

5 May, 2009

Hon Ms. Cyd HO Sau-lan
Chairman
Education Panel,
Legislative Council

Dear Ms. Ho and members of the Education Panel:

Re: Biology Curriculum Guidelines

Regarding the new biology curriculum for secondary schools with respect to the teaching of Darwinian evolution and the origin of biodiversity, we understand from SCMP articles that four scientists and a lobby group have been trying to change the present clause “*In addition to Darwin’s theory, students are encouraged to explore other explanations for evolution and the origins of life, to help illustrate the dynamic nature of scientific knowledge*”. We, as educators, scientists and professionals, are concerned about this issue and wish your panel to consider the following:

- 1) The present wording is stimulating, balanced, non-biased and has worked well for Hong Kong as well as being consistent with the 3-3-4 reform in stimulating students to exercise more critical thinking

The present wording of the guideline is excellent, and should be kept as it is, because it has served Hong Kong well. It has not in any way degraded the high standard of science teaching that we have had in Hong Kong. So the question we would pose here is – why change something that is already good, and has worked well? We also understand that good education is not just a matter of learning facts, but also includes the process of learning to critically think through issues. To encourage students “to explore other explanations” is to open up a forum within the science class to do just this. Indeed it is part of the essence of science, which students are taught, to allow different hypotheses to be placed for critical examination against available data.

- 2) There is no universally accepted definition of science

Philosophers of science have tried for many decades to come up with statements as to what constitutes science and what does not – but without success. The question is how to differentiate between what constitutes science and pseudo-science. This proves to be a religiously-sensitive issue, not with respect to science in general, but with respect to origins science – since it is in the question of origins that worldview is necessarily entailed.

Generally accepted definitions of science, however, include the concepts that it deals with knowledge of natural phenomenon, that it builds knowledge in the form of theories, and that these theories should make testable predictions.

One working definition of science has been put forward last year by the US National Academy of Sciences:

“Definition of Science: The use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process.”

[“Science, Evolution and Creationism” NAS 2008 report page 10]

This seems a reasonable definition in that it does not preclude discussions of theories that might have religious entailments. It is notable that it has been made less religiously-sensitive than the 1999 NAS statement “the job of science is to provide plausible *natural explanations* for natural phenomenon” [“Science and Creationism: a view from the NAS” (2nd ed. 1999, p7)], a statement that promoted a naturalistic worldview. The fact that the NAS has turned to a more inclusive definition of science demonstrates that Hong Kong has been ahead in this area in terms of school curriculum. This is something we should be proud of and not seek to change.

3) There is a real legitimate scientific controversy over Darwinian Theory.

Darwin’s theory, as applied to micro-evolution (that deals with genetic variations within a species), is well established and accepted by the scientific community. Darwinian macro-evolutionary theory, however, has become increasingly controversial over the last few decades. In its modern neo-Darwinian form, this theory says that all organisms are descended from a single original form of life, the mechanism being random genetic mutations acted on by natural selection. The following are just a few facts that are inconsistent with such a notion. Mutation rates are far too slow and geological time spans too short to account for more than just a few base pair mutations. Novel innovations, each requiring the formation of new coherently operating clusters of genes, are placed well out of bounds. To make matters worse, bio-complexity is known to undergo sudden jumps (i.e. prokaryote - eukaryote transition, the Cambrian explosion, gaps in the fossil record). A growing listing of over 750 highly qualified scientists, many from some of the world’s most respected academic institutions, have signed a statement which says: *“We are skeptical of the claims for the ability of random mutations and natural selection to account for the complexity of life. Careful examination of the evidence for Darwinian theory should be encouraged”*. [<http://www.dissentfromdarwin.org/index.php>]

Alternative explanations to Darwinian macro-evolution should thus be explored so long as they are based on rational and empirical grounds.

4) The origin of life remains a major scientific problem

After more than 60 years of investigating how life could have arisen from pre-biotic chemical conditions on the early earth, origin of life research has reached no conclusion on how life originated on Earth. Indeed the more that is discovered about the complexity of the living cell, the more unlikely it seems that life originated from non-life by natural processes (abiogenesis). The seriousness of this problem is witnessed by the fact that the subject of astrobiology is now taken seriously within the universities (a subject that would have been seen as pseudoscience 15-20 years ago). As with the origin of more complex life – the primary issue is that of the origin of genetic information.

We thank you for considering these points. Should you require further discussion or clarification, please do not hesitate to contact us.

Yours sincerely,

Prof. Stephen K.W. TSUI, Professor, Department of Biochemistry (Medicine), CUHK
(contact person)

Email: kwtsui@cuhk.edu.hk

Tel: (852) 2609 6381

Fax: (852) 2603 7732

Dr. Norman AU, Assistant Professor, School of Hotel and Tourism Management, HKPU

Prof. Oscar AU, Associate Professor, Department of Electronic and Computer Engineering, HKUST

Dr. Shannon W.N. AU, Associate Professor, Department of Biochemistry (Science), CUHK

Yat-Yin AU, High School Teacher

Prof. Chris BELING, Professor, Department of Physics, HKU

Alex O.C. CHAN, Ph.D., High School Teacher

Dr. Alvin CHAN, Associate Professor, Department of Computing, Hong Kong Polytechnic University

Dr. Anissa CHAN, Principal, St Paul's Co-educational College

Prof. Keith CHAN, Professor, Department of Computing, HKPU

Dr. Raymond T.T. CHAN, Specialist in Clinical Oncology, MBBS, FRCR, FHKCR, FHKAM

Dr. Stephen C. CHAN, Associate Professor, Department of Computing, HKPU

Dr. Anthony CHENG, M.D. (Canada) FRCC, FRCSC

Prof. Roger CHENG, Associate Professor, Department of Electronic and Computer Engineering, HKUST

Sandy C.K. CHIM, CA, MBA

Dr. Stephen S.C. CHIM, Assistant Professor, Department of Obstetrics & Gynaecology, CUHK

Suk-Yee CHIU, High School Teacher

Edmond CHO, MBA, Company director

Prof. Daniel H.K. CHOW, Professor, Department of Health Technology & Informatics, HKPU

Dr. Louis CHOW, MBBS, FRCS, FHKAM (Surgery)

Prof. Yuen-Min CHOY, Adjunct Professor, Department of Biochemistry (Science), CUHK

Dr. Samuel Kai-Wah CHU, Assistant Professor, Faculty of Education, HKU

Dr. Korris CHUNG, Associate professor, Department of Computing, HKPU

Prof. Jimmy C.H. FUNG, Professor, Department of Mathematics, HKUST

Dr. Teik-Khiang GOH, Associate Professor, Department of Biology, HKUST

Dr. Tiberio HARKO, Research Professor, Department of Physics, HKU

Dr. Kenneth HO, MBBS, FHKCFP, FRACGP, Medical practitioner

Prof. Kin-Chung HO, Dean, School of Science & Technology & Professor in Environmental Studies, The Open University of Hong Kong

Dr. Joe KWAN, MPH, MCLS, D.Env, CIH, REHS, Director of Health, Safety and Environment, HKUST

Dr. Grace LAU, Ph.D., Assistant Professor, HKIEd

Dr. Kwok-Fai LAU, Assistant Professor, Department of Biochemistry (Science), CUHK

Dr. Vivian W.Y. LUI, Assistant Professor, Department of Clinical Oncology, CUHK

Kwok-Lun LEE, M.Phil. (Physics)

Dr. Levi LEE, M.D. (U.S.A) Diplomate American Board of Pediatrics

Dr. Richard C.K. LEE, Assistant Professor, Department of Religion and Philosophy, HKBU

Dr. Mason C.P. LEUNG, Associate Professor, Department of Rehabilitation Sciences, HKPU

Prof. Kwok-Nam LEUNG, Professor, Department of Biochemistry (Science), CUHK

Prof. Donald J. LEWIS, Associate Professor, Department of Law, HKU

Evelyn LIU, B.Sc., Environmental Engineer

Prof. Samuel C.L. LO, Professor, Department of Applied Biology and Chemical Technology, HKPU

Catherine K. LUK, Ph.D. Biophysics

Dr. Tony K.F. MA, Senior Pathologist, MBBS(HK), FHKCPath, FHKAM(Path), FRCPath, FRCPC, FRCPA, FIAC, DipAmB(Path)

Prof. Arthur FT MAK, Chair Professor and Head, Department of Health Technology and Informatics, HKPU

Dr. Henry M.K. MOK, retired professor, Department of Decision Sciences & Managerial Economics, CUHK

Dr. Vincent NG, Department of Computing, HKPU

Dr. Grace NGAI, Department of Computing, HKPU

Prof. Kanya M. NGAI, Associate Professor, Faculty of Education, HKU

Prof. Calvin C.P. PANG, Professor of Ophthalmology & Visual Sciences, CUHK.

Prof. Helen SHEN, Associate Professor, Department Computer Science and Engineering, HKUST

Dr. Yee-Ming SIU, Stanley

Ferrous SO, High School Teacher

Prof. Richard H.Y. SO, MergS MIIE MIEEE, Associate Professor, Department of Industrial Engineering and Logistics Management, HKUST

Dr. Bilian N. SULLIVAN, Assistant Professor of Management, HKUST

Stephen TAM, High School Teacher

Andrew TONG, High School Teacher

Tse Kwong SHING, High School Teacher

Prof. Wen-Xiong WANG, Professor, Department of Biology, HKUST

Dr. Henry C.W. WONG, Family Physician, MBBS, FRACGP, FHKCFP, FHKAM (family Medicine)

Prof. Joshua Sook-Leung WONG, Professor Emeritus, Department of Electronic and Information Engineering, Former Vice President, HKPU

Dr. Man-Sau WONG, Associate Professor, Department of Applied Biology and Chemical Technology, HKPU

Dr. Kwok-Ming YAO, Assistant Professor, Department of Biochemistry, LKS Faculty of Medicine, HKU

Prof. Benjamin YUNG, Chair Professor in Biomedical Science, Department of Health
Technology and Informatics, HKPU

Cc: Mr. Michael Suen
Secretary for Education
Education Bureau