

BIG HISTORY

BY ALANA JOHNSTON AND KIRA SAMPSON

Kira Sampson is a History teacher at Somerville House. A specialist in Modern History, she teaches Years 8 to 12. She is also Acting Head of Social Sciences in Term 1, 2014.

Alana Johnston is a teacher of Science and Biology, with degrees in both Secondary Education and Applied Science. She has been teaching for 6 years at Somerville House, in both the Middle and Senior Schools.

It was something new and different from other subjects. Julie L.

Earthrise

On Christmas Eve 1968, an Astronaut on the Apollo 8 space mission, William Anders, took a photo of Earth, famously known as *Earthrise*.

The viewer looks across the lunar horizon to the Earth, small and vulnerable in space. Indeed some argue that it was this photo that catalysed the environmental movement (The Worldwatch Institute 2013) because this photo changed the way people viewed the Earth. It changed their perceptions of what was important and gave them hope.

This one photo put Earth into context for the first time. The Big History course, a new and uniquely international course trialled in Year 9 last year, puts human civilisation into context on an even grander scale.

Telling the story of humans

Narrative is the key to this big picture and also the key to engaging Year 9 students. This story doesn't start with Ancient Egyptians, united under the first Pharaoh of upper and lower Egypt; it doesn't even start with the first prokaryotes teeming around underwater vents in the young Earth; it goes back as far as human understanding does – currently 13.7 billion years ago.

...a sometimes monumental, but always engaging task. Emily L.

Don't get us wrong – this is still the story of humans. The key questions asked are "What is it that makes the human species distinctive?" and "Why have humans come to dominate the planet within such a relatively short space of time?" The new idea, the new perception, is that to answer these questions we have to go back much further than is traditionally done in history, and prioritise interconnectedness; not just the interconnectedness of living and non-living elements of our universe (Science) and the interconnectedness of cause and effect (History), but also interconnectedness among the different Science and Social Science disciplines.

The disciplines of History and Science have long been fragmented – divided into separate units based on a Curriculum. Students understand each separate topic studied, but never get much time to understand the relevance of that Historical or Scientific study to their lives and to



the story of humanity, or to make connections. Everything is discrete and they are left to put the puzzle together somehow.

Big History has explained how seemingly isolated events we are taught at school fit in the context of the universe, its history, and how this may have further implications in the future. Emily L.

This course is more fascinating and more intrinsically motivating because it is 'THE big picture' and 'THAT big story' that is discussed in class. A student, Alice M, wrote in her evaluation that "Big History was an incredible learning experience because it allowed me to gain knowledge about the question, how did humans get here today? And this is a question I have asked myself all my life."

The narrative of 13.7 billion years provides the framework for looking at nearly every discipline and the contributions that studies in each field have made to our current understanding. The narrative helps students make their own connections within the course. Most importantly, the narrative helps students make connections to work they have done elsewhere and to their own knowledge.

Last year and this year, we have seen this in action. A class later studying convection in microbiological techniques astounded their teacher by making a very relevant connection to the convection currents in plate tectonics. Students studying globalisation made the connection to the expansion and interconnection that occurred when trade became dramatically more important on a global scale. Another 'wow' moment stemmed from a discussion with two different classes – one Big History, one not. When asked about modern ideas of democracy, one class commented that it had been around for such a long time; the other replied that it was a remarkably recent development in history. No points for guessing which class now thinks in terms of 13.7 billion years!

The course has provided me personally with a broader outlook on the world today. Charlotte P.

How does the course work?

Part of the success of Big History is due to the way in which the course is set out. It 'chunks' 13.7 billion years of history and science into eight manageable thresholds covered in 10 units. A threshold is a term coined by David Christian, the founder of the Big History course,

which describes moments in time when the Universe becomes more complex. Thresholds range from the Big Bang, the birth of our Universe, to the formation (and death) of stars, which produce all the chemical elements in the universe, to the first agrarian civilisations and the modern revolution.

According to Christian, thresholds occur due to a specific set of conditions that are just right for something to change, to be formed or to become more complex, which he termed 'Goldilocks Conditions'. Students review these 'Goldilocks Conditions' to understand just how the first stars formed from what appeared to be a relatively uniform universe. The minute changes in temperatures among the particles in the universe led to changes in density, creating a gravitational pull among heavier particles, eventually snowballing into a hot, dense core which becomes the first star. Students (and teachers) think about how truly lucky we are that we exist here at this very moment, considering that the tendency of the universe is to become more disordered and chaotic, not more complex and organised (Second Law of Thermodynamics). "Without certain Goldilocks Conditions, the universe may not have existed (as it does today)," Sindhu J. commented at the end of the course.

While these "thresholds of increasing complexity" determine the course, students are also challenged to debate as to whether they consider a threshold to be worthy of studying, or whether smaller events deserve to be considered a threshold. This questioning or critical thinking begins by learning about claims testers – an age-appropriate way of exploring epistemology. How do they know what they know? Are they told by *authority*? Did they use logic to work it out? Have they examined *evidence*? Did they *intuit* the knowledge? Students are discouraged from simply accepting knowledge and encouraged to analyse why they know. For example, the Unit 4 Investigation question is not "When did Continents form?" but "When and how did the theory of Continental Drift come to be accepted as fact?"

Scale is another focus point for Big History. Trying to comprehend 13.7 Billion years of history is really quite challenging. Think about the entire history of the universe as a 24-hour day, in which the Big Bang happens at 12am. Life does not arise until 5.59pm and humans do not appear until four seconds to midnight. Most of what students learn about at school has occurred within those 4 seconds. Big History finally puts that into perspective.

Although we have only existed for a few hundred thousand years, we have already managed to figure out a lot of the universe around us. Holly P.

What the students had to say...

A survey conducted at the end of the course last year saw that 30% of students most enjoyed learning about the 'big picture' and interconnectedness of the universe. For the same question, another 34% found that the most interesting part of the course was studying our knowledge of what came before humans.

Annie L. summed up the positive reaction to the 'big picture' and interdisciplinary approach when she wrote "Every aspect of the course was different, like the thresholds and combining Science and History. But the best thing for me was that, in a semester, we learnt the history of 13.7 billion years!"

Students also commented on the skills and critical thinking of the course. Maddie L. wrote that she benefited from "how it differs from most subjects in giving students the power to take on the course from different points of view, and how we were allowed to challenge concepts within the course." Nathalie T. identified that "the claims testers we used to evaluate information were a skill essential for life in general...It is helpful to know why I trust what someone says." Emily L. stated that "the critical thinking and claims-testing skills developed throughout this process have also had useful applications in my other subjects."

The students wrote in detail about how they had enjoyed the differences in the way the course was taught, including the short online videos used (with accompanying transcript) instead of a textbook, the collaborative journaling and the focus on discussion.

Ainsley W. argued that "the videos were effective as they used the excitement students feel [about this genre]." Sophie reflected that "the video format of the coursework was interesting and engaging, providing a combination of both aural and visual information, and the online nature of Big History, unlike many other subjects, allowed me to access information in my own time." Annie L. also found the online videos helpful: "I was able to identify areas I didn't fully understand and re-watch the videos."

The students did their homework and kept a reflective journal in a collaborative OneNote as part of an internal trial conducted here at Somerville House. Although there were a few technical glitches, the students were largely positive about the collaborative aspects, commenting that they could "see how other people had 'approached' a question" (Sophie W). Adiya G. wrote that "it made it more interesting, to be able to see other students' perspective on the matters discussed in the course", and Laura B. agreed that the collaborative OneNote was useful as students were able to view other student thoughts on topics, as each varied. They were not as enthusiastic about the actual journaling at the end of any major activity, but admitted that it helped them when studying. Kayla R. wrote that "the journal was a good way to... retain our knowledge. I always went back to it to recover information."

The focus on whole-class discussion was also a highlight for many students. On a purely practical level, Elian C. wrote that "discussion helped me to gain a better understanding of concepts while sharing my ideas as well." Isabelle M. wrote that "the most enjoyable part of the course was the way the whole class were included in discussions. This made it a more amusing environment to learn in and I gained new perspectives." The benefit of participating in these discussions was also

identified by Anastasia P. who wrote "there were great moments where I found I was able to bring some prior knowledge into the course and expand on an idea. Usually this would lead to learning more about the subject and feeling more confident." These discussions also helped students deal with the complex questions posed: "the in-class discussions were very enjoyable, as they allowed me to think 'outside the square' when we discussed the issues raised in each threshold" (Prudence E).

The Little Big History Projects

In assessing Big History, we used a mix of our own assessment, including a typical Science exam and a typical Historical extended written assessment, as well as a digital poster which incorporated student-made videos. The major assessment was one recommended as part of the course – a 'Little Big History' project - and we were thrilled with how engaging this assessment turned out to be for both students and their families.

Students were placed in groups and selected an everyday modern object; for example: clocks, paint, a 'Bob the Builder' toy, books, running shoes and matches. Initially, they worked collaboratively to brainstorm and explore the resources about this object. They then individually researched this object across three Big History thresholds, with at least one being prior to humans, and wrote a narrative essay with a strong analytical component. The success of this slightly unorthodox style of essay writing was evidenced by the attainment of a First Place and a Highly Commended award in the QHTA Historical Writing Competition. Once this essay was completed, the students came back together to share what they had learnt and to prepare a short presentation and a laptop-based display. These were presented for parents in July. "The best part of the Big History course for me was the day we got to do the presentations for the Little Big History Project. It was really exciting to see what all the other groups did for their object and how they approached the task" (Emma C).

From the teachers' perspective...

This course is so different from any other. It isn't often that you get comments from parents about their dinnertime conversation being focussed around their daughter's classwork. It isn't often that teachers enthusiastically talk to their colleagues, friends and family about content they are teaching. It isn't often that you can spend a whole session in class in a discussion with students on one topic, and trying to address all the "what if" questions. This course has sparked so much interest in, and enthusiasm for, learning from people of all ages.

It is truly wonderful to hear that students enjoyed the course so much that they would talk about it at home for hours on end. It stimulated academic discussion between parents and daughters at home. It also sparked critical thinking and the exploration of knowledge in the classroom. So much of the course focussed on student discussions after viewing the core videos. Every student in the class would

become engaged, and be so eager to share her ideas, thoughts and questions.

For us, one of the biggest privileges was learning a discipline other than our own. The multidisciplinary approach has brought the Science and Social Science Departments closer together, which is not all that absurd when you consider the crossovers of content and skills in the curriculum. It makes sense to combine these disciplines, and other subjects in the school might also benefit from such sharing of ideas. The students certainly did.

Overall, it was a fantastic experience teaching this course; we are both delighted to be teaching it again this year. It is also interesting, in the midst of new Australian Curriculum units being published and taught for the first time, to teach a course that is international in execution and more than global in focus.

The current Year 9 students who chose the course seem to have benefited measurably and immeasurably, and it is fitting to have a student sum up her experience:

“I never thought that a subject could so dramatically change my outlook and provide me with such thought-provoking topics that I would happily discuss with anyone for hours on end. The subject of Big History has managed to do just this. This modern interpretation of the scientific and historical journey of our universe has fascinated me right from the first classroom discussion that took place. This course has provided me with a new outlook on not just Science and History, but any subject that I participate in by enabling me contribute to topics discussed and allowing me to question authority” (Maddie L).

An afterword – Homo evolutis in the Anthropocene

A semester after we finished teaching Big History for the first time, we've found a little time to look at the final threshold of the course – the Future. “After carefully considering the past, the study of big history inevitably leads to the future...” (Christian 2013)

While the expanding universe will ultimately tend towards simplicity, on Earth, the immediate future is one of increasing complexity – the ‘acceleration’ of the last 500 years (Threshold 9) is increasing at a truly inspiring or terrifying pace. For example, after about 5000 days of the World Wide Web (WWW), it is now clear we are moving towards all machines being linked to the internet and, in essence, becoming a single machine. Juan Enriquez, founding director of the Harvard Business School Life Sciences project, looks upon the remarkable achievements in bioengineering, including using stem cells to grow replacement trachea, ears and bladders, and the near future of hearing and sight replacement devices which have a better range than human ability as evidence of the future arrival of a new hominid – *Homo evolutis*. He argues that our next step is to take “...direct and deliberate control over the evolution of [our] species and other species...” (Enriquez 2009).

With these triumphs of human ingenuity, come the problems our advancements have created. Ecologist Eugene Stoermer has dubbed the current era the *Anthropocene* – the era when human abilities have had a significant impact on the Earth's ecosystems. Issues such as the scarcity of resources, including food and water, the extinction of other species, the acidification of oceans and the rapid escalation of greenhouse gases are all issues that our students are becoming increasingly aware of and concerned about. When asked to place themselves on a continuum between feeling optimistic and pessimistic about the future, the 9s spread themselves remarkably evenly along the line. Some students expressed worry about the challenges facing them as adults, most were tentative, but hopeful about the ability of human ingenuity to cope with new challenges, while a few led the way by arguing that collective learning gives us remarkable abilities to cope with challenges, and that we should feel very optimistic about the future. We finished the course with fifty-two very thoughtful young women who have distinct ideas about the future they want and expect. What a wonderful cause for hope!

References

- Christian, David 2013, 'Big History Project', *Complexity and the Future*, viewed 27 November 2013, <<https://course.bighistoryproject.com/pages/console/?clientkey=54330#units/>>.
- Enriquez, Juan 2009, 'TED: Ideas Worth Having', *The Next Species of Human*, viewed 24 November 2013, <http://www.ted.com/talks/juan_enriquez_shares_mindboggling_new_science.html>.
- NASA 2012, 'Lunar Reconnaissance Orbiter', NASA, viewed 3 September 2013, <http://www.nasa.gov/mission_pages/LRO/news/apollo8-retrace.html>.
- THE WORLDWATCH INSTITUTE 2013, *State of the World 2013: Is Sustainability still possible?*, Island Press, Washington.