

Executive Summary

Prepared for Board of Trustees Meeting December 12, 2006

4 x 4 Core Area Curriculum (House Bill 1)

Purpose of Report

The purpose of this report is to provide the latest information on the **final** approval by the State Board of Education regarding the addition of a fourth year of math and a fourth year of science to the Recommended and Distinguished Achievement high school graduation plans. The changes are required by HB1 legislation passed during the special session last May requiring the SBOE to adopt a “4 x 4” curriculum of four years each of secondary school math, science, English Language Arts, and social studies.

Objectives

Key components of the proposed plan:

- the changes will begin with next year’s incoming 9th graders
- no changes were made to the 22 credit minimum graduation plan
- the number of graduation credits was increased from 24 to 26 to reflect the additional year for both math and science and allow students to have the same number of elective options
- a minimum 26 credits will be required for both the Recommended and Distinguish Achievement diplomas

Key components of the proposed plan relating specifically to **Math**:

- for the Recommended plan: in addition to Algebra I, Algebra II, and Geometry, students must take additional (fourth) SBOE-approved math course. The four credits can be completed prior to the senior year which includes courses taken in middle school.
 - (1) All of the courses available for the fourth math credit except Mathematical Models with Applications have Algebra II as a prerequisite. Those classes are Pre-Calculus; AP Statistics; AP Calculus AB; AP Calculus BC; AP Computer Science; Independent Study in Mathematics; IB Mathematical Studies Subsidiary Level; IB Mathematical Studies Methods Subsidiary Level; IB Mathematics Higher Level; IB Advanced Mathematics Subsidiary Level; and concurrent enrollment in college math courses.
 - (2) The SBOE stipulated that, if selected, Mathematical Models with Applications *must* be taken prior to Algebra II.
 - (3) Three math credits *must* be earned in Algebra I, Algebra II, and Geometry *before* the 4th math credit with the one *exception* stated above regarding Mathematical Models with Applications.

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- for the Distinguish Achievement plan: the same requirements apply as listed above beginning with next year's incoming 9th graders with one exception: only courses with Algebra II as a prerequisite can be taken for the 4th year of math which eliminates Mathematical Models with Applications from the DAP.

Key components of the proposed plan relating specifically to **Science**:

- for the Recommended plan: Four science credits are required as follows:
 - (1) one Biology credit – Biology I, AP Biology or IB Biology
 - (2) one Chemistry credit – Chemistry I, AP Chemistry or IB Chemistry
 - (3) one Physics credit – Physics I, AP Physics, IB Physics, Principles of Technology I
 - (4) Note: IPC is phased out and removed from the allowable choices for the incoming ninth graders in 2012-2013. Before that time, if IPC is chosen, the course can not be taken as the final or fourth year of science, and it must be taken before the senior year of high school.
 - (5) *After completing the first three science credits*, the fourth year of science may be selected from the laboratory courses listed below:
 - a. Earth and Space Science (Geology, Metrology, and Oceanography is being phased out into this new course)
 - b. Environmental Systems
 - c. Aquatic Science
 - d. Astronomy
 - e. Anatomy and Physiology of Human Systems
 - f. Medical Microbiology and Pathophysiology
 - g. AP Biology
 - h. IB Biology
 - i. AP Chemistry
 - j. IB Chemistry
 - k. AP Physics
 - l. IB Physics
 - m. AP Environmental Science
 - n. IB Environmental Systems
 - o. Scientific Research and Design
 - p. Engineering (Currently known as Engineering Principles)
 - q. Principles of Technology I or II
 - r. Concurrent enrollment in college science courses
- for the Distinguish Achievement plan: the same requirements apply as listed above beginning with next year's incoming 9th graders, one each of Biology, Chemistry, and Physics is required for the DAP and one additional science course from the laboratory courses listed above in (5). Note: Principles of Technology may *not* be substituted for Physics and IPC does not count for the DAP as there is no phase out for this course for this plan.

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Operational Impact

- (1) Additional science and math teachers will be needed for the addition of a fourth year of both courses. The number of highly qualified math and science teachers is steadily declining. According to a 2002 SBEC report, 34.8% of high school math teachers were teaching with no certification or outside their certification field and 51.3% of science teachers. A number of school districts in the Metroplex area are offering signing bonuses or stipends to qualified math and science teachers due to the increasing shortage.
- (2) Science laboratory facilities' usage will be stretched. There will be a need for additional scientific equipment and consumable materials.
- (3) Additional math manipulatives, calculators, and other math materials will be needed.
- (4) Summer writing teams for the curriculum development for new courses will be necessary.
- (5) Additional staff development sessions to support the development of new courses.

Results

The following questions need to be answered in order to include the necessary guidelines in the upcoming High School Course Catalog to be printed in early January:

- (1) Denton ISD currently requires 24 credits plus 2 local credits for a total of 26 credits for graduation. With the addition of the fourth year of science and math and the increase by the state to 26 credits for both the Recommended and Distinguish Achievement graduation plans, should Denton ISD continue to require an additional 2 local credits in order to qualify for graduation?
- (2) Denton ISD currently requires that the three credits of math required for graduation be taken during high school in addition to any math credits earned at middle school. Should this requirement continue with the addition of a fourth year of math?
- (3) Denton ISD currently has identified those courses that will be included in the GPA calculation. Should this list be expanded to include additional math and science courses for the new fourth year requirement?
- (4) Denton ISD currently offers a variety of math courses for students to take even if they begin higher level course work in middle school. Should additional courses be developed to ensure a selection of higher level course work for the fourth year of math?