in university.

References:
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- [http://www-groups.dcs.st-and.ac.uk/~history/Curves/Cardioid.html](http://www-groups.dcs.st-and.ac.uk/~history/Curves/Cardioid.html)
- [http://mathworld.wolfram.com/EpicycloidPedalCurve.html](http://mathworld.wolfram.com/EpicycloidPedalCurve.html)
Psychology on the road; Studying the perception of driving speed.  

By Emma White

Aim:
To find out whether the use of yellow bar lines made a difference to the deceleration rates of everyday travellers in cars travelling on a dual-carriageway.

Hypotheses:

H0 : There will be no differences in the rate of deceleration between approaches to roundabouts with yellow bar markings and those without.

H1 : Approaches to roundabouts with yellow bar markings will lead to a faster, gradual deceleration as opposed to roads without the markings.

Previous Research:

Shaffer, 1995.
In this study, people consistently judged the lines and the empty spaces to be the same size, claiming that both were two feet. “This means that to most people, 40 feet looks like a lot less than 40 feet when they’re on the road,” Shaffer said. “People cover more ground than they think in a given period of time, so they are probably underestimating their speed.”

This suggests that the YBLs may not be as successful as planned as drivers still underestimated their speed.

Gibson’s Theory of Perception:

James Gibson put forward a theory of perception stating that perception is a direct, bottom-up process. He suggested that there is enough information in our environment to make sense of the world and that there is no need for processing/interpretation as the information we receive about size, shape and distance etc. is sufficiently detailed for us to interact directly with the environment.
Real World Applications - Yellow Bar Markings

Yellow bar markings are used in certain conditions on high speed approaches to roundabouts, either on the main carriageway or on an exit slip road. Authorisation will normally be given only where the accident record for the roundabout includes at least three accidents involving personal injury during the preceding three years, in which speed on the relevant approach was a contributory factor. The marking consists of 90 yellow bars on main carriageways, and 45 on slip roads. They get closer together as they approach the roundabout which gives the impression that the driver is speeding up, with the hope that they decrease their speed to compensate and don’t decelerate as suddenly which can lead to accidents.

Results

The study found that the average rate of deceleration was lower, at 0.723 m/s/s, where YBLs were present compared to 1.081 where they were not. The data was analysed using the Wilcoxon Signed Ranks statistical test proved this to be a significant difference at the 5% level of significance so we can be more than 95% confident that the difference obtained was due to the manipulation of the IV and not due to chance.

Conclusion and discussion

As the deceleration was significantly higher without the presence of yellow bar line, this shows that the cars had to brake harder when they needed to decrease their speed at the end of the carriageway. This suggests that using YBLs is a successful way to reduce sudden deceleration which is a leading cause of accidents on dual carriageway. The implications of this could be to increase the areas in which YBLs are used, rather than waiting until accidents have happened in the area.

References:
Dennis Shaffer, 1995 http://researchnews.osu.edu/archive/seeline.htm
http://www.journalofvision.org/content/13/10/23.full
Gibsons theory from http://www.simplypsychology.org/perception-theories.html
What is food addiction? by Yvette Hooper

Symptoms:
- Binge eating/uncontrollable eating when not physically hungry
- Eating little in public but maintaining a high bodyweight
- Feelings of guilt due to overeating
- Preoccupation with bodyweight
- Withdrawal from activities due to embarrassment over weight

Description
Someone who has compulsive overeating will have frequent episodes where they cannot control their eating, to the point that they feel out of control and will continue to eat even when they are feeling sick/overfull. Binging episodes are commonly followed by episodes of depression and guilt over their lack of control. They will often eat alone through embarrassment or worry that they will have an episode of uncontrollable eating. The obsession with food extends to excessive amounts of time spent thinking or planning on eating, in some cases this can cause issues with relationships as they can withdraw from others, especially if they have the symptom of eating little in public and feelings of guilt. While compulsive overeaters tend to be overweight or obese, persons of normal or average weight can also be affected.

Incidence
This is a very uncommon disorder. The reality is it is thought to affect less than 3% of obese people.

Explanation
Some evidence has shown that in ‘binge eaters’ brains they often have an abnormal endorphin metabolism which triggers the addictive process (endorphins are associated with feelings if pleasure). Other theories suggest that compulsive overeaters are not avoiding withdrawal symptoms but because there is an abnormality in the reward centre of the brain, they become addicted due to excessive ‘rewards’ from the brain when they ingest food. This reward can be the release of serotonin neurotransmitter which lifts the mood and give feelings of happiness. Because of these neurotransmitter reactions, when the person is put on a diet or tries to control the compulsive eating, they often experience anxiety and depression as the serotonin levels are lower than would be normal for them.

Treatment
The main course of treatment for compulsive overeating is to see a nutritional specialist (to have a new diet plan or way to help control the overeating in a healthy way) and to have long periods of therapy and counselling to provide psychological support for the feelings of guilt they may already have, and to help with the higher levels of depression due to the different diet.
Schizophrenia is diagnosed in individuals who have characteristics that complement the classification models. This behaviour includes: delusions, hallucinations, and disorganized speech as main symptoms; and bizarre delusions and third person auditory hallucinations. It is a broad term applied to disruptive psychotic illness; however, the DSM and ICD models suggest that any of the former symptoms for a period of one month or longer can suggest schizophrenia.

It is a mental disorder that is extremely hard to classify and diagnose. Problems outlining the reliability and validity of classification systems imply the difficulties of a clinician accurately spotting the psychosis. Two major classification scales/schedules (DSM and ICD) aim to outline the behaviour of those suffering from schizophrenia.

The validity of the systems is marred due to the varying observable behaviour of people who fall under this diagnosis. As the disease is an “umbrella term” for a whole spectrum of varying subtypes, it is difficult to label patients as “schizophrenic” when one may be presenting symptoms of paranoid schizophrenia, whereas another has similar characteristics of a catatonic schizophrenic. In fact, Sarbin (1992) suggested that the overall concept is non-existent, implying that both DSM and ICD systems lack validity.

After all, it does not have one overall defining symptom, suggesting the impossibility of providing a treatment that works for all sufferers. This lessens the validity of the classification itself, as an illness with no specific method of treatment suggests no single illness at all.

In theory, schizophrenia could be a human coinage for a mixture of very separate diseases. Due to the overlapping symptoms of schizophrenia and other disorders – including bipolar disorder, depression and anxiety – in the ICD and DSM models, the ability to diagnose the condition specifically is greatly reduced.

It is also the case that – using the systems of diagnosis – two psychiatrists may diagnose the same patient with different disorders. As mental illnesses are mostly unearthed and classified through the personal opinion of the psychiatrist, the models and the diagnosis are subjective. Rosenhan (1973) showed that incorrect diagnosing of schizophrenic and bipolar disorders was directly down to the inaccurate judgment of the psychiatrists.

There is also a difference in the models ICD and DSM in terms of inter-rater reliability. A correlation coefficient of 0.11 suggests cultural difference, being that ICD is commonly used in Europe, whereas DSM is primarily used in the USA.
In moments of lucidity, or perhaps delusion, I like to think about the universe and my place in it. Usually the whole scale can lead to rightful feelings of insignificance and impermanence, however I have recently been thinking about how connected we are to all space and time.

I probably should give a little background as I suppose most people’s view of space and time are somewhat Newtonian in that there is a prevailing view that space and time are inherently different animals. Our experience leads us to a feeling that time is universal, that for example it is possible to synchronise two events, say one in Tiverton and one in Plymouth so they happen at “exactly the same time”. We could for example agree to listen to the television and perform our experiments when the news starts in both locations. This works fine as long as the participants are stationary with respect to each other, however if one person is moving relative to the other things start to behave differently.

Einstein thought through this problem about 100 years ago (although they didn’t have television to use for synchronisation!). He thought about people on trains and platforms watching clocks. Just previously two men, Albert A. Michelson and Edward W. Morley had found a strange result. The speed of light does not depend on how fast the experimenter is moving.

Imagine throwing a ball on a train in the direction of travel say at 5 mph. If the train is doing 70 mph, someone on the platform sees the ball moving at 75 mph. But if we measure the speed of light from a torch both experimenters get the same result, no matter how fast the “train” is going. One of the main outcomes from this thought experiment is to show that time runs at different rates for the train passenger compared to the people on the platform. This effect is known as time dilation. We don’t notice this usually because trains travel much more slowly than light.

The table shows that even travelling at 1 million metres per second would only cause a clock to run slow by ½ second per day.

<table>
<thead>
<tr>
<th>Speed in m/s</th>
<th>% difference in clocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00000</td>
</tr>
<tr>
<td>100</td>
<td>0.00000</td>
</tr>
<tr>
<td>10000</td>
<td>0.00000</td>
</tr>
<tr>
<td>1000000</td>
<td>0.00056</td>
</tr>
<tr>
<td>100000000</td>
<td>0.05557</td>
</tr>
<tr>
<td>2000000000</td>
<td>25.46440</td>
</tr>
</tbody>
</table>

However as an object approaches the speed of light the clock runs slower and slower. Anything made of matter (or antimatter) with mass can never reach the speed of light so always experiences time. But here is the bit where the connection to the universe comes in...

A photon or packet of light energy has no (rest) mass and can travel at the speed of light. In fact it can only travel at the speed of light in a vacuum. Therefore to any other observer, like the guy on the platform for example, if the photon had a clock with it, platform man would see it stopped. So a photon leaving a light bulb, travelling to this page and bouncing back to your eye experiences no time at all for its trip. You could calculate the time easily from your perspective. For example if the total trip is 3 metres the time is 0.00000001 seconds for you, but no time at all for the photon.

The way Hollywood envisions moving at light speed doesn't really work - since it still implies that you move a certain distance over a certain time period. As far as a photon is concerned, it does neither.

Looking further into our universe, say at a star in a galaxy so far away that light from its surface has travelled for 13 billion years to reach us; from our point of view, a photon would have left when the universe was young and its star was one of the first to light up the mewling universe. But from the photon’s perspective it leaves and arrives in my eye in the same instant, connecting me with an event 13 billion years ago.

There is one other twist. For us to agree on a universal speed of light, the only way the photon can experience no time and travel at 300,000,000 m/s in its own reference frame is if the distance it travels is zero! This effect is known as the Lorenz contraction where lengths shorten for objects travelling at near light speeds.

So why the view from the boundary? If the photon from our early star experiences no time and travels no distance to get to me, in some sense being absorbed into my eye, I am connected instantly and in proximity to an event near the birth of our universe – it’s almost like a front row seat at the Big Bang.
Ubuntu vs. Windows:
Windows is better in some ways, but Ubuntu is better in more.

By Thomas Fear

If Windows brings you function and simplicity, and Macintosh brings you style and creativity, then Ubuntu is surely both and more. Booting up faster than even the new Windows 8 OS, you find yourself in front of a stylish login, which is followed by near instant loading of the desktop (no waiting around for your computer to 'warm up'!). After a groovy jingle and noticing that your background is a Quetzal (or some other interestingly named creature – Ubuntu releases are not simply designated a number, they are given an animal you see), you start to notice the differences. Some of these will become immediately apparent.

You have something similar to the taskbar on the left of your screen if you move your mouse that way, and some useful menus along the top. For some reason, is at this point most people give up; faced with a different interface, people tend to break down and run away. However, stick with this! The reasons will become all too apparent to you...

I really have to stress, Ubuntu is really something else, not only in a functional sense, but in a deeper, more philosophical one. It’s as if all the furniture in your house was made of plastic. Sure, plastic serves its purpose. But what if it’s the wrong colour? Or perhaps the table is the wrong height? You can’t paint plastic and you certainly can’t saw down those table legs. This plastic furniture is Windows. Now replace all that with rich mahogany. Painting and sawing is fine here. Do what you want, it belongs to you! This is Ubuntu.

Ubuntu (and Linux users in general) won't have to worry themselves about viruses. This isn't just because there aren't many viruses for Ubuntu, it's because to make a virus for Ubuntu at all is near impossible. Because of the way it works, Ubuntu doesn't use .exe files (executable or runnable files) like Windows does, and even when it does they need your permission to run and will probably need an emulator (usually WINE). This means that viruses have no way of running, because they'd need your permission first!
Ubuntu is supplied with a firewall protection, so you can browse the web (which will be on Firefox by default) in security. Ubuntu also comes with its own office suite – LibreOffice. This is free (unlike Microsoft Office) and its functionality is on par or even better in some cases, as well as looking sleek and working quickly. Perhaps you're an artist, and enjoy working with Photoshop. No worries: Ubuntu is presented with GIMP installed, a free (as always) image editor that is widely considered to be Photoshop’s biggest rival, and one I personally prefer to use.

Maybe you only need your PC for emails and social things. Again, Ubuntu has you covered. Using Mozilla Thunderbird, you can access your emails. Gwibber (also free) allows you to surf through Facebook, Twitter, Digg or any other social blog site you care to be a part of, all in one place on your desktop. Pidgin (free yet again) allows you to chat to MSN, IRC, Skype, ICQ or any other chat service you can name, again all in one place on your desktop.

“But what about applications? Doesn't Windows have an advantage here?”

Well, consider that, if you want a program that doesn't come with the operating system, Ubuntu makes downloading it ridiculously easy. Use the Ubuntu Software Centre, Ubuntu's one stop application ‘store’ (I put store in quotes because it's nearly all free). With Windows, you know the drill. Go to your local store, poke around what's available on Download.com and Tucows, etc. etc. Just be sure to have your credit card ready since a good deal of Windows software isn't open source or free.

Here we've actually stumbled on probably the greatest thing about Ubuntu (and Linux in general): It's free and open sourced.

“How is this possible?” you ask yourself. “How do they make money to develop the OS if it's all free? How can they stop people stealing it if it's all open-sourced?” It’s mostly because a lot of the people who help to develop Ubuntu do it for free. If you liked Ubuntu enough, and you made something that was really cool or useful and submitted it to Canonical (who are the business that own Ubuntu, and are based in the UK by the way), you could even find it released as standard when the next update comes along. As stated on Ubuntu's website:

“Our global community is made up of thousands of people who want to help build the best open-source operating system in the world. They share their time and skills to make sure that Ubuntu keeps getting better and better. From IBM to Google, Firefox to Wikipedia — some of today's best software is based on an open-source model. Shared efforts. Shared principles. No cost.”

This is, by the way, where Ubuntu gets its name. “Ubuntu” is a South African philosophy meaning “harmony towards others”. This is one of Ubuntu's greatest aspects; to support freedom and sharing, but still have a functional OS. The only funded part of Ubuntu's development comes from Canonical, which is owned by a man called Mark Shuttleworth.

Shuttleworth founded Thawte in 1995, which specialised in digital certificates and Internet security and then sold it to VeriSign in December 1999, earning R 3.5 billion (about US$ 575 million at the time). From here he's founded Canonical, which employs 500 people in 30 countries, all to make something for you. For free.

How is Ubuntu great? In quite a few ways, really.
National Biology week With Tiverton High School

Ode to the Body – by Lucy Bates.

Everybody needs food; it goes down your oesophagus.
If it goes down your windpipe, you cough it back up-agus.
Your stomach turns food into a liquid that’s thick,
Don’t eat too fast or it will come back as sick.
Food travels through nine metres of tubes,
And finally comes out of somewhere that’s rude.

Breathing is not respiration at all,
Though the role of oxygen is not tiny or small.
When you breathe in, lungs inflate like balloons,
And when you breathe out they’re flat like macaroons.
The Bones called ribs protect your lungs and heart,
In the game of survival this is not a small part.

The heart pumps blood around and around,
If it stopped doing this you would not make a sound.
Blood goes into the left and out of the right,
And (if ill) your heart will put up a fight.
Blood cells carrying oxygen are always red,
If pathogens attack, white blood cells make them dead.

You have six hundred muscles that make you all strong,
And two hundred bones that make you all long.
Nearly half of your bones are in hands and feet,
Protected by muscles - which are pieces of meat.
Tendons join your muscles and bones,
And if you hurt one you’ll surely groan.

Above: Biology-themed cakes from THS.

When the celebrations gripped Tiverton High School, alongside the wonderful biology-themed cakes produced for the Bio-Bodies Bake-Off (see above), they embraced (no doubt with eye-ball cake in hand) the challenge of the Physiological Society’s ‘My Ode to Physiology’ competition.

Open to Under 11’ and Under 19’s, entrants were asked to explain how their bodies worked… in rhyme; pick a bodily function and use it as their poetic inspiration.

Special thanks goes to Briony Copsey for sharing the very best entries from Tiverton High School’s Year 11 Science students.

Photo: supplied by Tiverton High School.
How does my body work, how do I live?
Let's look inside, a clue it may give!
I breathe, I digest, my heart beats in my chest.
I see, I hear, my taste buds impress.
Let's just pick one process to explore.
This will be fun, of this I'm sure!
Let's talk about how we sense around the body,
Without this you'd be unable to study.
The cells may be microscopic,
But this is a massive topic.
The Central Nervous System.

It's neurological, quite logical,
Although it's biological,
It’s actually really factual.
It used to be mythological
But now is very technological

Here’s how it works: First you get reflexes;
Touch something hot, or trap your fingers.
This activates an electrical signal,
Flows to your spine, and gets hindered
By your synapses, turning it to chemicals.
And just like that, a bolt of lightning,

An Ode to Respiration

- Oliver Marston

At the muscle,
The heart an example of this,
It helps us walk and talk,
Run and jump,
Stay alive basically.
And the heart, it still pumps.

It diffuses from the sacs
To the stream of blood rushing by.
It gets trapped in the cells,
Of which there are a lot.
Blood cells are red,
White ones are not.

The O: reacts with the glucose,
Not making a peep or a hiss.
CO2 and O: find their way out eventually,
But the energy we put to good use.

Carbon dioxide and energy are the products,
And of course water too.
That’s the story of respiring,
Not breathing for Pete’s sake.
The real story is more in-depth,
But you’d be reading till late.

Ode to the Central Nervous System - By Adam Barnett

How does my body work, how do I live?
Let's look inside, a clue it may give!
I breathe, I digest, my heart beats in my chest.
I see, I hear, my taste buds impress.
Let's just pick one process to explore.
This will be fun, of this I'm sure!

Let's talk about how we sense around the body,
Without this you'd be unable to study.
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Here’s how it works: First you get reflexes;
Touch something hot, or trap your fingers.
This activates an electrical signal,
Flows to your spine, and gets hindered
By your synapses, turning it to chemicals.
And just like that, a bolt of lightning,

You pull your hand back as the signals
Reach your muscles. Frightening.

Your central nervous system
Also lets your senses work.
Routing signals through confusion,
To the brain, via sparks
Of electricity,
And chemistry,
Coming through the other side to
Try and tell you what to do.

The nervous system is quite central.
It's like following a trail,
It's everywhere!
It doesn't give room to spare.
You'd be lost without it,
And it’s for everyone's benefit

So that's all there is to it,
Bet you're feeling quite smart.
That's the exploring done,
I've played my part.
I hope it was fun
But remember, there's only one.
Damage it, and it’s gone…
Imagine you’re at a concert, waiting eagerly for it to begin. Eyes on the stage, disbelief hits you as what appears is not a real person, but a hologram. No, it isn’t the infamous attempt to recreate Tupac on stage (if you’re confused, you’re much better off not knowing) but a cute, bubbly anime style character – Hatsune Miku.

Known as a Vocaloid, she’s actually a synthesized voice PC program that allows its user to input lyrics to a melody, and have this virtual singer accompany any song they want. Miku is just one of over fifty to come pouring out of several companies, one of the most notable being Yamaha, working in tandem with Zero-G to give us the first two English Vocaloids, Lola and Leon. This didn’t create the popularity spike, however...

Hatsune Miku, name literally translating into ‘first sound of the future,’ was introduced as the next generation of the program, Vocaloid2. This was by a fairly new company called Crypton Future Media.

But how is it so popular?

By having the bright idea to appeal to a certain target market which has always been strong over in Japan – the anime fans - that’s how Giving her a high, unrealistic voice, and an adorable little get-up to go with it, her popularity was secured. She began the trend that has spread overseas, and created concerts with millions attending, dancing around on stage through the use of powerful technology. Crypton has managed to project her over Tokyo Bay, and even onto the clouds!

This helped the Vocaloid community grow significantly, and helped it to fall in the hands of some very talented people. And then here’s the main reason why people began to love it: it was just for them.

By purchasing the ‘voice in a box’ and having a music program on their computer, anyone could begin to create their own music without going to big record companies. They could load it up on YouTube or NicoNicoDouga (Japan’s hosting site) and have that song listened to by thousands, then by millions.

Hiroyuki Ito, founder of Crypton Future Media and creator of Hatsune Miku, said in an interview that ‘people have feelings to want to express something more than we initially thought. Miku ignited those feelings. I think the unsophisticated quality not found in professional works was fresh to the general public.’

So they were popular in Japan, but then it was time for the virtual divas to spread overseas… Other countries saw how huge Vocaloid had gotten in Japan (also how much money several companies were getting) and they wanted in. Now Vocaloid has been converted into many different languages such as Spanish, Korean, and Chinese. There’s even a Catalan Vocaloid that has just

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been released.

It’s probably impossible to know just how many songs are floating around cyberspace but, for Miku alone, there are over a million. So it’s safe to say that if you don’t like one, there is definitely another out there you will love. And that’s some of the magic these little virtual voices create. Every genre has been accounted for, with varying quality put into each one.

Even popular Japanese musicians such as Gackt and Megumi Nakajima have offered their singing talents to be converted into Vocaloids for Internet.Co. Like Miku, they each have their own anime-style avatar to go with their characters Gakupo and Gumi.

This leads us on to the other reason why people all over the world find the concept of Vocaloid so incredibly fascinating, because their favourite singers now have a virtual voice anyone can pick up and use to create their own songs.

Avid fan and creator of several popular English Vocaloid songs, VocaCircus (his online alias) says, ‘One reason I find using these guys so amazing is because no matter what, they can’t do anything wrong. They’re not real, so they can’t spout lots of nasty stuff about anyone else, embarrass themselves, or do anything to upset anyone. No matter what the song material is, it’s on the creator, not the Vocaloid.

‘And when those people get older, their Vocaloids are still there preserving their voice. That may sound a little creepy, but in reality it’s only the essence of them in that program. It’s up to the creator what that Vocaloid’s story is that day, because nothing about them is canon.’

Obviously Vocaloid has its imperfections. Such technology can come at a hefty price, the new Hatsune Miku English bundle will set you back about one hundred pounds. There are ways around this, in shady corners of online territory, but that’s definitely not the way to go, having had actual time and effort poured into them. They’re not just some cheap marketing project.

But no matter what the price is, it still doesn’t stop millions of users all over the world from creating songs from the comfort of their own home. Their popularity is only going to spread further, meaning Vocaloid is most likely here to stay.

This is just the tip of the iceberg on the subject. If you’re interested in learning more, simply typing in Vocaloid will flood you with information, like the Vocaloid wiki page. Have fun!
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