

Case study

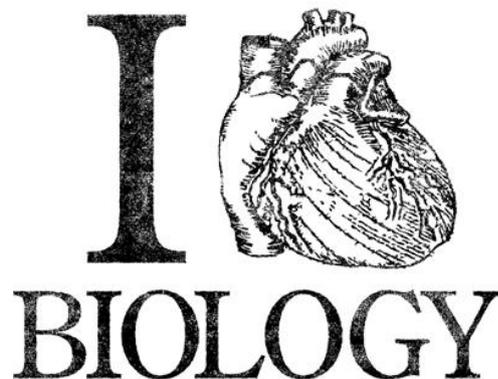
Gemma Singleton

“Biology is the study of complicated things that have the appearance of having been designed with a purpose” Richard Dawkins

In this case study I will share my reflections of teaching Biology and what I feel makes not only an effective teacher but one who can also inspire a future generation to study Biology.

1. I heart Biology

From a really young age I have always loved reading and exploring the world of science, but more so Biology. Biology fosters a natural curiosity about the inner complexities and workings of an organism and how everything has its part to play, whilst communicating in its own unique way. Biology helps individuals understand the interaction between humanity and the world around them. It is fundamental to the world as it has enabled us to discover how humans have developed from a single, unicellular organism to a complex, multicellular organism and how the genetic code has allowed such complexity to thrive here on this very Earth. Alongside this there is no greater thrill than exploring how society makes decisions and how biology related issues can contribute to the success of the economy and society. Biology is broad and diverse, a natural science and I personally consider it the science of the 21st century, as it requires a good understanding of the other sciences to really deepen understanding and make conceptual and synoptic links. Biology is not all fun and games, it requires hard work and study, but the rewards of real understanding really are worth it. Obtaining my degree was like a ticket to a new world. It allowed me to maintain my curiosity and in my pursuit of teaching, allowed me to offer many more ‘tickets’ to students who have also fell in love with the subject.



2. Born to teach

From a very early age the seeds were planted and nurtured well that I would make a good teacher. In fact, it was at my year five parents evening when Mr Barnby insisted this to my parents. This was the ignition I needed and the fires kept growing. I have and continued to have an absolute love and passion for teaching and learning – I

find myself constantly driven to read and research best practice, attend conference and teach meets to gain ideas and to build my own professional learning network. I know that when I am given a challenge I face it head on either inside the classroom or outside. I also consistently challenge myself and reflect on my own practice so each time I can improve the experience of the students sat in front of me. When it comes to teaching, I feel I have relentless optimism and positivity – not to say that I am not honest or realistic with my students but I feel this can really drive the motivation and work ethic needed in students today. I believe that this stems from the fact that I love what I do, I am passionate about what I do. I know this mentality and attitude really helps students develop their own positive energy to learning and inspires them to continue learning rather than just for an exam. I am also fascinated by other subjects and enjoy to make links and to encourage divergent thinking between the subjects, to really develop a well-rounded learner. I always try to find new and creative ways to teach and new concepts to students based on them rather than my own personal preferences. I enjoy the challenge in tailoring a lesson to the audience sat in front of me as one size does not fit all. However, the most important factor is that I actually love kids. I really care for a child's development and educational journey. I enjoy seeing them succeed in their own unique way and feel privileged that I play a role in the process.

“

The test of a good teacher is not how many questions he can ask his pupils that they will answer readily, but how many questions he inspires them to ask him which he finds it hard to answer.

ALICE WELLINGTON ROLLINS

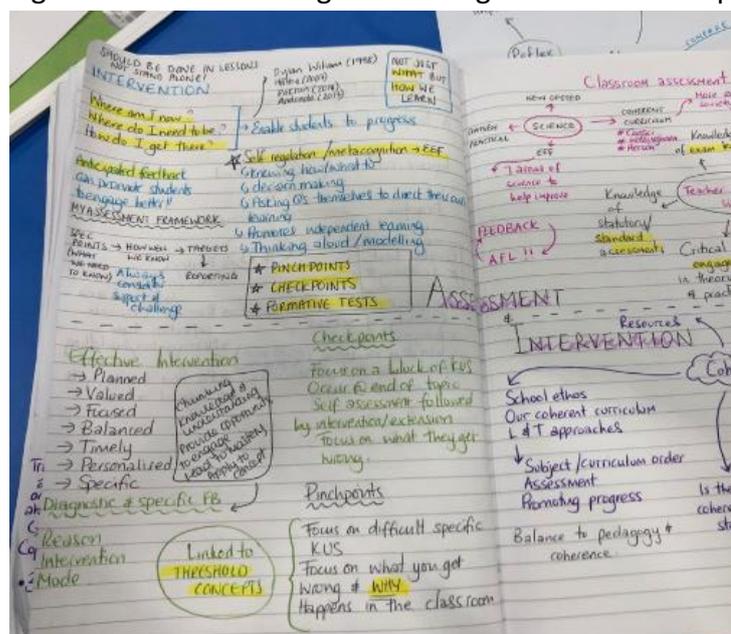
3. Great teachers make great learners

Great teachers are great because fundamentally they are great learners and experimenters. Supporting great teaching is the ability of the teacher to be honestly reflective about their approach and impact in all things teaching and learning. I accept that I don't know everything, but I still make a conscious effort to learn because teachers that create the greatest learning environments are those that are surrounded by people that are willing to ask questions. The real power of a teacher lies not in their ability to transmit static information to students but in their ability to create, grow and nurture a learning space which empowers students to develop as independent, critical thinkers who are prepared to ask questions of the curriculum content as well as its relevance to the now and the future. Great teachers realise that the curriculum content is important, but even more important is the trust and confidence that students derive from how they are learning. I believe that it is our

job not only to teach students Biology, but to celebrate how to learn and the benefits of life-long learning, because for this we all end up better off, in and out of the classroom.

**I HAVE NO SPECIAL
TALENTS. I AM ONLY
PASSIONATELY
CURIOUS.**
-ALBERT EINSTEIN

Having discussed the love of learning, it would provide an ideal opportunity to share my most valuable learning experiences. NPQML and NPQSL are two qualifications that has enabled me to focus on students love of learning within Science and helped initiate leadership skills to drive change within my department. I regularly attend CPD opportunities ranging from BAME Ed, Women Ed, local and national teachmeets, pedagoo, researchED, ASE conferences and Biology specific courses such as the Royal Horticultural Society on plant biology and practical work to gain new and innovative ideas to incorporate into my practices and share across the team. I have also recently completed my Masters in Education on Leading Innovation and Change which again reinforced my personal love of learning and exciting challenge that academia brings. Through this I looked at initiating a bespoke subject specific CPD program and new learning and sharing is essential in all practice.



4. Sharing is caring



Very early on in my career I realised that teaching is simultaneously one of the hardest and most rewarding jobs in the world, and I have found the one thing that can make or break your happiness as a teacher are your colleagues. Collaboration enables deep and meaningful connections to be made through building relationships – as teaching can be emotionally draining, so these relationships are important for mental wellbeing and can also help reduce work load due to a collegiate approach. Time to collaborate is always a difficult factor so I have

tried to find ways to do this effectively. Firstly, we have specific allocated time in our departmental meetings dedicated to sharing effective teaching and learning strategies for Biology with all teachers. As a teaching and learning lead for Science across the GLF Multi Academy Trust, I meet with Science leaders from 7 secondary schools to deliver INSET, work on strategising curriculum change and collaborative planning. I undertake many school visits as part of this role which also links with my specialist leader of education for science role that provides opportunities to make more connections, share best practice and gain ideas. This year as part of my whole school practitioner role, I have lead research groups and whole school INSET focussing on differentiation, stretch and challenge which has enabled effective collaboration across my own school which has resulted in staff embedding ideas into their daily practice. This has been triangulated through learning walks by several members of staff.

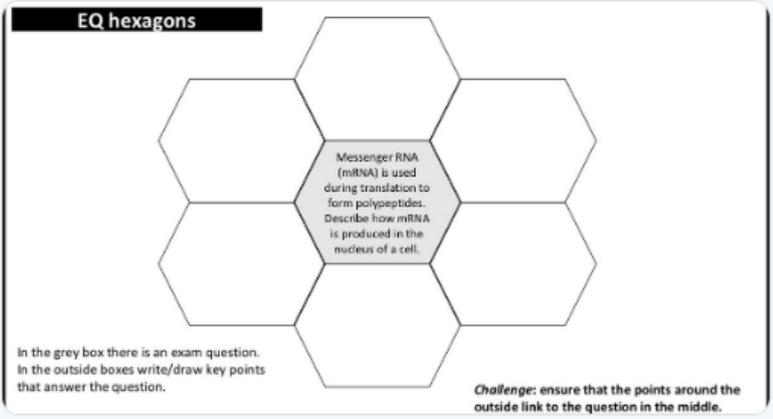
Mrs Singleton @MrsSingleton · Jan 26
Superb INSET on metacognition and modelling. It consisted of showing staff what students think, the science behind learning and modelling ideas. These were @TheBeaconSch @TBSBanstead "light bulb" moments...
#thebeaconschoolproud #BeaconTALENT



Case study: Gemma Singleton

Collaboration is also important for reducing workload – which I believe is a real issue for teachers at this present time. To try and help my department I initially set up a Biology resources sharing drive, however this wasn't enough, So I decided to expand and share effective teaching and learning resources across all 3 science disciplines, with all science teachers within the GLF MAT through a team science shared drive. This is regularly used by staff of varying experiences and does the support the learning of science for all students. I still believe I could share more, so I took to the world of Twitter. Through this platform I regularly share resources for staff at a national and international level for teachers to download and use. These resources range from usable worksheets, PowerPoints, KS3 schemes of work, Biology required practical work and the latest being KS5 A-Level Biology revision packs.

Mrs Singleton @MrsSingleton · Jan 27
Exam question hexagons.... great to practice the 6 mark questions or extended answers in science
[@LessonToolbox](#) [@TeamScienceEdu](#) [@TheBeaconSch](#) #KS5 #KS4 #science



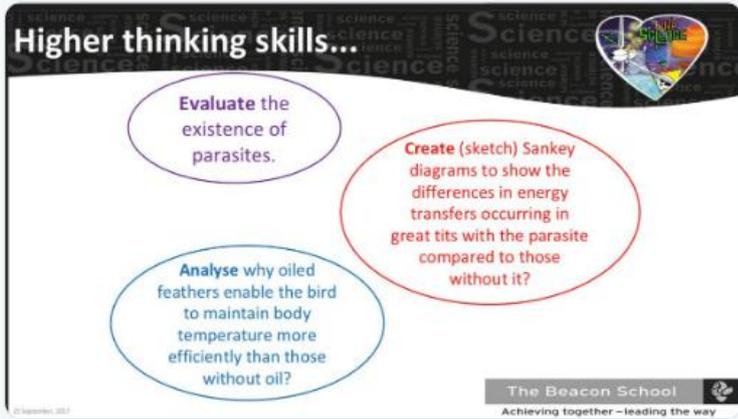
EQ hexagons

Messenger RNA (mRNA) is used during translation to form polypeptides. Describe how mRNA is produced in the nucleus of a cell.

In the grey box there is an exam question. In the outside boxes write/draw key points that answer the question.

Challenge: ensure that the points around the outside link to the question in the middle.

Mrs Singleton @MrsSingleton · Feb 12
Used this today with my year 10 group to really challenge their thinking and started making conceptual links between the sciences- worked so well. Also allowed us to work on application to unfamiliar contexts and command words
#simplebuteffective



Higher thinking skills...

Evaluate the existence of parasites.

Analyse why oiled feathers enable the bird to maintain body temperature more efficiently than those without oil?

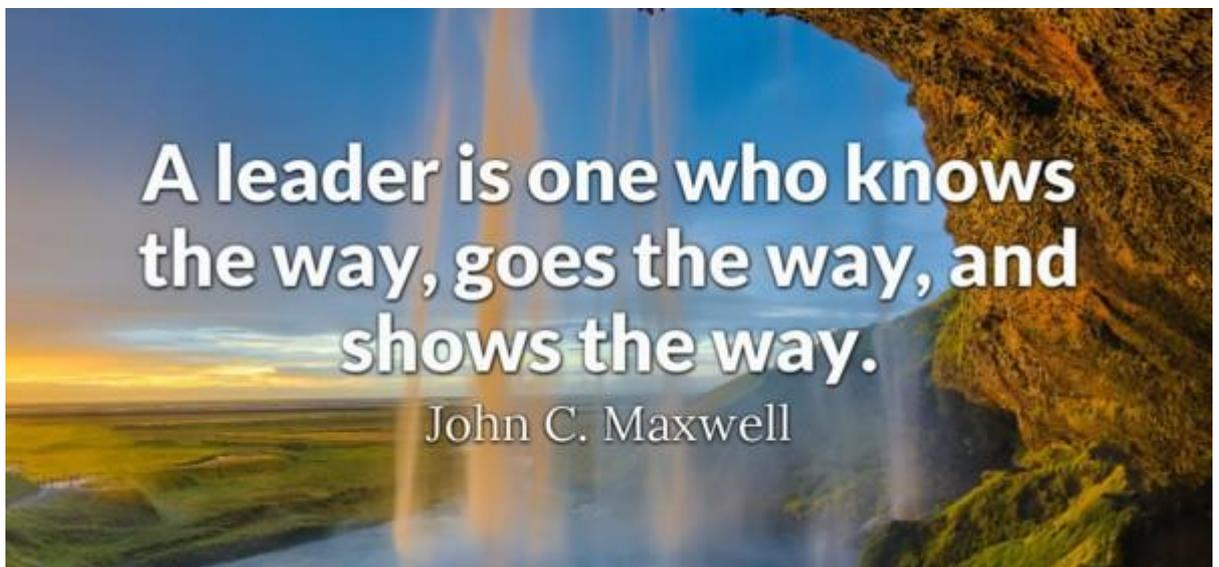
Create (sketch) Sankey diagrams to show the differences in energy transfers occurring in great tits with the parasite compared to those without it?

The Beacon School
Achieving together – leading the way

Mrs Singleton @MrsSingleton · Feb 10
Unit 3 A level Biology revision pack. I usually print as A3 and give to my students. Let me know what you think (hopefully you can access it!)
docs.google.com/file/d/15tghcr...

5. Lead by example

Leadership by my own definition is the ability to inspire others to do something differently or improve what they do. I believe that over my 14 years of teaching I am really starting to see the impact of my own leadership in Science. Throughout my career to date I have had the opportunity to lead in many different contexts. My first opportunity arose as a KS3 coordinator within Science. This introduced me to the importance of a solid curriculum to build concrete foundations for learning. Leading turned out not to be easy – the school I had just moved to after 4 years of teaching in Hull were placed in Special Measures. The Science department were deemed the worst department in the school, staff were disengaged, brow beaten and quite frankly could not see a way out of the rut they were in. The head of department then decided to give their notice and left 6 weeks later to which I was then appointed head of department. The challenge was very daunting, first I had to galvanize staff in a clear and collaborative vision, with scaffolding to support success on our journey. Student was progressing poorly and this needed to change. The curriculum and collaborative planning was the first plan of attack, followed by a clear focus on improving teaching and learning. Summer followed and the results increased marginally. Coaching and mentoring of staff, modelling good practice and focussing on intervention for key students saw an increase in results for the next 8 consecutive years. Students were performing well above the national average in both Double Award and Triple Award Science, with Biology out performing in both categories.



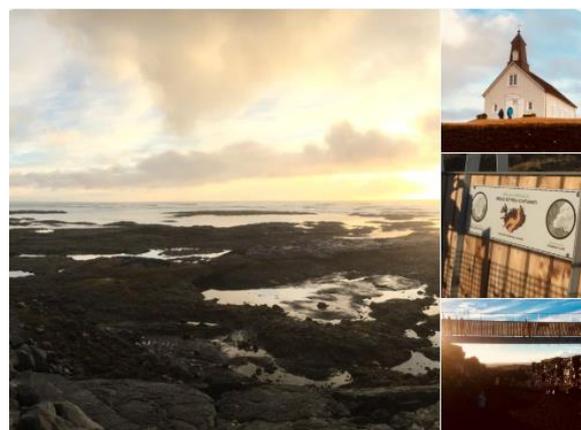
My leadership opportunities then took a different direction as I was appointed director of teaching and learning for the whole school. At this time, I also decide to complete my MA. This enabled me to reflect on the type of leader I was and focus on the type of leader I wanted to be. This course gave me the skills to engage reluctant staff, develop better strategies to improve student's life chances and inspire leadership in others. Leadership is an important skill that should also translate into the classroom setting as it is vital that we, as leaders direct and support our learning

to successful destinations whilst developing potential leadership skills within them for their futures.



6. Enriching Lives

Enrichment opportunities are vital for both students and staff. With regards to students I have organised many enrichment opportunities including the British Biology Olympiad for 6th form students, the biology challenge aimed at KS4 students, we have also participated in the CREST award when completed STEM challenges and we regularly take our students to “The Big Bang Fair” as it such a positive and inspirational experience for our students. Trips have also been a vital part of our curriculum. One of the most memorable ventures includes a trip to Body Works by Dr Gunthen von Hagens where students can experience the plasticised bodies and recognised the anatomical beauty individual to us all, whilst appreciating the fragility of the human body. My most memorable learning experience came last year in the form of a 6th form and year 11 trip to Iceland. Not only could students experience the black sand beaches, majestic fjords and natural wonders, students also engaged in field study experiences looking at succession and evolution based on the ever changing landscape. I have also had the opportunity to reach a much wider audience than most teachers. Being a MAT lead I have been able to set intra-school competitions and help co-organise the GLF grand science fair for KS1,2 and 3 students at both Surrey University and Royal Holloway University. I have also worked with external agencies like Pfizer where our year 9 students looked at the ethics of



biological drug design. We also looked at biological testing from a crime scene using the STEM buses from Kingston University.

Enrichment and development opportunities are also important for teaching staff. This has been a real focus for me to attend and encourage a wider variety of staff to engage in more CPD opportunities. Teachmeets are a place where grassroots practice that is so personal to a teacher is shared in an honest and open format. Ideas can be easily implemented and shared with fellow colleagues. I have successfully organised a number of teachmeets focussed on best practice within Science teaching and coordinating experts to deliver CPD workshops. I have attended many teachmeets including #TMThefield, #pedagooHull and #pedagooHampshire where I have presented on strategies for stretch and challenge within Science and knowledge and retention strategies for learning. I have also worked with the national science learning partnership to deliver specific CPD on effective teaching of A-Level Biology, strategies for GCSE Biology and Maths skills in Science. I have been a Chartered scientist for 4 years and as part of this you need to show a level of commitment to developing your own practice and that of others. I have also gained a Coachmark qualification so when working 1:1 with staff, using coaching techniques is a much more powerful tool to implement change. My most recent projects have been writing resources for GCSE and A-Level Biology and presenting these ideas and resources to over 1500 heads of Science at the PiXL Science Conference. TES resources have recently appointed me as a Science ambassador in which as a team we will look at potential funding of projects linked to raising the profile and experience of Science in schools. One of the most rewarding parts of my role is being involved with GLF SCITT Science trainees and delivering pertinent CPD sessions on effective Science lesson planning and a day dedicated to developing Biology subject knowledge such as, difficult concepts to teach, required practicals and misconceptions that students hold.

