An important note about Physics Course changes as proposed in the NGSS standards

From Jane Jackson <jane.jackson@ASU.EDU>

I am disturbed at the marginalization of physics in the NGSS model course maps in Appendix J. I see it as harming the spread of research-based programs such as Modeling Instruction. We all need to give feedback.

Below are 3 posts to the physics modeling listserv. Greg Hnlicka poses a practical (and easy) solution to the marginalization of physics and chemistry in Appendix J of the NGSS. Simply add another page of course maps, listing 4 courses. That is what is offered in most high schools, and that makes a lot of sense to me.

Science coordinators do not know physics and chemistry, in many cases. Many school districts do not even HAVE a science coordinator.

Many school district curriculum coordinators are NOT strong in science. So they take the easy way out: use the sample course maps. Their teachers must abide by them. Trusting in the current course maps in Appendix J will lead to more 'mile wide, inch deep' science, to the detriment of the nation in this age when STEM and thinking (in addition to the base of memorization) is central to civilization's progress.

What do you think of Greg's suggestion: to propose to ACHIEVE (& the AAPT) that another page of FOUR model course maps be added to Appendix J?
(I asked David Hestenes. He responded, "It couldn't hurt.....Dave")

You can download Appendix J at
http://www.nextgenscience.org/next-generation-science-standards
The ONLY physics course is outlined on page 17; and it is 40% earth science. Memorization will rule, because the teacher must teach the standards too fast for concept understanding.

Please provide feedback to the Lead States and writers.
Deadline is Jan. 29.
All feedback on the NGSS draft should be submitted through the official survey:
http://interceptum.com/ngss/how.html
(I find the survey form daunting! Can someone post guidelines for completing it quickly?)

Or give feedback to AAPT. It is easy: send an email to
ngss@aapt.org, as soon as possible but no later than January 26th. The category is "clarity of statements". (Rationale: If 4 science courses will be needed, as Jim Gates and Ramon Lopez said at the AAPT national meeting in New Orleans, then for clarity Appendix J should have model course maps of 4 courses, rather than 3 courses. I like Greg Hnilicka's suggestion of 1/2 year earth science.)

-- Jane Jackson, ASU Modeling Instruction Program, Tempe AZ

Date: Fri, 11 Jan 2013
From: "Greg Hnilicka (MD98 IL)" <g.hnilicka@COMCAST.NET>
Subject: NGSS

The most significant change that I have noticed so far about the NGSS second draft is the addition of model course maps in Appendix J and their potential for a negative impact on a

physics course and physics enrollment. Of the three included, only Course Map 3 includes a physics course. (One of the other maps includes a physical science course instead of separate chemistry and physics courses. The other map integrates life science, physical science and earth/space science in each year.)

But the physics course in Map 3 actually becomes physics/earth & space science. Forty percent of the standards listed under the physics course are earth & space science. And the chemistry course becomes chemistry/earth & space science, too. Quoting from NGSS, "Since a fundamental assumption of all of the model course maps is that the performance expectations of the NGSS are all for all students and many states do not require four courses of science, the decision was made to attempt to distribute the Earth and Space Science in a logical fashion across the Biology, Chemistry, and Physics Courses."

While these course maps are intended as models (states and local educational agencies are not required to pick from one of the models), it seems that a likely impact of your state adopting NGSS will be pressure to incorporate a large percentage of the earth & space science standards into physics. Quoting again from NGSS, " All students are expected to accomplish all of the performance expectations (PEs) of the NGSS ." (That statement is in bold print in the NGSS.)

Adding earth and space science content to a physics course is actually counter to the original vision of NGSS of reduced content breadth and increased depth. For a modeling physics course, increased breadth is especially troublesome.

Worse yet, some states may adopt NGSS and a course map that does not include a physics course during the first three years. Though the physics course could still be a senior elective, such an approach is sure to reduce physics enrollment. One administrator here said that Illinois is considering adopting only the integrated course map. I hope he is wrong about that; but if he is right, it would dramatically and negatively impact physics teaching and learning.

For the sake of our physics students and physics teaching as a profession, please read Appendix J of the NGSS second draft and respond to the NGSS survey.

Date: Wed, 16 Jan 2013
From: "Greg Hnilicka (MD98 IL)" <g.hnilicka@COMCAST.NET>
Subject: The physics course in Appendix J of NGSS

As previously noted, Appendix J of the NGSS second draft includes a physics course in only one of three course maps. And 40% of the standards listed under that physics course are earth and space science. This leaves little room for a modeling approach to physics.

As a possible resolution to the place of physics in the NGSS Appendix J course maps, Achieve could add a 4 year or 3.5 year course map that includes a physics course that is not diluted with Earth and Space science standards. The four year map would include one year each of biology, chemistry, physics and earth/space science. The 3.5 year map would include one year each of biology, chemistry and physics, along with one semester of earth/space science. (Not sure if that's reasonable, since I have no background earth and space science.)

A four year course map could help, because it would alleviate the time pressure of adding earth and space standards to physics, leaving room for a modeling approach to physics. But it would not solve the problem at my school entirely. A 3.5 year course map would be better, if the earth and space standards could be adequately covered in one semester by higher ability students.

Earth and space science at Metamora high school has been viewed as primarily for the lower track students. They get earth and space science in either their freshman or junior courses, but the upper half of the students take biology, chemistry and physics. Then as seniors they can take a second year of biology, chemistry or physics and possibly get AP credit or dual credit with the community college. Three years of science are required, but about half of the students take at least one additional year. Most of these students go on to some STEMM (including medicine) major in college.

Replacing our optional second year of biology, chemistry or physics with a required year of earth and space science seems to me like it takes away from what is already a good STEMM pathway. Requiring only a semester of earth and space science might be a reasonable compromise, though it would negatively impact our second year biology/chemistry/physics enrollments (but less than requiring an entire year of earth and space science would).

Does having Achieve add a 3.5 year or 4 year course map that keeps earth and space science standards out of physics sound like a reasonable approach to resolving the current difficulty with the course maps presently in Appendix J of the NGSS?
Thanks,
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Metamora High School (Illinois)