EXECUTIVE SUMMARY

Title: High School Science Courses Taken in the Middle School: Considerations for Extending Policy Beyond Mathematics and Foreign Language

Type of Executive Summary: 
☒ Action ☐ Action on First Reading ☐ Discussion ☐ Information

Policy Implications:
☐ Constitution
☐ General Statute #
☒ SBE Policy #HSP-M-001
☒ SBE Policy Amendment
☐ SBE Policy (New)
☐ APA #
☐ APA Amendment
☐ APA (New)
☐ Other ______

Presenter(s): Mr. Robert Logan (Associate Superintendent, Innovation and School Transformation), Mr. Edd Dunlap (Middle/Secondary Science Section Chief), and Dr. Eleanor Hasse (Secondary Science Consultant)

Description:
The GCS Committee has requested information on expanding the current policy HSP-M-001 that allows students to take high school mathematics and foreign language courses for high school credit while they are in middle schools.

Resources:
N/A

Input Process:
Zoomerang survey of science teachers and administrators; survey of state science supervisors from other states; library research; middle and secondary content consultants

Stakeholders:
Students, LEA and school personnel, business community

Timeline For Action:
This item was presented for discussion at the January 2008 meeting and is returned for action at the February 2008 meeting.

Recommendations:
State Board members are requested to approve the expansion of existing policy to include science courses.

Audiovisual equipment requested for the presentation:
☐ Data Projector/Video (Videotape/DVD and/or Computer Data, Internet, Presentations-PowerPoint preferred)
☐ Specify: ____________________________

☐ Audio Requirements (computer or other, except for PA system which is provided)
☐ Specify: ____________________________

☐ Document Camera (for transparencies or paper documents – white paper preferred)

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Motion By: ______________________________ Seconded By: ______________________________
Vote: Yes ________ No ________ Abstain ________
*Person responsible for SBE agenda materials and SBE policy updates: Amy Betsill, 919-807-3817*
NORTH CAROLINA STATE BOARD OF EDUCATION
Policy Manual

Policy Identification
Priority: High Student Performance
Category: Course for Credit
Policy ID Number: HSP-M-001

Policy Title: Policy defining "Course for Credit"

Current Policy Date: 05/03/2007

Other Historical Information: Previous board dates: 05/05/1988, 08/02/2001, 02/07/2002, 12/05/2002, 07/01/2004, 11/04/2004

Statutory Reference: GS 115C-81

Administrative Procedures Act (APA) Reference Number and Category:

A credit course, one for which credit toward high school graduation is awarded and which qualifies as part of the instructional day:
• must consist of 150 clock hours of instruction in a traditional schedule or
• must consist of a minimum of 135 clock hours of instruction in a block schedule; developed curriculum guides, or Advanced Placement syllabi in which high school students are enrolled; and
• must be directed by a teacher.

Public University, Community College, and Private College Courses
• Courses taken for high school graduation requirements at community colleges and private or public colleges/universities are exempt from the 135 or 150 instructional hours with the exception of the following courses required for high school graduation, which must be taken at the high school or middle school where indicated:
  - English I, II, III, IV;
  - Algebra I, Algebra II, Geometry, and any higher level mathematics course with Algebra II as the prerequisite that will be used to fulfill the fourth mathematics requirement or Integrated Mathematics I, II, III (These mathematics courses may be taken in middle school.)
  - Biology, Earth/Environmental Science, and a physical science course that is used to fulfill the third science requirement;
  - Civics and Economics, US History, World Studies;
  - first year of a Second Language (This Second Language course may be taken in middle school);
- second year of the same Second Language (This Second Language course may be taken in the middle school.); and
- one credit of Health/Physical Education.

- Beginning in the 2007-08 school year, students who pass mathematics or foreign language courses during grade 6-8 that are described in the North Carolina Standard Course of Study for grades 9-12 must achieve level III or IV on an EOC, if available, to meet that high school graduation requirement. High school mathematics and foreign language courses taken in grades 6-8 which do not have an EOC shall use high school course codes and shall be aligned to the North Carolina Standard Course of Study for grades 9-12. The courses will count toward graduation requirements, but the students’ GPA will be computed with courses taken during the high school years.

- Students are strongly encouraged to complete at least one unit of mathematics credit in their final year of high school.

- Each local superintendent may grant a waiver to allow students to take the courses listed above at the Public University, Community College, and Private College and exempt them from the 135 or 150 instructional hour requirement, if these courses are not available to the student at his or her local high school. Courses taken at a Community College that have a corresponding end-of-course assessment at the high school require that the assessment be taken.

- Each local superintendent shall ensure that all required and elective courses have sufficient rigor, breadth, and depth to be awarded high school credit.

An online course qualifies for course credit if it meets the following requirements:

- The NC Standard Course of Study competency goals and objectives must be adopted, where available. Nationally validated standards for AP and IB must be used, where available.

- In the absence of a Standard Course of Study curriculum, the course must be designed such that a typical student would take 135-150 hours to complete. The principal, in consultation with a teacher certified in that content area, is ultimately accountable for determining whether the course is of sufficient depth and breadth and meets the state and/or nationally developed criteria for awarding credit.

- Where available, end-of-grade tests, end-of-course tests, and post assessment must be used as an indicator of student mastery.

- Where statewide assessments are not available, the course must be DPI staff-and/or peer-evaluated before posting.

Credit may not be awarded for school bus driving, office assistance, teacher assistance, or laboratory assistance.
High School Science Courses Taken in the Middle School: Considerations for Extending Policy Beyond Mathematics and Foreign Language

History
Current State Board of Education Policy HSP-M-001 adopted by the State Board of Education in May, 2007

- Beginning in the 2007-08 school year, students who pass mathematics or foreign language courses during grade 6-8 that are described in the North Carolina Standard Course of Study for grades 9-12 must achieve level III or IV on an EOC, if available, to meet that high school graduation requirement. High school mathematics and foreign language courses taken in grades 6-8 which do not have an EOC shall use high school course codes and shall be aligned to the North Carolina Standard Course of Study for grades 9-12. The courses will count toward graduation requirements, but the students’ GPA will be computed with courses taken during the high school years.
- Students are strongly encouraged to complete at least one unit of mathematics credit in their final year of high school.

Issues with Existing Policy
Timeline of Policy

- May 2007 - Policy adopted for implementation School Year 2007-08
  - Communication to Field—May 2007 and beyond
  - Registration for School Year 2007-08 had already occurred
- Development of course codes to support policy
  - (May- September) Discussions on best way to code mathematics and second language course to support policy
- Communications sent to field September 2007
  - After registration had occurred

Guiding Principles for High School Courses Taken at Middle School

The following principles should be considered in allowing/offering high school courses to be taken in middle school:

- **Access and Equity** - Acceleration provides a cumulative educational advantage. Numerous studies have shown that opportunities for accelerated and rigorous courses have been inequitably distributed in the past. Districts should establish a coherent plan, extending across grade levels, which would enable a higher proportion of students to benefit from accelerated study. By treating all middle school students as potential participants, they would expose all students to the documented benefits of a rigorous and challenging curriculum. LEAs accelerating students in any discipline should be required to review their policies and practices to be sure that they are promoting equity in access to these courses and that there are opportunities to enter advanced courses even for students who may not have been accelerated in the earlier grades.
A further equity consideration is to ensure that middle schools offering high school courses have the resources to ensure that the courses are substantially equivalent to the same courses offered at the high school. This includes facilities, materials, participation in district-wide common assessments, and teacher opportunities for professional development. Middle school teachers should plan with high school teachers of the same courses to ensure equitable opportunities to learn and appropriate preparation for advanced courses are offered to both groups of students.

- **Teacher Preparation** - Teachers of high school courses at the middle school should be licensed and fully qualified to teach the high school course.

- **Balanced Middle School Curriculum** - Research studies have shown that middle school students benefit from a balanced curriculum including adequate time for all disciplines while testing incentives have led to overemphasis on the tested subjects. It is important to accomplish acceleration by accelerating and compacting the middle school curriculum rather than omitting subjects or topics which will be needed later.

- **Rigor** – When making decisions to accelerate students in middle school, the LEA should plan across schools and grade levels to ensure the rigor of the high school program throughout and including the final year. Numerous studies show the importance of rigor in the final year of high school to be an important factor in college success.

## Rationale

**SCIENCE**

Rigorous high school science courses particularly Chemistry, Physics and AP Sciences are associated with readiness for and success in college-level work in several recent studies (ACT, 2007; Adelman, 2006). Yet, many North Carolina students do not take these courses.

The intent of adopting a policy to allow high school science courses to be taken at the middle school should be to increase enrollment in physics, chemistry, and other advanced science courses. Currently, three science courses are required for graduation and many students do not have room in their schedules to pursue more science. Others have not had their interest in science encouraged. Depending on how a new policy allowing high school science in middle school is written and implemented, it could have a strong impact on future enrollments in higher level science in high school and beyond. Allowing some high school courses to be taken for high school credit at middle school while continuing to require three science courses in high school will be most likely to produce the stronger globally competitive scientific literacy that is needed in the 21st century.
Current Programs  
In North Carolina there are relatively few middle grades students taking high school level science courses compared to the numbers taking Algebra, but these courses are offered to some middle school students. 

A small number of magnet middle schools offer Earth/Environmental Science to their higher performing eighth grade students. There are also eighth grade students taking physical science, a small group taking biology, and approximately 45 sixth, seventh, and eighth grade students taking chemistry.

Considerations for Implementation  
Many of our middle schools have abandoned the balanced curriculum concept, opting instead to devote more instructional time to the tested areas of mathematics and reading. However, with end-of-grade science tests becoming operational in 2007-08, there will be pressure to increase focus on science. The principals who have been proactive in this effort should see reasonably acceptable achievement results from the first years of science testing. Those who have not dedicated sufficient instructional time to science may see lower science scores and ultimately devote more time and resources to this area. Without a strong preparation in elementary and middle school science, the majority of students will lack the background knowledge and experiences to be as successful as they could be in rigorous high school science courses.

Safeguards should be considered in four areas to ensure the quality and integrity of any high school courses offered in middle school. These are teacher preparation, laboratory facilities, instructional time and student assignment.

- Teacher Preparation—Teachers of high school science courses at the middle school should have the same license requirements and opportunities for further professional development in their content as those teaching the course at the high schools. Middle school science teachers should plan with the high school teachers of the same courses to ensure equitable opportunities to learn and appropriate preparation for advanced science courses are offered to both groups of students.

- Laboratory Facilities—A laboratory component requires adequate facilities to engage students in appropriate activities. This component is embedded in the goals and objectives of the North Carolina Standard Course of Study and a laboratory science course is part of the minimum entrance requirement for the University of North Carolina. Laboratory experiences are also required to prepare students for success in AP and IB science courses. Though a middle school science room does not necessarily have to mirror a high school lab, a safe learning environment should be provided with the proper equipment, including technology, to enable middle school students to complete the same or similar laboratory investigations as would be completed by high school students in the same course.
Instructional Time—High school courses offered in middle school should be held to the same standards as those offered at the high school. There should also be evidence that all students are given adequate opportunities to learn the Standard Course of Study for grade 6 – 8 in order to provide a solid foundation for students when they enroll in high school science courses.

Student assignment—Student assignment to advanced courses is often done haphazardly and reflects teacher and community cultural biases rather than best practices. Often perceived home environment is used as a proxy for achievement and those from wealthier families are more likely to be placed in accelerated courses than others with the same achievement scores. (Stone and Tuba, 1999; Stone, 1998) Middle schools accelerating students in any discipline should be required to review their policies and practices to be sure they are promoting equity in access to these courses.

Recommendations

Recommendations for offering High School Science Courses in Middle School:

1) Teachers should be licensed and fully qualified to teach the high school course.
2) High school science courses should be in addition to, not in place of, the middle school standard course of study in science which may however be compacted. The middle school students will still need to be fully prepared for the 8th grade end-of-grade science test required by NCLB.
3) The course may be used to meet a particular high school science course requirement (such as the requirement for a biology course).
4) Encourage 3 credits in science to be taken during the high school years including chemistry, physics, and other advanced courses.
5) Courses should meet the same assessment and time requirements as required for credit in high school courses. (i.e. EOCs, 135 hours, and local requirements such as common assessments, benchmark testing.)
6) Laboratory facilities should meet safety requirements and state and national guidelines for laboratory equipment and expendables to allow the same opportunities for laboratory work as the high school laboratories in the LEA.
7) High school courses should be open to all middle school students, not just a selected group.
References


