

Decision Brief: Alternate Science Options for the Proposed Virginia Diploma Program

Background

The “strawman” Virginia Diploma¹ requires students to earn four standard credits and one verified credit in the laboratory sciences².

Students currently seeking a Standard Diploma must: (a) satisfactorily complete three laboratory science courses from the Board of Education’s (BOE) approved course list; and (b) attain at least one verified credit in science, i.e., achieve a passing score on a Standards of Learning (SOL) science assessment (or a BOE-approved substitute). SOL assessments are currently administered for three laboratory science courses: Earth Science I, Biology I, and Chemistry I.

Students currently seeking an Advanced Studied Diploma must: (a) satisfactorily complete four laboratory science courses from the BOE approved course list; and (b) attain at least two verified credits in science. All BOE’s currently-approved science courses (for the Advanced Studies Diploma and the Standard Diploma) are based on 140 clock hours of instruction.

A review³ of course taking patterns for students who received a Standard Diploma in 2015 indicated that approximately 54 percent did not complete a secondary laboratory science course in the chemistry or physics discipline areas. A typical course-taking pattern includes three science courses in two discipline areas, e.g., Earth Science I, Biology I, and Ecology.

School divisions do not currently offer foundational laboratory science as 70 clock-hour courses. The overwhelming majority of students now earn standard credits in science via 140-clock-hour courses.

Proposal for Consideration

As the Board revises graduation requirements to align with the Profile of a Graduate, it is asked to consider two proposals to meet the science diploma requirement:

1. a sequence of 70-clock-hour (one-semester) or segmented treatments of the four foundational science areas: Earth Science, Biology, Chemistry, and Physics, which can be aggregated for up to two science credits; and
2. a three-credit sequence of integrated, problem-based, applied science courses (140 clock hours each OR alternate credit-bearing designation that adheres to Board Guidelines to waiver 140 hours) that utilizes concepts and laboratory skills/practices from the foundational science areas.

Explanation

Approval of the alternate science options would provide students with two additional pathways meeting the science requirement of the proposed Virginia Diploma beyond the traditional sequences in place. The proposed alternate science options reflect coursework where science concepts and skills/practices could be tailored to specific work force pathways in high demand, therefore potentially complementing career and technical preparation. The course content could be developed locally, from the four foundational science areas and subject to general state guidelines.

“Proposal One” would require the student to commit to complete two courses or the full four-course sequence. “Proposal Two” would require students to commit to the three-part sequence. The BOE could provide the flexibility and responsibility to divisions to determine the science endorsement(s) needed to teach the courses in the sequence. Proposed Licensure Regulations create the option for local divisions to seek single endorsement approval to teach “blended” classes.

For both proposed alternate science options, a student must still attain the currently-required verified science credit through: (a) passing an SOL science assessment or substitute; (b) achieving a Career and Technical certification, license, or credential that confers more than one verified credit; **or** the BOE would need to consider amending the *Standards of Accreditation* (SOA) to accommodate the verified credit requirement. For example, in “Proposal Two,” the BOE, through regulations, could provide school divisions with the flexibility to administer their choice of one current SOL assessment to students anywhere during or at the end of the sequence depending on the structure of the local course sequence.

Advantages of Action

- Could promote science coursework specifically designed to complement work force preparation;
- Will increase student exposure to science from all four foundational science disciplines areas; and
- Will allow greater flexibility to school divisions in local science program content and delivery.

Considerations

- 70-clock-hour courses would provide less in-depth instruction for each specific science discipline.
- Military recruiters, college admissions/athletic eligibility, community and technical colleges, or employers may potentially not recognize or equally value alternate options for science.
- State assessments for semester courses do not currently exist and would need to be created

Legislation/SOL Innovations Committee Recommendations to Consider

In its Fall 2015 Report, the SOL Innovations Committee noted *“high school graduation requirements should be adjusted as needed to conform to the new expectations identified in this Profile. High schools should be redesigned so that students move from attaining core knowledge and skills in the early years to one of several alternative paths toward college and career readiness.”*

Stakeholder Summary

- The presidents of the four key science education professional associations, the Virginia Association of Science Teachers, the Virginia Science Education Leadership Association, the Virginia Mathematics and Science Coalition, and the Virginia Academy of Science have each expressed concerns about 70-clock-hour (semester) treatments of foundational science courses as substitutes for 140-clock-hour courses.
- Parents and educators expressed general support for alternative course options which broaden and blend the curriculum and allow students to experience more problem-based learning.

Action by other States

Many states, including Minnesota, North Carolina, Washington, and Michigan, allow CTE credit to be used as one credit of the required science credits.

NEXT STEP

- Accept for Immediate Inclusion (First Review in June)
- Approve, but Not Ready for the Initial Phase
- Reject

¹ “Profile of a Graduate” Proposal, Report to the Virginia Board of Education Committee on School and Division Accountability, February 24, 2016

² “Laboratory Science” means those secondary science courses where students directly investigate natural phenomena as a significant part of instruction (minimum 40 percent), along with discussions, simulations, and lectures. In laboratory experiences, students learn to manipulate real materials and equipment, think systematically, and work safely by developing research questions, designing and conducting investigations, collecting and analyzing data, engaging in argumentation, and drawing conclusions (Office of Science and Health Education, Virginia Department of Education, 2013).

³ “The Standard Diploma: Enhancing Foundational Laboratory Sciences Preparation” Report to the Virginia Board of Education Committee on School and Division Accountability, November 18, 2015.