

The Epic of Evolution: Life, the Earth, and the Cosmos:
A course for non-science majors at Washington University

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In the early 1990's I expanded my intellectual interests, moving from the "straight science" I'd been pursuing for decades and into the interface between science and that complex phenomenon we call religious sensibility.

My core context in this endeavor has been the Institute on Religion in an Age of Science www.iras.org. Early on I also had the great fortune to encounter the works of Thomas Berry and the abiding friendship and encouragement of Mary Evelyn Tucker, John Grim, and Brian Swimme. The initial outcome of this immersion was publication of a book, *The Sacred Depths of Nature*, in 1998, wherein I narrate our understandings of life at a molecular/cellular level and offer non-theistic religious responses to these understandings. Since then I've written articles, chaired conferences (including one on Ecomorality with Brian and Mary Evelyn), and offered numerous seminars and workshops in the context of this religious-naturalist perspective while remaining fully active in molecular/cellular research and training at Washington University.

In 1996 I co-chaired an IRAS conference with Loyal Rue called The Epic of Evolution, with Brian, Mary Evelyn, and John as speakers, and realized that this thrilling narrative was largely unknown and/or misunderstood by humankind. I also became convinced that knowledge of this story had the power to initiate and/or deepen human commitment to an ethos of planetary sustainability. I therefore initiated conversations with two faculty colleagues and good friends, Professors Claude Bernard (Physics) and Michael Wyession (Earth and Planetary Sciences), about joining me in offering an interdisciplinary course along these lines.

The outcome was the launch, in 2000, of "The Epic of Evolution: Life, the Earth, and the Cosmos" a one-semester 3-credit course that fulfills 1/3 of the "science requirement" for graduation at Washington University. It has been offered ever since, with physicist Clifford Will replacing Claude Bernard last year. Course enrollment fluctuates between 100-130 students. Each of us offers one-third of the lectures. The course website http://epsc.wustl.edu/classwork/classwork_210a/index.html contains all our powerpoints and assignments.

Since the course emanated from 3 departments, its establishment might have been more onerous than it was because the Dean of Undergraduate Studies was very enthusiastic about it. Those considering launching such a course on their campus are advised to be mindful that some departments are more generous than others in yielding teaching equivalents for such an endeavor, and obtaining "higher" administrative support is a wise move early on in the process.

Since the course is geared to fulfilling a science requirement, and given the knowledge base of the 3 faculty members, the lecture material does not cover human history in the traditional sense, and hence does not merit the full "Big History" label. That said, I offer several lectures on human evolution, with an emphasis on language-making and culture-

making as distinctive human traits, and Mike considers human environmental impact in several of his lectures. Hence the human is an abiding presence.

That said, in the main, the course considers the history of the universe, earth, and life as ascertained via traditional scientific inquiry. Along the way, core understandings relating to such topics as particle physics, stellar nucleosynthesis, gravity and relativity, plate tectonics, cladistics, regulation of gene expression in embryos, and modes of natural selection are covered. Each week the students turn in responses to a “homework question” relating to the scientific content of the lectures of the previous week that is graded by a graduate TA, and the midterm and final exam cover the science-based material based on the lecture powerpoints that are posted on the website. Each of us develops our lectures and materials independently, with little effort at coordination, albeit more coordination might well improve the product.

A feature of the course that has eluded a satisfactory outcome has been our original concept that we would hold discussion sessions on matters related to the material – e.g. the anthropic principle, teaching evolution in schools, species extinctions, climate change, etc. Students quickly figured out that attendance wasn’t required (this would entail changing to a 4-credit course) and that the material wasn’t tested, and despite our best efforts to make these sessions interesting, they quickly devolved into low-attendance dispiriting affairs. We’ve therefore stopped holding these sessions in recent years, but some mechanism to revive this component would enhance the value of the course.

On the positive side, the “Evolutionary Narrative” assignment has successfully offered opportunities for response to the material. Here’s the description from the website:

After each set of lectures, you are asked to turn in a work, usually of no more than one page, in which you present or respond to the scientific material of the previous week as a narrative. This can take many forms. For example, you might write a story as you would tell it to a parent or a younger sibling. You might choose to include your own feelings about the material from e.g. a philosophical or religious perspective. You might write it in prose or poetry, or include some fantasy or art (simple but careful drawings fine!). The point is to give you the opportunity to take what you have heard the previous week and work with it.

These offerings are read by the faculty, meaning that each week one of us goes home with an unwieldy stack of materials, sometimes including a sculpture or large work of art. Some of them are slap-dash and receive one point, but the large majority are thoughtful and, in many cases, brilliant and/or deeply poignant, and receive either 2 or, in some cases, 3 points. Since these points directly impact the grade received, motivation to pay attention to the assignment is high, but it’s also clear that in most cases, considerable active engagement is involved.

Based on the narratives, course evaluations, and conversations with students, my sense is that while there are students who enter and leave the course as confirmed “science haters,” most are very positive about the experience, and some testify that learning about scientific understandings in the epic-of-evolution context has been transformative.

It has certainly been transformative for me to teach the course. I educated myself in a number of biology fields where I was at best rusty, at worst uninformed, and have

emerged as a far more perceptive scientist. During the first few years we rigorously attended each others' lectures, and my understandings of physics and earth sciences were immensely deepened even as I remain an amateur. Best of all have been my encounters with this population of students given that my prior teaching experiences were confined to bio-majors and pre-meds. I've continuously found better ways to explain things without assuming prior knowledge, a skill that's been valuable in many other contexts.

Each year a few science majors enroll, telling us that our integrated version of things is very difficult to pull together via within-discipline courses. I think a course like this should be standard fare as a "capstone course" in both high school and college. But then, I'm a true believer!