**Recommendation from Natural Sciences Scoping Committee**

The Natural Sciences Scoping Committee met on 15 November 2013 to discuss revisions of the 1986 document, **Statement on Preparation in Natural Science Expected of Entering Freshmen**. Although the committee believes that the document contains some broad statements that remain true today, the document needs to be completely revised to incorporate the information from the Next Generation Science Standards (NGSS).

Recommendations

1. The existing document emphasizes the importance of science education in creating an informed citizenry that is better able to participate in society and to compete internationally. The existing document pushed for three years of science education during high school to help achieve this goal. The committee strongly believes that we advocate for four years of science education during high school. This is increasingly important as many college students may only take a single science course while earning their degree.
2. The existing document needs to be restructured to be more like the new competency statement for mathematics. The existing document is too long and the new document needs to be more concise and useable for both scientists and nonscientists.
3. The committee believes that the existing document correctly advocates for science education prior to high school. The committee also believes that encouraging science education during every year of education should be included in the document.
4. A section on the expected skills of all successful students needs to be added to the document. These skills should include proper study habits, effective note taking, the ability to use modern tools, familiarity with research methods, the ability to effectively speak and listen, and the ability to write clearly and effectively.
5. The existing document advocates that students should complete a course in each of three core disciplines (Biology, Chemistry, and Physics). The NGSS includes several possible new course structures that high schools could use to cover this information; therefore the committee is not endorsing any particular structure or ordering of courses.
6. Technology was mostly overlooked in the existing document and needs to be integrated into the introductory sections of the new document. Some items that should be included are using technology for graphing and presenting data, writing laboratory reports, taking experimental measurements and data, performing simulation based laboratory activities, and archiving information for rapid retrieval.
7. Earth and Space Sciences or Environmental Sciences needs to be added to the existing three disciplines (Biology, Chemistry, and Physics).
8. The content of each of the existing discipline needs to be revised to reflect the material covered today and to be consistent with the topics listed in the NGSS.
9. Each of the content areas should include general performance expectations (outcomes) and have citations to more specific outcomes listed in the NGSS.
10. The NGSS includes many topics that are covered in every scientific discipline in different ways. The concepts are not part of the existing document and need to be added. The cross-cutting concepts should include:
    1. Uncertainty and weighing evidence
    2. Systems and system modeling
    3. Structure and function
    4. Stability and change
    5. Energy and matter
    6. Scale and proportionality
    7. Synthesis of information and how it contributes to the “big picture”
    8. Visualization of data
    9. Human and global impact

While the committee agrees with the philosophy of the introductory material, most of the document needs to be completely reworked to align with the NGSS. The committee is willing and able to perform this task and believes that a draft of the new document could be completed by June 2013. The committee offers its services for that task but realize that decision needs to be made by ICAS.

If there are any additional details that we can provide, please let me know.

Respectfully submitted by Craig Rutan, Chair, Natural Sciences Scoping Committee

Natural Science Scoping Committee

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