Tutorial #1

Student introductions were followed by the review of a key concept from the first lecture (prokaryotic versus eukaryotic cell distinctions). The students then participated in an astrobiology themed Pictionary activity, as a way to get acquainted with vocabulary relating to evolution and astrobiology concepts forthcoming in the course.

Tutorial #2

In response to the quality of student essays received in the 2010 year, a tutorial was dedicated to a detailed explanation of expectations for the essay writing assignment in 2011. Students did a very brief “think, pair, share” exercise in the beginning of class to determine what they wanted to accomplish (in broader terms) when writing an essay. A review of essay structure was then undertaken with a particular emphasis on constructing a thesis statement. Then, anonymous introductory paragraphs from last year’s essays were analyzed by the students (an exemplary paragraph and a paragraph that had many poor elements). An example of obvious plagiarism was also examined and cautioned against. There was a discussion of how to select research sources, as well as some tips on how to use and record information from these sources. The students then worked on formulating their own thesis statements during the tutorial period, on an evolutionary biology topic (one distinct from the assignment, but touching on issues raised in the first two lectures, for review purposes). Proofreading tips and other common writing pitfalls were reviewed. At the end of the tutorial, the students were provided with a writing “checklist”, and also prompted to email their future thesis statements, while they are working on the essay assignment, to the class tutor. This provides a formative assessment opportunity, and it is preferable on the part of the assessor to spend a few minutes reviewing a thesis statement and making suggestions for re-structuring, than to spend a considerably larger chunk of time reading a poorly constructed essay.

Tutorial #3

A short assessment was completed by students in regards to material covered in the previous lecture periods. This assessment covered the following:

i) the BBC documentary, Space (Star Stuff), dealing with the origin of the elements on earth
ii) the concept of the “habitable zone”
iii) specific elements (Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorus, Sulfur) that make up the building blocks of life (DNA, RNA, proteins)
iv) how DNA is involved in heredity and also host susceptibility to disease (drawing directly from an example mentioned during the lecture period)

This was followed by a detailed explanation of the assignment on creating a video interview. This assignment was inspired in part by exemplars shown at the end of year Common Core forum in May 2011, and also by a lack of information regarding beliefs of the Hong Kong general public in regards to evolution (detailed data exists in regards to perception of evolution for U.S. and UK citizens). A 6 minute interview exemplar was created by the tutor and shown to the students. This investigated lay opinions
on how humans arose on earth, how evolution was taught (if at all) during schooling, how independent knowledge was acquired in regards to evolution, whether evolution, creationism or a combination of the two should be taught to highschool students (this also set up a primer for the debate that the students would embark on in a later tutorial), and perceived relationships between evolution theory and religious beliefs. The difference between asking “open-ended” and “closed-ended” questions was highlighted by the tutor.

The classic Miller-Urey “primitive earth simulator” experiment was then discussed with the students, in addition to the random nature of mutations, and non-random selection pressure on those mutations -- this again drew directly from material in lecture.

**Tutorial #4**

Expectations for the forthcoming poster assignment were laid out in detail. The students each made a 5-minute poster on a generic topic, and critiqued the posters of their peers. This sparked a student-led discussion on the elements of a high quality scientific poster. The criteria generated by students in this activity were used, in part, for the instructor-generated rubric to evaluate the scientific posters later in the semester. This introduced students to the concept of a rubric (which many were unfamiliar with), and also indicates the thought, care, and effort put into the assessment process on the part of the tutor. The rubric from a poster assessment in a previous common core course was also shown to the students. The peer to peer assessment and forthcoming student-generated rubrics were also discussed. Students then assembled into small groups in preparation for the debate in the next tutorial period.

Peer versus instructor grading was investigated by the tutor in a previous common core course, and was submitted to the Assessment Resources website at HKU ([http://ar.ceti.hku.hk/assessment_with_table.php](http://ar.ceti.hku.hk/assessment_with_table.php)). The peer to peer grading exercise for the CCST9018 course in 2011 was greatly expanded upon in comparison to this previous submission and should again yield intriguing and potentially publishable findings.

**Tutorial #5**

Students debated the following:

Should we teach evolution and creationist views together in school science classes?

Group A: Argued from the point of view that only biological evolution should be taught

Group B: Argued from the point of view that only creationism should be taught

Group C: Argued from the point of view that both evolution and creationism should be taught together in science class

The three groups had 10 minutes each to state their viewpoint, followed by 5 minutes of rebuttal time by each group; any remaining time was free discussion. I took note of participation and performance during the debates and made assessments based on those. This included responsiveness to other student’s points (or to my follow-up questions) during the debate, persuasiveness of argument,
scientific validity of points put forward, and presence of new points made from material outside of
lecture or tutorial material (indicative of further research on the part of the students). One of the
groups in each of the debates was required to hold a position that was more difficult to defend—a small
amount of leniency was afforded for these groups in the assessment compared to the others.

**Tutorial #6**

A recap of the debate strategies was undertaken, with direct quotations from the student’s arguments
in the previous week (What constituted strong/poor evidence? Which obvious rebuttals were missed?
What was exemplary and unacceptable behaviour during the debate?) A meta-analysis of the
literature dealing with “scientific creationism” (and the shortcomings of that literature) was briefly
discussed. The law of superposition was briefly reviewed and put into the context of the previous
debate. The logic (or the absurdity) of creationist “science” fair projects produced by various levels of
secondary students was examined. A review of the assigned readings was undertaken (see list below),
and the students completed an assessment on the origin of humans and the small genetic differences
(single nucleotide polymorphisms) that separate us. Students received the information required to
complete the assessment three distinct times – in the assigned reading, the lecture, and the tutorial.

Reading for tutorial:
1) Excerpt: Charles Darwin and the Brutality of Slavery
2) Foster, MW, Sharp, RR. Beyond Race: Towards a whole genome perspective on human populations
3) Study: Neanderthal DNA lives on in modern humans. Time Magazine.
   http://www.time.com/time/printout/0,8816,1987568,00.html
4) Implications of biogeography for humans for ‘race’ and medicine. Tishkoff, SA, Kidd, KK. *Nature

**Tutorial #7**

The students watched the BBC documentary “Are we alone”, dealing with the search for extraterrestrial
life, extremophiles, and the enormity of the universe. As an assessment for the viewing, the students
provided 3 pieces of supporting evidence in regards to the possibility of life existing outside of planet
earth, and also a short opinion statement on what they believe the impact would be on our society of
finding such life elsewhere.

**Tutorial #8**

The students completed a multiple choice and short answer assessment based directly on the lecture
topic of “evolution on a small time scale” (antibiotic resistance, generating adaptive antibody diversity
through mutation/selection) and the current understanding of sensory perception governing natural
selection. The assessment was taken up in class and then key concepts of that lecture were further
reinforced. Procedures for the upcoming poster session were further clarified.