

APPENDIX

Curriculum Analysis of Courses Paired with AP Courses

by
Hinshaw & Culbertson LLP
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I. WORLD HISTORY

A. *The District's World History Courses – An Overview*

Courses offered by the CCPS include World History, World History Honors, and AP World History. World History, World History Honors, and/or AP World History may be taken as “stand-alone” courses at certain schools or through dual enrollment or the Florida Virtual School. Students enrolled in AP World History normally receive credit for World History Honors for work performed during the first term of the course. Counselors, parents and students indicated that some students in the district received credit for Eastern and Western Heritage Honors (Course #2100460) for their first term of AP, despite the fact that this course is not listed in the district’s High School Course Offerings booklet. There are students who have Eastern and Western Heritage or the honors equivalent in their academic history, but these course were transferred from another district or state. In addition, in 2001, CCPS awarded a total of 17 students credit for Eastern and Western Heritage Honors. In 2002, CCPS awarded 8 students credit for the course; and, in 2003, only 3 students were awarded credit for Eastern and Western Heritage Honors. Thereafter, CCPS has not awarded credit to students for Eastern and Western Heritage or the honors equivalent which suggests that the practice of pairing the course with World History was been discontinued several years ago.

B. *FDOE Standards – World History Standard Track / World History Honors*

As a threshold matter, the FDOE standards for World History and World History Honors courses are identical, but for the requirement that “[t]he district shall develop a description of additional requirements to provide for in-depth or enriched study of the course requirements” for the Honors course. The FDOE standards require that the following content must be covered in any World History course (whether standard track or Honors):

- time-space relationships
- prehistory rise of civilization
- cultural universals
- development of religion and the impact of religious thought
- evolution of political systems and philosophies
- influence of significant historical figures and contemporary world events

In addition, the FDOE mandates that World History courses must comport with the Sunshine State Standards and cover material that will ensure that a student who has successfully completed the course will:

1. **Demonstrate understanding of the influence of physical and cultural geography on the development of civilizations and nation-states.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.2.4.1; SS.A.2.4.4; SS.A.2.4.3; SS.B.2.4.1; SS.B.2.4.2; SS.B.2.4.3; SS.B.2.4.4; SS.B.2.4.5; SS.B.2.4.6; SS.B.2.4.7)
2. **Demonstrate understanding of the impact of significant people, ideas, and events on the development of values, traditions, and social, economic, and political institutions of civilizations and nation-states.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.2.4.4; SS.A.2.4.6; SS.A.2.4.7; SS.A.3.4.5; SS.A.3.4.6; SS.A.3.4.7; SS.A.3.4.8; SS.A.3.4.9; SS.A.3.4.10; SS.C.1.4.1; SS.D.2.4.6)
3. **Demonstrate understanding of current and historic events in relation to the experiences, contributions, and perspectives of diverse cultural and ethnic groups, including African-Americans and the Holocaust.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.2.4.5; SS.A.2.4.8; SS.A.2.4.10; SS.A.2.4.11; SS.A.3.4.1; SS.A.3.4.2; SS.A.3.4.3; SS.A.3.4.4)
4. **Demonstrate understanding of the processes used to create and interpret history.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.1.4.1; SS.A.1.4.4)
5. **Demonstrate understanding of the interactions among science, technology, and society within global historical contexts.** (Courses must do this by providing instruction in the sub-topics covered by SS.A.4.1.4.2; SS.B.1.4.4)
6. **Apply research, study, critical-thinking, and decision-making skills and demonstrate the use of new and emerging technology in problem solving.** (Courses must do this by providing instruction in the subjects covered by SS.A.1.4.3; SS.B.1.4.1; SS.B.1.4.2)

The FDOE provides that if student earns credit for taking World History, s/he may not also earn credit for Eastern and Western Heritage or for World History Honors.

C. CCPS World History Curriculum Documents

The Collier County Public Schools “World History Curriculum Document” and the corresponding Curriculum Document for the Honors both include an instructional guide and course pacing outline. The Appendix of those documents includes excerpts and suggested lesson plans from the “History Alive” program; also included are descriptions of kits that provide materials and exercises geared toward experiential learning. The Curriculum Documents are organized around and parallel the FDOE requirements and standards, and to the extent the

courses within the district comply with the Curriculum Document, they meet or exceed the FDOE standards.

The Curriculum Document’s instructional guide and course pacing outlines for the standard World History course and the World History Honors course are identical. But for the fact that the Honors students do not study the chapters in their text in exactly the same order as the students in the standard track course, both groups of students follow the same progression with respect to the actual content. The instructional guide suggests that the standard World History students read one more chapter in their textbook than do the Honors students (Chapter 27). However, it is our understanding that this is due to the fact that the Honors students are issued different books than those issued to the standard World History students.

Inasmuch as FDOE mandates that a district “develop a description of additional requirements to provide for in-depth or enriched study of the course requirements” for Honors courses, the district is not in compliance if the World History Curriculum Document is the sole source for designating the required curriculum for Honors coursework.¹ It should also be noted that the Curriculum Document states that it is merely a “guide” and assures teachers that it is “not a mandate.” (page 5). This suggests that teachers are free to disregard the Curriculum Document if they wish. As a result there is lack of assurance that honors work is being done across the district. That being said, the teachers who were interviewed and the course materials provided by the teachers indicate that this is not the practice in the district.

D. The District’s High School Course Offerings Booklet

In addition to the Curriculum Document, the District School Board of Collier County’s 2006-2007 High School Course Offerings booklet provides narrative course descriptions. A close reading of the descriptions for the World History and World History Honors courses in the High School Course Offerings booklet reveals no substantive difference between the two courses, although the order in which course content is listed is not identical. The Honors course description differs only in terms of word choice and order. The most notable difference appears to be that the World History Honors description includes the following statement: “Implicit in this is an understanding of the historical method, the inquiry process, historical reasoning and interpretation, and the issues of external and internal validity.” The Honors description also includes a sentence which begins: “Appropriate concepts and skills will be developed in connection with the following content” – followed by a list of the same content that appears in the standard course description. (One might reasonably assume that in the standard course, too, appropriate concepts and skills will be developed in connection with the students’ study of the material.)

With the exception of the two distinctions noted above, the difference between the descriptions of World History and World History Honors in the High School Course Offerings booklet comes down to utilizing more sophisticated language in describing the Honors course, and the prerequisite of a teacher recommendation for placement in the Honors section.

¹ The Curriculum Documents for World History and World History Honors inexplicably state that “As in the past, teachers of *American* History Honors are expected to accelerate, expand and enrich the curriculum beyond the textbook and traditional instructional approaches. This appears to be a typographical error.

E. AP World History

The FDOE course description for AP World History is much more succinct than that for World History standard track and Honors. It provides that the AP course should incorporate the content specified by the Advanced Placement Program, but notes that the content of the AP course must include the instruction mandated by the state's World History graduation requirement. According to the FDOE, an AP World History course must equip students to evaluate and analyze course material, and to "[a]pply processes of critical and creative thinking to evaluate cultural and intellectual developments and interactions among and within societies."

The description of AP World History in the High School Course Offerings booklet incorporates this "critical thinking" requirement, designating that the course will help students advance their understanding of the course material "through a combination of selective factual knowledge and appropriate analytical skills." The content described in the High School Course Offerings booklet incorporates the FDOE standards, although it uses different words to describe that content. The language in the Course Offering booklet mirrors closely the language used by the College Board in its AP course descriptions. The Course Offering description of AP World History focuses heavily on the "process" to be employed in the course, stressing that students will develop an understanding of the role of culture, social institutions, demographics and technology in the development of societies.

F. AP College Board Requirements

The College Board has historically left it to individual school districts to develop their own curricula for courses labeled "AP." However, as noted earlier, the College Board has instituted a new program, effective for the 2007-2008 school year, whereby any school district wishing to designate its courses as "AP" must submit its AP course materials for audit. Schools whose programs meet the expectations developed by college faculty in conjunction with the College Board will receive authorization to designate the courses which comply with those expectations as "AP." Although the College Board does not mandate a particular curriculum, the AP Course Audit program provides AP teachers with its "expectations" for the course, and offers to assist teachers in producing an acceptable syllabus/program. The organization's website describes the procedure as follows:

Each AP teacher is required to submit an electronic copy of his or her syllabus outlining the course of study to be followed for the 2007-08 academic year. Teachers' syllabi must provide clear and explicit evidence that the AP Course Audit requirements are included in their courses.

Within two months of submitting AP Course Audit materials, schools will receive authorization for qualifying courses to use the "AP" designation on student transcripts.

All AP courses in the district are in the process of being audited by the College Board. If the material provided as part of the instant inquiry is similar to that which was provided as part of the College Board audit, it is likely that these course will be approved by the College Board.

G. *World History Course Content as Revealed in Teachers' Syllabi & Course Materials*

Course materials generated by Mr. Barden Keeler (Palmetto Ridge), Mr. Michael Stuart (Gulf Coast), Mr. Sponseller (Barron Collier), Ms. Darah Perini (Naples), Dr. Janet Testerman (Naples High School) and Ms. Vicki Scott (Barron Collier) were reviewed and evaluated. These instructors teach World History, World History Honors, and AP World History within the district.

The materials and syllabi for the AP courses suggest a truly rigorous approach to the material, and stress the serious, analytical nature of the courses. The AP course outlines and syllabi reveal that these courses are largely built around preparation for the AP exam students will take in May, and that the courses are structured to immerse students in the material that will be tested on that exam. As Mr. Michael Stuart (Gulf Coast) tells students in his Course Outline and Syllabus for AP World History:

Exams, quizzes and assignments are given weekly in order to promote greater absorption of information and enhance students' understanding of the AP testing format. These exams are "targeted" to essential material and AP testing skills. Students are in training for the exam from the time the school year begins...Essay writing will be continual, incorporating all the benchmarked skills and standards required by the College Board and ETS. Targeting these skills and standards is a weekly process. (emphasis in original)

Another instructor, Dr. Janet Testerman, reminds her students that her AP World History course is a year-long "serious commitment to scholarship" and that "[v]ocabulary tests will be given for each chapter as well as multiple choice tests and practice AP exams. Students must also be prepared to write and rewrite several essays in preparation for the free response section of the AP exam."

Inexplicably, Dr. Testerman explains to her AP World History students that those who earn a C or above in the course "will receive AP GPA weighting in either World History Honors or Eastern and Western Heritage Honors² during the first term and for AP World History during the second term." As a result, students sitting together in the same class doing the same work according to the same syllabus may receive credit for different courses for the first term. The reason for awarding students credit for different courses, although not explicit, appears to be driven by whether the student has previously received credit for World History Honors.

The materials and syllabi examined for World History Honors reveal no targeted or heightened expectations for Honors students as distinguished from standard track students. This

² The Eastern and Western Heritage course is indistinguishable from World History as defined by FDOE. The course does not, however, appear in the Course Offerings booklet as an available course. According to FDOE, the course is intended for 9th graders. Moreover, the FDOE standards expressly preclude a student from receiving credit for the Eastern and Western Heritage Course if the student has already taken and received credit for World History or World History Honors. During the interview stage of the underlying inquiry, counselors and parents indicated that it remains the practice of the district to enroll students in the Eastern and Western Heritage course (as the paired non-AP course) where the students had previously taken World History Honors. However, no students were included in the report produced by the Information Technology Department in response to our request for names of the students who have been credit with such a course during the period of 2002 through the present.

situation is at odds with the FDOE standard, which directs school districts to develop enhanced requirements for Honors coursework. Whether individual teachers decide to develop their own heightened standards is largely irrelevant to the legal issue of the school district's duty to promulgate such standards on a district-wide basis.

H. Conclusion – World History

When World History Honors is paired with AP World History, there is no question that heightened course requirements are imposed on the enrolled students. Nevertheless, the school district is not in compliance with the FDOE mandate that a district develop a description of additional requirements for World History Honors courses that will ensure in-depth or enriched study of the course content requirements.

An anomalous situation exists with respect to AP World History, to the extent the district has awarded credit for different courses to students taking World History Honors as a paired non-AP course. Although the district no longer awards credit to some students for Eastern and Western Heritage Honors while awarding credit to other students for World History Honors, the district should ensure that it does not resurrect the practice of awarding credit for different courses to students who are taking the same course that is being paired with AP World History, receiving the same instruction, and completing the same work.

II. AMERICAN/U.S. HISTORY

A. The District's American/U.S. History Courses – an Overview

The district offers courses in American History, American History Honors, and AP U.S. History. Both American History and American History Honors may be taken as “stand alone” courses. Students enrolled in AP U.S. History receive credit for American History Honors for the first term of work in the AP course.

B. FDOE Standards – American History Standard Track / American History Honors

As with World History, the FDOE standards and requirements for American History and American History Honors are identical but for a requirement that school districts offering American History Honors “shall develop a description of additional requirements to provide for in-depth or enriched study of the course requirements.”

The FDOE mandates that all courses in American History (whether standard track or Honors) must include the following content:

- review of U.S. History prior to 1880
- time-space relationships
- significant events and trends in the development of United States culture and institutions
- impact of expansion on the United States origin of United States documents, ideals, and characteristics

- the changing role of the U.S. Constitution
- political, social, and economic conflicts and resolutions
- technological and urban transformation of the United States
- changes in lifestyles of United States citizens
- changes in United States foreign policy from regional to global
- cyclical characteristics of United States economic development
- contemporary domestic and foreign issues that affect the United States

In addition, the FDOE mandates that American History courses must comply with the requirements imposed by the Sunshine State Standards, and cover material that will ensure that a student who has successfully completed the course will:

1. **Demonstrate understanding of the early historical development of the United States.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.4.4.1; SS.A.4.4.2; SS.A.4.4.3; SS.A.4.4.4; SS.A.4.4.5; SS.A.4.4.6)
2. **Demonstrate understanding of the impact of significant people, ideas, and events on the development of values, traditions, and social, economic, and political institutions in the United States.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.5.4.1; SS.A.5.4.3; SS.A.5.4.4; SS.A.5.4.5; SS.A.5.4.6; SS.A.5.4.7; SS.A.5.4.8; SS.D.2.4.3)
3. **Demonstrate understanding of the significance of physical and cultural geography on the development of the United States society.** (Courses must do this by providing instruction in the sub-topics covered by: SS.B.1.4.3; SS.B.1.4.4; SS.B.1.4.5; SS.B.2.4.1; SS.B.2.4.2; SS.B.2.4.3; SS.B.2.4.5; SS.B.2.4.6; SS.B.2.4.7)
4. **Demonstrate understanding of current and historic events in relation to the experiences, contributions, and perspectives of diverse cultural and ethnic groups, including slavery, the passage of slaves to America, abolition, and the contributions of African Americans to Society.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.1.4.2; SS.A.5.4.2; SS.A.1.4.4; SS.C.2.4.3)
5. **Demonstrate understanding of the processes used to create and interpret history.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.1.4.1; SS.A.1.4.3; SS.A.1.4.4)
6. **Demonstrate understanding of the interactions among science, technology, and society within the context of the historical development of the United States.** (Courses must do this by providing instruction in the sub-topics covered by: SS.A.1.4.2; SS.B.2.4.4)
7. **Apply research, study, critical-thinking, and decision-making skills and demonstrate the use of new and emerging technology in problem-solving.**

(Courses must do this by providing instruction in the sub-topics covered by: SS.B.1.4.1; SS.B.1.4.2)

The FDOE provides that a student who has earned credit for American History may not also earn credit for American History Honors.

C. CCPS American History Curriculum Document

As with the CCPS World History Curriculum Document, both the CCPS American History Curriculum Document and its counterpart, the Curriculum Document for American History Honors, include an instructional guide and course pacing outline, as well as an appendix with resources, excerpts, and suggested lesson plans from the “History Alive” program. Like the World History Curriculum Document, this document identifies itself as a “guide” and “not a mandate.”

One difference between the Curriculum Documents for World History and those for American History is the fact that the American History Document provides at least some direction with respect to Honors courses. It states that “As in the past, teachers of American History Honors are expected to accelerate, expand and enrich the curriculum beyond the textbook and traditional instructional approaches.”³

As with the World History Curriculum Document, the American History Curriculum Documents’ topics, suggested activities, and suggested resources are identical as to the standard track and Honors track courses, although the Honors students have different reading assignments, presumably correlating to the location of the subject matter being studied in a different textbook. The Honors students appear to be using a text with only 26 chapters, whereas the standard track students apparently have a text with at least 34 chapters. Again, although the Curriculum document does not specify, this appears to be due to students being issued different textbooks depending on the level of course being taken.

Overall, the content of the American History Curriculum Documents (both standard track and Honors) suggests that these courses follow the Sunshine Standards and appear to address all required components of the state standards for American History, although the document’s directive that teachers of Honors courses should “accelerate, expand and enrich the curriculum beyond the textbook and traditional instructional approaches” arguably falls short of the FDOE-mandated “description of additional requirements” that school districts are required to provide.

D. The District’s High School Course Offerings Booklet

Although the descriptions of American History and American History Honors courses in the High School Course Offerings booklet appear to differ at first blush, a closer examination reveals that not only is there little difference between the two, both simply identify the content mandated by the FDOE requirements and the Sunshine Standards. Thus, there is no discernable difference in content between the standard track course and the Honors course.

³ The identical statement appears in the Curriculum Document for World History; the World History document is silent as to World History Honors enrichment.

E. *AP American History*⁴

The FDOE course description for AP U.S. History is much more succinct than the description of American History and American History Honors. It states that an AP U.S. History course must cover the content specified by the College Board AP program.

The FDOE description explains that the course must equip students with analytical skills that allow them to “derive conclusions” based on the material studied, and to apply “critical and creative thinking” to evaluate the effect of historical figures, ideas, and events. They must be able to evaluate the relationships between “science, technology and society,” and to hypothesize about the impact of those relationships on “historical change in the United States.” The emphasis – as with AP World History – is on critical thinking, exemplified by the ability to synthesize information, to analyze historical occurrences in the context of their influence on the development of society and evolving institutions, and to formulate reasoned hypotheses based on the material studied.

The description of the AP American History course that appears in the High School Course Offerings booklet focuses on the kind of analytical approach required by the FDOE, and warns students that the course is meant to be the equivalent of a freshman college course that will require them to devote considerable time to homework and study. The description in the High School Course Offerings booklet closely follows the language used by the College Board in explaining the appropriate methodology to be utilized in an AP U.S. History Course. The College Board’s description of an AP American History course reads, in part, as follows:

The AP program in United States History is designed to provide students with the analytical skills and factual knowledge necessary to deal critically with the problems and materials in United States history... Students should learn to assess historical materials - their relevance to a given interpretive problem, their reliability, and their importance - and to weigh the evidence and interpretations presented in historical scholarship. An AP United States History course should thus develop the skills necessary to arrive at conclusions on the basis of an informed judgment and to present reasons and evidence clearly and persuasively in an essay format.

The High School Course Offerings booklet describes the AP course, in part, as follows:

The purpose of this course is to provide the opportunity to develop the analytical skills and factual knowledge necessary to deal critically with the problems, content, and materials of American historical development by focusing on persistent themes and change in history. . .Emphasis is placed on critical and evaluative thinking skills, essay writing, interpretation of original documents,

⁴ Although the Course Offerings booklet refers to the course as “AP American History,” the College Board refers to an AP course in this subject area as “AP U.S. History.” The FDOE similarly refers to the AP course as “U.S. History.” The materials from CCPS teachers that were reviewed for this memo refer to the AP level course as “AP U.S. History.”

and historiography. Students will master a broad body of historical knowledge, demonstrate an understanding of historical chronology, effectively use analytical skills of evaluation, use historical data to support an argument or position, and interpret and apply data from original documents...

The district materials concerning the AP American History courses suggest that the courses are designed in a way that meets FDOE and College Board standards.

F. American History Course Content as Revealed in Teachers' Syllabi and Course Materials

Course materials from Mr. Robert Topping (Palmetto Ridge), Ms. Audrey Cannon (Gulf Coast), Mr. Walters (Barron Collier), and Mr. Robert Garvie (Naples) were reviewed and evaluated. These instructors all teach AP U.S. History in the CCPS.

Review of Mr. Topping's syllabus reveals that the focus in his AP U.S. History course is quite different from that in the American History and American History Honors courses. For example, students in his course spend a substantial amount of time studying the pre-revolutionary war era. In the Collier County Curriculum Document for American History and American History Honors, only 5 days are allocated for the history of the country up through the Civil War era.

Topping's AP course does not address some of the content designated in the Curriculum Document for American History, including units XIII (Middle East and China), XIV (Afghanistan, Global Interdependence and Latin America) or XV (1990's, the New World Order, Information Age, and European Union – which includes, *inter alia*, the Gulf War, immigration issues, and NAFTA). However, it should be noted that the FDOE content requirement for AP U.S. History states only that the content “should include, but not be limited to” the content specified by the AP program. Topping's program of instruction is clearly geared toward preparing students for the AP exam at the end of the year, and for developing strong analytical skills.

Ms. Cannon's course description makes clear to students that they will learn “how to assess texts, identify issues and problems, infer connections, weigh evidence and interpretations, deal critically with materials, problem solve, present, and debate.” Students are required to learn appropriate terminology, to apply information to solve problems, to draw inferences from the material studied, and to synthesize what they learn by “creatively or divergently applying prior knowledge and skills to produce a new or original whole.” Students are required to write critical analyses of text materials and to make oral presentations of their material. Her syllabus follows the same general order and content as that of Topping.

Mr. Walters builds his course around materials from the College Board. Like the other AP teachers, he focuses on analytical skills and writing, and requires that his students take multiple essay-based quizzes and tests throughout the term.

Mr. Garvie also requires extensive writing of his students, including take home essays to assess a student's understanding of material covered in class.

G. Conclusion – American History / AP U.S. History

The American History courses, both standard track and Honors track, address the content required by the FDOE and appear to be in full compliance with state standards.

All of the AP U.S. History teacher materials reviewed indicate that the courses are designed to comply fully with the FDOE standard, therefore they appear to comply with Florida law. Because that FDOE standard expressly adopts the College Board content, the courses appear to meet the College Board standards for AP U.S. History.

To the extent the district chooses to pair AP U.S. History with another course it should ensure that it does not award credit for different courses to students who are taking the same class, receiving the same instruction, and completing the same work.

III. CALCULUS⁵

A. The District's Calculus Program – an Overview

The district offers 3 separate Calculus courses: Honors Calculus, AP Calculus AB, and AP Calculus BC. All three Calculus courses have separate entries in the Course Offering booklet. In fact, however, as explained below, students wishing to take Calculus must effectively commit to a full year, and must choose to pursue either AP Calculus AB, or AP Calculus BC.

B. FDOE Standards – Calculus Honors

The district does not offer a standard track Calculus course, but instead offers only “Calculus Honors” which it designates with the number 1202300. This is an erroneous pairing of course title and number. Under the FDOE system, 1202300 is the state’s designation for standard track Calculus, not for Calculus Honors. The FDOE also deems the state’s standardized course code numbers to be ‘essential.’ The FDOE website includes the following language:

All school district and postsecondary documents, forms, automated terminal displays, or hard copies must use only the state course numbers and titles listed in this document.

Exceptions are made for private schools, for students dually enrolled in postsecondary institutions, and for students in career/technical programs.

Although the FDOE does not permit changes to the titles and designations of courses, school districts do have the ability to assign weight to courses. 1003.437 F.S. The FDOE recognizes Calculus as being a Level 3 course which means the course is intended to be more

⁵ The layout for this section of the report is slightly different from previous sections due to distinct differences in the nature of the course offerings in this subject area (overlap of AP Calc H/AB and AP Calc AB/BC).

rigorous and challenging than the general math courses. Thus, the district can properly weight the course as an honors level course. To the extent the district requests and receives authorization from the FDOE for official recognition of a course with the title “Calculus Honors”, then it may properly identify the course as such. Otherwise, it should discontinue use of this title, but need not adjust the weight given to the course for purposes of calculating class rank.

C. FDOE Standards – Calculus

The FDOE description of Calculus (standard track only) requires that the following content be covered:

- functions
- limits and continuity
- derivatives and their applications
- antiderivatives
- definite integrals and their applications

In addition, a Calculus course must comply with Sunshine State Standards and cover material that will ensure that a student who has successfully completed the course will:

- 1. Work with functions graphically, numerically, and analytically; and demonstrate understanding of the connections among these multiple representations.** (Courses must do this by providing instruction in the sub-topics covered by MA.D.1.4.1; MA.D.1.4.2; MA.D.2.4.1)
- 2. Apply the theory of limits and continuity to solve problems.** (Courses must do this by providing instruction in the sub-topic covered by MA.A.2.4.1)
- 3. Demonstrate understanding of the meaning of derivatives, apply rules of differentiation, and use derivatives to solve varied problems.** (Courses must do this by providing instruction in the sub-topics covered by MA.B.2.4.1; MA.B.2.4.2; MA.B.4.4.1; MA.C.2.4.1)
- 4. Find the general antiderivative of a function.**
- 5. Demonstrate understanding of definite integrals and use integrals to solve varied problems.** (Courses must do this by providing instruction in the sub-topics covered by MA.B.1.4.1; MA.B.4.4.1; MA.C.2.4.2)

The FDOE description of Calculus provides that “[c]ourse student performance standards must be adopted by the district, and they must reflect appropriate Sunshine State Standards benchmarks.”

D. FDOE Standards – AP Calculus AB and AP Calculus BC

The FDOE description for the AB course states that the course should teach the content required by the College Board AP program. The FDOE description further provides that students who successfully complete the course must be able to do the following:

- Identify and apply properties of algebraic, trigonometric, exponential, and logarithmic functions.
- Apply the concept of limits to functions.
- Determine derivatives of algebraic, trigonometric, exponential, and logarithmic functions.
- Determine derivatives of the inverse of a function.
- Determine the relation between differentiability and continuity.
- Demonstrate an understanding of the application of the derivative to problem situations.
- Identify increasing and decreasing functions, relative and absolute maximum and minimum points, concavity, and points of inflection.
- Determine antiderivatives of algebraic, trigonometric, exponential, and logarithmic functions.
- Apply antiderivatives to solve problems.
- Use the techniques of integration.
- Determine approximations of definite integrals using rectangles or trapezoids.
- Apply knowledge of integral calculus to find the area between curves and the volume of a solid of revolution.

The description for the AP Calculus BC course is nearly identical, except that the description of the AB course states that it is intended to provide “a study” of algebraic and transcendental functions and the general theory and techniques of calculus, whereas the BC course states that it will provide “an extensive study” of the same concepts.

E. CCPS “Mathematics Curriculum Calculus H/AB Course Description/Standards”

Despite the FDOE requirement mandating district-wide standards, the CCPS Mathematics Curriculum and Description Standards for Calculus H/AB does not provide any description for Calculus (Honors or standard track). Rather, it provides only a description for AP Calculus AB. It is readily apparent from review of district materials that Calculus Honors is not a stand-alone course, but is instead merely a name used by the district to award credit for a student’s first term in the AP Calculus AB course – according to the CCPS “Curriculum and Pacing Guide – Mathematics Honors Calculus (120230) and AP Calculus AB (1202310)” document. The “Pacing Guide” explains that students who successfully complete the 1st term of

the AP Calculus AB course receive 1 credit for Honors Calculus. Thus, according to the Pacing Guide, the transcript of a student who successfully completes the entire course will reflect 1 credit of Honors Calculus and 1 credit of AP Calculus AB, with AP weighting assigned to both credits.

F. CCPS “Curriculum and Pacing Guide – Mathematics AP Calculus AB/BC”

According to the Pacing Guide document, students who enroll in the AP Calculus AB/BC course are enrolled for a full year, and receive instruction in both AP Calculus AB and AP Calculus BC. The course is designed with the expectation that students will take the AP Calculus BC exam at the end of the year.⁶

A student who successfully completes both terms of this course is awarded 1 credit for AP Calculus AB (first term) and 1 credit for AP Calculus BC (second term). However, the Pacing Guide indicates that even if a student successfully completes the first term, s/he will not receive any AP credit unless s/he also completes the second term.⁷ Instead, the Pacing Guide contemplates that a student who successfully completes the first term of the AP course receives only (non-AP) credit for Calculus Honors. The explanation given for this anomaly is that one of the chapters of material for AP Calculus AB (Chapter 6) is not fully covered until the second term of the course.⁸

Despite what is stated in the Pacing Guide with regard to the manner in which these courses are to be treated in the event the student fails to complete both terms, the high school administrators deny that this occurs within the district. To clear up any confusion in this regard, the Pacing Guide should be revised to ensure that such a practice does not occur.

G. The District’s High School Course Offerings Booklet

1. Calculus Honors

As previously noted, the High School Course Offerings booklet lists course number 1202300 as Calculus Honors, which does not match the FDOE title for that number. The description of this Honors course that appears in the High School Course Offerings booklet states that the purpose of the course is to provide a “*non-rigorous*” approach to differential and integral calculus. Topics shall include, but not be limited to elementary functions, limits and continuity, derivatives, differentiation, applications of the derivative, anti-derivatives, definite integral (sic) and applications of the integral.”⁹ The description of topics matches up with the FDOE description for standard track Calculus.

⁶ By contrast, students who take the Calculus H/AP College AB course are expected to take the AP Calculus AB exam at the end of the year.

⁷ Such a practice would be at odds with district policy as expressed in the Course Offerings booklet where, at page 29, the booklet states that “A student enrolled in a full credit course shall receive one-half credit if the student successfully completes either the first half or the second half of a full credit course, but fails to successfully complete the other half of the course and the averaging of the grades obtained in each half would not result in a passing rate for the year.”

⁸ Review of teacher materials suggests that the material missing in the first term is a single segment of a three-segment chapter.

⁹ The description of the course as having a “non-rigorous” approach to study of the subject seems curiously at odds with its Honors designation.

2. Advanced Placement Calculus AB

This course is described in the High School Course Offerings booklet as meeting the guidelines of the College Board AP program, with topics to include applications of properties of algebraic, trigonometric, exponential, and logarithmic functions; limits; derivatives of algebraic, trigonometric, exponential, and logarithmic functions; derivatives of the inverses of functions, the relationship between differentiability and continuity; tangent and normal lines; maxima and minima; integration; area between curves; and volumes of solids of revolution. This matches the material designated by the College Board for Calculus AB on its website, and also matches the material described in the FDOE description.

3. Advanced Placement Calculus BC

This course description tracks the FDOE standard, stating that the course provides an “extensive study of the general theory and techniques of Calculus” pursuant to the AP program’s designations for AB Calculus as well as sequences of real numbers, convergence, and solution of elementary differential equations. This exceeds the FDOE standard, and tracks the requirements set forth by the College Board for AP Calculus BC.

H. AP Calculus Course Content as Revealed in Teachers’ Syllabi and Coursework

Course materials from Mr. Moore (Palmetto Ridge) and Ms. Sharon Thoemke (Naples High School) were reviewed. Both of these instructors teach both levels of AP Calculus. The materials for each suggest that the courses instruct students on the material tested in the College Board AP Calculus exams for AB and BC, and therefore meet the standards imposed by FDOE.

I. Conclusion - Calculus

The district has mis-labeled state course number 1202300 as Calculus Honors, rather than titling this numbered course by its correct name: Calculus. The fact that the Pacing Guide and Instructional Guide indicates that students enrolled in AP Calculus AB/BC are denied any AP credit for successfully completing a term in the course, and are instead given only credit for Calculus Honors, creates confusion and draws attention to the mislabeled course. Finally, the listing of Calculus Honors in the district’s course offerings book is somewhat misleading, inasmuch as it appears that the course is not offered as a stand-alone course, but instead exists only as a credit-authorizing mechanism whereby students taking AP Calculus AB are able to earn 2 credits for the year-long AP course.

The district should take action to remedy these issues.

IV. BIOLOGY

A. *The District's Biology Program – an Overview*

The District offers courses in Biology 1, Biology 1 Honors, and AP Biology. The Biology 1 and Biology 1 Honors courses may be taken on a stand-alone basis either at certain CCPS schools or through dual enrollment or the Florida Virtual School. Most students enrolled in AP Biology receive credit for Biology 1 Honors for the first term of the course. Although Biology 2 Honors is listed in the High School Course Offerings booklet, the actual course is not included in any of the high schools' course selection sheets. A few students nevertheless receive credit for Biology 2 Honors for the first term of AP Biology. This apparently occurs if a student previously received credit for Biology 1 (as a stand-alone course). The FDOE prohibits the district from awarding a student credit for Biology 1 twice. Furthermore, although Biology 2 is recognized by the FDOE as a legitimate course and although the FDOE has designated Biology 2 as being a Level 3 course (i.e., rigorous and honors' level course), the title of "Biology 2 Honors" is not recognized by the FDOE.

B. *FDOE Standards – Biology 1 Standard Track / Biology 1 Honors*

The FDOE standards for Biology 1 and Biology 1 Honors are virtually identical, but for the mandate as to Honors courses that "[t]he district shall develop a description of additional requirements to provide for in-depth or enriched study of the course requirements." Both standard track and Honors Biology 1 must include the following content:

- the nature of science
- matter, energy, and chemical processes of life
- cells: biology, reproduction, and communication
- genetics: principles, molecular basis, diversity, and biotechnologies
- levels of organization, classification, and taxonomy
- structure, function, and reproduction of plants, animals, and microorganisms
- behavior of organisms
- interdependence of organisms, humans, and the environment
- biological selection, adaptations, and changes through time
- agricultural, food, and medical technologies and careers

Laboratory work involving scientific research, laboratory technologies, and safety procedures are required to be an integral part of the course.

Upon completion of the course, students must be able to:

1. **Apply knowledge of the nature of science and scientific habits of mind to solve problems, and employ safe and effective use of laboratory technologies.** (Courses must do this by providing instruction in the sub-topics covered by: SC.H.1.4.1; SC.H.1.4.2; SC.H.1.4.3; SC.H.1.4.4; SC.H.1.4.5; SC.H.1.4.6; SC.H.1.4.7; SC.H.2.4.1; SC.H.2.4.2; SC.H.3.4.1; SC.H.3.4.3; SC.H.3.4.4)

2. **Demonstrate understanding of the roles of matter, energy, and the chemical processes of life.** (Courses must do this by providing instruction in the sub-topics covered by: SC.B.1.4.1; SC.B.1.4.2; SC.B.1.4.7; SC.F.1.4.1; SC.F.1.4.3; SC.F.1.4.4; SC.G.1.4.3)
3. **Demonstrate understanding of the structure and processes of cells with emphasis on reproduction and communication.** (Courses must do this by providing instruction in the sub-topics covered by: SC.F.1.4.5; SC.F.1.4.8; SC.F.2.4.1)
4. **Demonstrate understanding of the principles of genetics with emphasis on the molecular basis of heredity, genetic diversity, and related biotechnologies.** (Courses must do this by providing instruction in the sub-topics covered by: SC.F.2.4.2; SC.G.2.4.3)
5. **Demonstrate understanding of the importance of levels of organization, classification, and taxonomy to the study of biology (e.g. ontogeny recapitulates phylogeny).** (Courses must do this by providing instruction in the sub-topic covered by: SC.G.1.4.1)
6. **Demonstrate understanding of the relationships of structure, function, and reproduction of selected plants, animals, and microorganisms.** (Courses must do this by providing instruction in the sub-topic covered by: SC.F.1.4.2)
7. **Demonstrate understanding of factors which affect the behavior of organisms.** (Courses must do this by providing instruction in the sub-topics covered by: SC.1.4.6; SC.F.1.4.7)
8. **Demonstrate understanding of the interdependence of all living things and the environment.** (Courses must do this by providing instruction in the sub-topics covered by: SC.G.1.4.1; SC.G.1.4.2; SC.G.1.4.3; SC.G.2.4.1; SC.G.2.4.2; SC.G.2.4.4; SC.G.2.4.5; SC.G.2.4.6)
9. **Demonstrate understanding of types of selection, variations, and adaptations, and how they lead to biological changes through time.** (Courses must do this by providing instruction in the sub-topics covered by: SC.D.1.4.3; SC.D.1.4.4; SC.F.2.4.3; SC.G.1.4.1; SC.G.2.4.3)
10. **Demonstrate understanding of the impact of agricultural (sic), food, and medical technologies on the quality of our lives and career opportunities.** (Courses must do this by providing instruction in the sub-topics covered by: SC.D.2.4.1; SC.H.3.4.2; SC.H.3.4.5; SC.H.3.4.6)

The FDOE prohibits a student who has earned credit in Biology 1 from earning credit in Biology 1 Honors.

C. FDOE Standards – Biology 2

It should be noted that FDOE does not acknowledge an Honors version of Biology 2, therefore no official course description is available for this course. Rather, the state recognizes only standard track Biology 2, designated as 2000330. This numerical designation is listed in the High School Course Offerings booklet as designating Biology 2 Honors. Florida mandates that schools use only the titles and state course numbers listed in the Florida Course Code Directory. In this case, CCPS has assigned a different name (Biology 2 Honors) to FDOE Course Number 2000330.

FDOE requires that a Biology 2 course provide instruction in the following:¹⁰

- implementation of scientific habits of mind
- application of scientific knowledge, methodology, and historical context to solve problems
- use of laboratory technologies
- terminology
- properties of life
- metabolic pathways
- chemical basis of heredity and biotechnology
- unity and diversity
- change mechanisms
- morphological differences
- relationships among individuals, populations, communities, and ecosystems
- connections between biology, technology, society, and the environment

The designation of requirements for what a student must know at the completion of the course (based on citations to Sunshine State Standards) is actually a sub-set of the requirements for Biology 1. In other words, every Sunshine State Standard topic that is listed for Biology 2 is also listed as a requirement for Biology 1, but Biology 1 adds *additional* requirements not mandated for Biology 2. This makes the designation of Biology 2 as an Honors course appear at first blush to be problematic, since a student in standard track Biology 1 is required under the Sunshine State Standards to, upon completion of the course, demonstrate knowledge of *more* topics than a student at the completion of Biology 2 Honors. That being said, the stated intent within the Sunshine Standard for the Biology 2 course is to “enable students to develop knowledge of biology by expanding and applying biological concepts introduced in 2000310 - Biology I or 2000320 - Biology I Honors.” Logically, the students would not be able to meet this goal if they have to cover all of the topic areas contained in the Biology 1 course.

¹⁰ Because all FDOE course descriptions reviewed for this analysis contain identical descriptions for the standard track and Honors track versions of courses, it is presumed that the standards for Biology 2 would apply equally to the CCPS course offering of Biology 2 Honors (if that were a legitimate course title).

D. CCPS Biology 1 Pacing Guide¹¹

The district's Pacing Guides for Biology 1 and Biology 1 Honors appear to be quite different, addressing the material in a different order, presumably to correspond to the different texts used in these courses. The content, however, is ultimately the same.

Matching the content in the Pacing Guides with the Sunshine Standards was difficult, inasmuch as the Sunshine Standards are, in some areas, highly detailed and even conclusory, making it impossible to determine for certain from the Pacing Guides whether the Biology 1 courses meet those standards. As an example, the Sunshine Standards require that students “understand that in the short run, new ideas that do not mesh well with mainstream ideas in science often encounter vigorous criticism and that in the long run, theories are judged by how they fit with other theories, the range of observations they explain, how well they explain observations, and how effective they are in predicting new findings.” It is simply impossible to discern whether concepts with this degree of specificity are incorporated into the CCPS curriculum. The most that can be said regarding standards such as this one is that the curriculum teaches students about the Scientific Method. Presumably instruction over the course of the term will lead to the kinds of conclusions stated in the Sunshine Standard quoted above.

The concrete items from the standard can, however, be matched with the Pacing Guides. For example, both Pacing Guides make clear that students receive instruction in “the roles of matter, energy, and the chemical processes of life” and all correlating sub-topics (see item 2 above), and learn about “the structure and processes of cells with emphasis on reproduction and communication” and all correlating sub-topics (see item 3). It should be noted, however, that many of the sub-topics in the Standard recite scientific rules and principles in intricate detail. This degree of detail would never appear in a syllabus or course outline. For purposes of this memo, the subject matter of each subtopic was matched against the content set forth in the corresponding Pacing Guides for Biology 1 and Biology 1 Honors, and each subject was found to be addressed in each Pacing Guide. Based on the Pacing Guides, both Biology 1 and Biology 1 Honors meet the FDOE standard. It may be worth noting that students in the Honors course apparently spend slightly more time learning about Viruses and Bacteria than students in the standard track Biology 1 course.

E. The District's High School Course Offerings Booklet

1. Biology 1 and Biology 1 Honors

The descriptions for Biology 1 and Biology 1 Honors in the High School Course Offerings booklet are identical. There is no variation in word choice between the two courses. Both courses also have the same prerequisites, and oddly enough the Honors section does not require a teacher recommendation.

¹¹ No Biology “Curriculum Document” was available for review, however “Pacing Guides” are available for Biology 1 and Biology 1 Honors.

Inasmuch as the FDOE requires that school districts “develop a description of additional requirements to provide for in-depth or enriched study of the course requirements,” this identity of description suggests the district may have failed to comply with FDOE mandates.

2. Biology 2 Honors

The description for Biology 2 Honors in the High School Course Offerings booklet describes Biology 2 as follows:

The purpose of this course is to provide an experience that goes beyond the regular honors curriculum. The course will provide an in-depth look at Biology similar to the Advance Placement but without the lab components and demands of the Advanced Placement program. This course should be used to pair with A.P. Biology when a student has already taken Honors Biology. (emphasis added)

To the extent that the district seeks to regularly use the title of “Biology 2 Honors” for the course, it should submit the course for approval to the FDOE.

FDOE provides that a student who earns credit in Biology 1 may not also earn credit for Biology 1 Honors. Similarly, a student in Biology 1 Honors may not earn credit for Biology 1. Here, the district’s AP Biology course is designed so that students who take the course will receive credit for Biology 1 Honors for the first term. However, students who previously earned credit for Biology 1 cannot receive credit for it a second time, so they are instead given credit for Biology 2 Honors for their first term of AP Biology. The manner in which credit is presently being awarded understandably creates the impression that some students effectively receive credit a second time for Biology 1 coursework and are even awarded additional AP “bonus points” for doing so.

F. AP Biology

The FDOE course description for AP Biology is similar in many ways to the requirements for Biology 1 (and Biology 1 Honors). The course is described as including the content specified by the Advanced Placement program. The FDOE requires that a student who has completed the course must be able to:

- Use the scientific method to solve problems, employ metric measurements, and demonstrate safe and effective use of laboratory instruments.
- Analyze the chemical composition of organisms.
- Describe in detail cell infrastructure and function of cellular organelles.
- Assess the role of enzymes in life processes.
- Trace the biochemical pathways involved in respiration and photosynthesis.

- Describe the processes of cell division.
- Describe the principles of genetics.
- Apply knowledge of structure and the function in plants and animals to their reproduction and development.
- Identify the experimental evidence for the modern theories of the origin of life.
- Describe the changes in organisms through time.
- Demonstrate knowledge of the principles of ecology and the role of energy flow, biogeochemical cycles, population growth and regulation, communities, habitats, and niches.
- Distinguish between stereotyped and learned behavior and list the factors of social behavior.
- Describe the implications of man's social biology on his environment and quality of life.
- Analyze how biology interacts with technology and society.

The High School Course Offerings booklet describes the district's AP Biology course as a college level course in biology that will prepare students to seek credit or appropriate placement in college biology courses. The content is described as including molecular and cellular biology, organism biology, and population biology, as well as lab work on selected topics. Use of the scientific method, measurement, laboratory apparatus and safety are described as an integral part of the course.

The following excerpt from the College Board website provides insight into what the College Board expects of an AP Biology Course:

Theme 1 – Science as Process – Students engage in a project . . . demonstrating the use of scientific reasoning to solve a problem.

Theme 2 – Evolution – Students compare ecological time with evolutionary time and examine how they correspond.

Theme 3 – Energy transfer – Students are asked to describe the movement, conversion, and storage of energy within an ecosystem, usually originating with the sun, then stored and converted to chemical energy by autotrophs, then passed on to heterotrophs and/or dissipated as heat.

Theme 4 – Continuity and change – Students are asked to consider how specific changes to an ecosystem (geological, climatic, introduction of new organisms, etc.) can affect the organisms that live within it.

Theme 5 – Relationship of Structure to Function – Students consider how organisms are physically adapted to survive and reproduce in their environment.

Theme 6 – Regulation – Students are to understand how an organism’s regulatory mechanisms (such as those that control body temperature) serve to aid or hinder its survival in particular environments.

Theme 7 – Interdependence in Nature – The very key to ecology – how organisms interact within their environment, and how they cannot survive without such interactions.

Theme 8 – Science, Technology and Society – Students are asked to consider how the population growth of human beings has influenced local ecosystems throughout history, and how it continues to do so, even to the extent of affecting the entire biosphere.

The description in the High School Course Offerings booklet, while not terribly detailed, shows that the design of the AP Biology course tracks the FDOE and College Board standards, including the integration of a strong lab component.

G. Biology Course Content as Revealed in Teachers’ Syllabi and Course Materials

Course materials from AP Biology teachers Mrs. Lawson (Naples), Mrs. Godley (Palmetto Ridge), and an unidentified teacher at Gulf Coast were reviewed. In addition, a comprehensive “Advanced Placement Biology 2007-2008” multi-page document from an unidentified instructor was reviewed. Materials from Biology 1 Honors instructor Ms. Blazina (Naples) and standard track Biology instructor Mr. Nelson (Barron Collier) were also reviewed.

The AP Biology materials from the unidentified instructor at Gulf Coast explain that his/her course will be “organized around the eight themes from the AP Biology Curricular Requirements: biochemistry, cell structure and function, metabolism, genetics, molecular basis of inheritance, DNA technology, evolution, microbiology, classification, plants, animals, animal physiology, and ecology.” These themes line up with those on the College Board’s AP webpage.

Mrs. Godley’s materials at Palmetto Ridge incorporate a calendar for AP biology that shows the course covers the eight general areas listed in the Gulf Coast materials.

The syllabus by Mrs. Lawson at Naples shows that her course is structured around the units in the college text used for the course (“Biology” by Neil Campbell and Jane Reece). Although there are more ‘core themes’ listed on Mrs. Lawson’s syllabus (correlating to units in the text) than on the Gulf Coast syllabus, both courses clearly cover the same content. Also, Mrs. Lawson’s syllabus reminds students that her course will teach the three main areas tested on the AP: “molecules and cells, heredity and evolution, and organisms and populations.” She explains the intensity of lab work by informing students that those taking her course “are in the lab every day but test day.”

The 2007-2008 AP Biology document from the unidentified instructor explains that students will be required to meet demanding requirements. The course is said to be divided into the three main topics noted above, and lists the 8 themes (in grid format) referenced in the Gulf Coast syllabus. It also includes a Pacing Guide that shows the order in which material will be presented, and shows the timeframe in which material will be covered over the course of the year.

All of the materials generated by the district's AP Biology teachers suggest that these are very rigorous courses which rely heavily on lab work and require extensive writing in preparation for the AP Biology test which is administered to all students in the spring. Students take practice AP exams throughout the year.

The syllabus for Ms. Blazina for Honors Biology includes all topics from the district's Biology Pacing Guide, which in turn comports with FDOE and Sunshine State Standards.

The syllabus for Mr. Nelson also incorporates the Pacing Guide material and the content required by the FDOE description and Sunshine State Standards.

H. Conclusion – Biology

All biology courses for which course descriptions and syllabi were reviewed suggest that the required material is being covered and that the FDOE course content requirements are being met.¹² The district has mis-labeled state course number 2000330 as Biology II Honors, rather than titling this numbered course by its correct name: Biology II. In addition, the course description in the Course Offering for Biology 2 Honors is deficient in that does not accurately describe the course content being delivered inasmuch as it indicates that the course is similar to AP Biology “without the lab component.” However, labs are in fact included in the course. The district should address these shortcomings.

The district should also address the incongruity of awarding credit for Biology 2 Honors to some (but not all) students who successfully complete the first term of AP Biology. The current practice was implemented to allow students who successfully completed Biology 1 Honors receive Biology 2 Honors credit (with AP bonus points) for their work during the first term of AP Biology, while most of their classmates, who are learning the same material for the first time and who do the same homework, take the same quizzes and exams, and work the same labs, receive credit for Biology 1 Honors.

¹² No teacher's materials were available for review for Biology 2 Honors, although the absence of materials for this course is to be expected since it seems to have been created to serve merely as a “place-filler” for students in AP Biology who have already taken Biology 1 Honors. Such students are the course cohorts of Biology 1 Honors students due to pairing protocols, and receive Biology 1 Honors instruction for a second time but are credited with having taken Biology 2 Honors for that term.

V. PHYSICS

A. *The District's Physics Program – an Overview*

The district offers courses in: Physics 1; Physics 1 Honors; Physics 2 Honors (no standard track version); and AP Physics B. Physics 1 and Physics 1 Honors are offered as stand-alone courses either at certain CCPS schools or through dual enrollment or the Florida Virtual School. In addition, students who take AP Physics typically receive credit for Physics 1 Honors for their first term of work in the AP course. Physics 2 Honors does not exist as a separate course, but is instead used as an administrative mechanism for awarding first term credit for AP Physics B to students who are enrolled in AP Physics but have already received credit for Physics 1 Honors.

Although Physics 2 Honors is listed in the High School Course Offerings booklet, the actual course is not included in any of the high schools' course selection sheets. A few students nevertheless receive credit for Physics 2 Honors for the first term of AP Physics inasmuch as the FDOE prohibits the district from awarding a student credit for Physics 1 twice. Furthermore, although Physics 2 is recognized by the FDOE as a legitimate course and although the FDOE has designated Physics 2 as being a Level 3 course (i.e., rigorous and honors' level course), the title of "Physics 2 Honors" is not recognized by the FDOE.

B. *FDOE Standards – Physics 1, Physics 1 Honors*

The FDOE descriptions for Physics 1 and Physics 1 Honors are identical in content. Both require that the following content be covered:

- unifying concepts and processes of science
- energy
- force and motion
- dynamics
- wave characteristics
- conservation of energy and momentum
- heat and thermodynamics
- electricity
- magnetism
- interactions among science, technology, and society

In addition, a Physics 1 course – whether standard track or Honors – must comply with Sunshine State Standards and must accordingly cover material¹³ that will ensure that a student who has successfully completed the course will:

¹³ As with the standards for Biology, the FDOE standards imposed for Physics courses include detailed, conclusory explanations that do not correspond well to the type of analysis performed for this memo. For example, one of the FDOE requirements for Physics provides that students must receive instruction that will guarantee that they "understand that in the short run, new ideas that do not mesh well with mainstream ideas in science often encounter vigorous criticism and that in the long run, theories are judged by how they fit with other

1. Demonstrate understanding of the unifying concepts and processes of science. (Courses must do this by providing instruction in the sub-topics covered by SC.H.1.4.1; SC.H.1.4.2; SC.H.1.4.3; SC.H.1.4.4; SC.H.1.4.5; SC.H.1.4.6; SC.H.1.4.7; SC.H.2.4.1; C.H.2.4.2; SC.H.3.4.1)

2. Demonstrate understanding and apply knowledge of wave characteristics, energy, and dynamics. (Courses must do this by providing instruction in the sub-topics covered by SC.A.1.4.2; SC.A.1.4.3; SC.A.2.4.6)

3. Demonstrate understanding of forces and motions. (Courses must do this by providing instruction in the sub-topics covered by SC.C.1.4.1; SC.C.1.4.2; SC.C.2.4.1; SC.C.2.4.2; SC.C.2.4.3; SC.C.2.4.4; SC.C.2.4.5; SC.C.2.4.6)

4. Demonstrate understanding of conservation of energy and momentum. (Courses must do this by providing instruction in the sub-topics covered by SC.B.1.4.1; SC.B.1.4.2)

5. Demonstrate understanding of interactions of energy and matter. (Courses must do this by providing instruction in the sub-topics covered by SC.A.2.4.4; SC.B.1.4.3; SC.B.1.4.4; SC.B.1.4.6; SC.B.1.4.7; SC.B.2.4.1)

6. Demonstrate understanding of the interactions among science, technology, and society. (Courses must do this by providing instruction in the sub-topics covered by SC.B.1.4.5; SC.H.3.4.2; SC.H.3.4.3; SC.H.3.4.4; SC.H.3.4.5; SC.H.3.4.6)

The FDOE mandates that with respect to Honors Physics, “the district shall develop a description of additional requirements to provide for in-depth or enriched study of the course requirements.” Notably, the Course Offering description makes no reference to any difference between the standard track and Honors track versions of Physics 1.

C. FDOE Standards – Physics 2

As with Calculus Honors and Biology 2 Honors, the district has – in the case of Physics – taken the official FDOE numerical designation of Physics 2 (2003410) and utilizes the title “Physics 2 Honors.” As with Biology 2, Physics 2 Honors has not been sanctioned by the FDOE for high school credit. To the extent that the district seeks to regularly offer this course for credit it should submit the course for approval to the FDOE.

The FDOE standards require that a Physics 2 include instruction on the following topics:

- astrophysics
- relativity

theories, the range of observations they explain, how well they explain observations, and how effective they are in predicting new findings.” (SCH.1.4.6). It is impossible to assess whether the instruction students receive in the CCPS meets this type of requirement.

- fluid dynamics
- heat and laws of thermodynamics
- Kirchhoff's laws
- magnetic fields
- electromagnetic induction
- quantum mechanics

While the majority of these topics in the Physics 2 course are included in AP Physics, not all of the topics are. Since the Physics 2 course is paired with the AP Physics course, it is recommended that the instructors revise the course material to reflect that all topics are addressed to the extent the district continues its current practice of awarding Physics 2 credit for the paired course.

The FDOE standard also requires that Physics 2 courses instruct students so that upon successful completion of the course a student can:

- Use the scientific method to solve problems, employ metric measurements, and demonstrate safe and effective use of laboratory instruments.
- Solve rectilinear, circular, and projectile motion problems.
- Solve problems involving Newton's Laws, friction, and centripetal force.
- Apply the law of gravitation to orbital motion.
- Analyze special relativity.
- Solve work and mechanical energy problems.
- Solve impulse and momentum problems.
- Solve problems involving heat changes.
- Use Ohm's, Coulomb's, and Kirchhoff's laws in practical application.
- Explain the properties of magnets, magnetic fields, and forces.
- Describe the significance of electromagnetic induction.
- Explain the Doppler effect.
- Explain theories concerning the nature of light.
- Describe the physics of stellar phenomena.
- Describe the behavior of fluids.
- Analyze the interactions of physics, technology, and society.

As discussed below, all items other than the last item on this list are evident in the course materials for AP Physics B (the only group in which there are students who will receive credit for Physics 2 Honors). The last item appears to be a catch-all and, as such, it is reasonable to assume that this understanding of the interactions of science and society is something students

develop during their year-long study of AP Physics. Therefore the Physics 2 standard appears to be met with respect to AP Physics students who are awarded credit for Physics 2. Notably, however, all students enrolled in AP Physics B receive the same instruction during the first term, therefore all are presumably eligible to receive credit for Physics 2 for the work of the first term.

D. CCPS “Physics 1 Curriculum Guide” and “Physics 1 Honors Curriculum Guide”

The district’s curriculum guides that were reviewed for Physics 1 and Physics 1 Honors are in table format, and indicate the subject matter of material to be covered each week as well as the type of questions that will be used to test the material (e.g. multiple choice, short response, etc.). The two courses appear to cover the same material in very similar fashion, although they vary slightly with respect to the amount of time spent on each topic, and the Honors students learn, at least briefly, about a couple of topics not covered in the standard track Physics course: the Honors students receive instruction on Fluid Mechanics and Thermodynamics during weeks 8 and 9 but these topics do not appear in the table that describes material studied in the standard track course.

When matched with the FDOE standard, the design of these two courses meets the standard for Physics 1.

E. The District’s High School Course Offerings Booklet

1. Physics and Physics 1 Honors

Physics and Physics 1 Honors are described in identical terms in the district’s High School Course Offerings booklet. The Honors course is *not* described as providing any enhanced or enriched examination of the topics.

2. Physics 2

Physics 2 Honors is described in the High School Course Offerings booklet as:

an experience that goes beyond the regular honors curriculum. The course would provide an in-depth look at Physics similar to the Advanced Placement but without the lab components and demands of the Advanced Placement program. This course should be used to pair up with AP Physics if the student has already taken Physics Honors.

As discussed more fully below, some students receive credit for Physics 2 Honors for the first term of AP Physics coursework, while their classmates receive credit for Physics 1 Honors for the same work. The difference is that the students receiving credit for Physics 2 Honors have already received credit for Physics 1 Honors and cannot get credit a second time for the course.

3. AP Physics B

The description for AP Physics B in the High School Course Offerings booklet reads, in pertinent part, as follows:

the content will include, but not be limited to, kinematics, Newton's laws of motion, conservation laws in classical mechanics, torque, rotational equilibrium, gravitation, oscillations, kinetic theory and thermodynamics, electrostatics, electric currents, magnetism, waves and optics, and modern physics. Laboratory investigations of selected topics in the content, which include the use of the scientific method, measurement, laboratory apparatus and safety, are an integral part of this course.

This description matches the FDOE standard, therefore the design of the course appears to satisfy Florida law.

F. AP Physics B

The FDOE standard provides that the purpose of this course is “to provide a systematic introduction to the main principles of classical and modern physics and emphasize the development of problem-solving ability.” The content of the course is to include that material designated by the College Board's AP program.

A student who has successfully completed the course must be able to:

- Use the scientific method to solve problems, employ metric measurements, and demonstrate safe and effective use of laboratory instruments.
- Analyze the principles of kinematics.
- Identify and apply Newton's laws of motion.
- Apply conservation laws in classical mechanics.
- Describe torque, rotational equilibrium, gravitation, planetary motion, and oscillations.
- Describe the kinetic theory and solve problems in thermodynamics.
- Analyze the principles of electrostatics quantitatively.
- Describe electric currents.
- Interpret concepts of magnetism.
- Develop an understanding of waves and optics.
- Analyze the concepts of modern physics.
- Analyze the interactions of physics, technology, and society.

This description clearly repeats and expands upon items listed for Physics 2.

G. Physics Content as Revealed in Teachers' Syllabi and Course Materials

1. Physics 1 Honors

Course materials for Physics 1 Honors from Clint Rickelmann (Palmetto Ridge) and Frank Spiegel (Barron Collier) were reviewed and evaluated for compliance with the FDOE standard. In both cases, the materials show that these courses are designed to instruct students according to the FDOE standard. Notably, although Mr. Spiegel's materials make passing reference to thermodynamics and fluid dynamics (the two topics distinguished above as present only in the Honors course), Mr. Rickelmann's materials make no reference to these topics. Because these topics are not required under the FDOE standard, their absence is irrelevant and the materials reflect compliance with Florida law.

2. CCPS "Physics 2 Honors"

No materials were reviewed for Physics 2 Honors. The absence of any materials for this course is presumably due to the fact that it does not exist except as an alternate method for awarding credit to AP students who have previously received credit for Physics 1 Honors, thereby allowing them to receive 2 credits for taking the AP course.

As a general rule, students who take AP Physics receive 1 credit for Physics 1 Honors for their first term of work in the AP Physics course, and receive 1 credit of AP Physics for work in the second term of the course. However, students who have previously taken Physics 1 as a stand-alone course and subsequently enroll in AP Physics are awarded credit for Physics 2 Honors instead, despite the fact that they do the same work as the students receiving credit for Physics 1 Honors. This creates the undesirable impression that these students effectively receive credit a second time for material previously studied. Moreover, in this situation a student receives credit on his/her high school transcript for having studied an additional "level" of physics, and also receives bonus points for Physics 2 Honors as an AP paired course, thereby giving the mistaken perception of having taken courses that are more advanced than those taken by their classmates.¹⁴

3. AP Physics B

We reviewed the materials provided by AP Physics instructors (Carl Johnson, Barron Collier), Clint Rickelmann (Palmetto Ridge), Allen Miller (Naples High School) and Dr. William Wright (Gulf Coast). These instructors' materials were compared with the FDOE standard and with the sample AP Physics syllabi available from the College Board.

In each case, the CCPS instructors' syllabi and course materials were built around the material covered on the College Board AP exam, and all instructors teach every topic tested on that exam. Similarly, the content listed in their materials meets or exceeds the FDOE

¹⁴ This is the same as the result in AP Biology, where students who previously took Biology 1 Honors can get credit for Biology 2 Honors – with AP bonus points – for doing the same work as their cohorts in first term AP Biology who receive credit only for Biology 1 Honors.

requirements, with the exception of the item referenced above (#16), which requires students to receive instruction that will enable them to “[a]nalyze the interactions of physics, technology, and society” (Item 16 of the FDOE standard). The pace and content of each course appear rigorous, as would be expected of an AP course.

H. Conclusion – Physics

All physics courses for which course descriptions and syllabi were reviewed suggest that the required material is being covered and that the FDOE course content requirements are being met. The school district has improperly assigned the title “Physics 2 Honors” to FDOE course number 2003410. In addition, the course description in the Course Offerings booklet for Physics 2 Honors is deficient in that does not accurately describe the course content being delivered inasmuch as it indicates that the course is similar to AP Physics B “without the lab component.” However, labs are in fact included in the course. The district should address these shortcomings.

The district should also address the incongruity of awarding credit for Physics 2 Honors to some (but not all) students who successfully complete the first term of AP Physics B. Apparently the current policy is for students who have already successfully completed Physics 1 Honors receive Physics 2 Honors credit (with AP bonus points) for their work during the first term of AP Physics B, while most of their classmates, who are learning the same material for the first time and who do the same homework, take the same quizzes and exams, and work the same labs, receive credit for Physics 1 Honors.

VI. CHEMISTRY

A. The District’s Chemistry Program – an Overview

The CCPS course offerings in the area of Chemistry are: Chemistry 1; Chemistry 1 Honors; Chemistry 2 Honors (no standard track version); and AP Chemistry. Chemistry 1 and Chemistry 1 Honors are offered as stand-alone courses either at certain CCPS schools or through dual enrollment or the Florida Virtual School.

Although Chemistry 2 Honors is listed in the High School Course Offerings booklet, the actual course is not included in any of the high schools’ course selection sheets. A few students nevertheless receive credit for Chemistry 2 Honors for the first term of AP Chemistry inasmuch as the FDOE prohibits the district from awarding a student credit for Chemistry twice. Furthermore, although Chemistry 2 is recognized by the FDOE as a legitimate course and although the FDOE has designated Chemistry 2 as being a Level 3 course (i.e., rigorous and honors’ level course), the title of “Chemistry 2 Honors” is not recognized by the FDOE and is improper as a result.

Students taking AP Chemistry generally receive credit for Chemistry 1 Honors for work done during the first half of the AP course, and are awarded AP Chemistry credit for the work done during the second half of the year. However, a student who has previously taken Chemistry 1 Honors and goes on to enroll in AP Chemistry is instead awarded credit for Chemistry 2 Honors for the work done during the first half of the AP Chemistry course. This results in a

situation where AP students working side-by-side during the first term, doing the same work and taking the same exams, receive credit for different courses, with some receiving credit for Chemistry 1 Honors while others receive credit for Chemistry 2 Honors, depending on whether they have already studied Chemistry, or are learning the material for the first time. Obviously, this is the same problem discussed in Biology and Physics.

B. FDOE Standards – Chemistry 1 / Chemistry 1 Honors

The FDOE requirements for Chemistry 1 and Chemistry 1 Honors are the same, but for the requirement in the case of the Honors course that the district, “develop a description of additional requirement to provide for in-depth or enriched study of the course material.” In the case of both Honors and standard track Chemistry, the course must cover:

- the nature of science
- matter: its classification, structure, and changes
- atomic theory
- the periodic table
- bonding
- chemical formulas, chemical reactions, and balanced equations
- stoichiometry
- reaction rates and equilibrium
- acids and bases
- oxidation and reduction
- behavior of gases
- dynamics of energy
- chemistry of life

A student who has successfully completed either Chemistry 1 or Chemistry 1 Honors must be able to:

1. Apply knowledge of the nature of science and scientific habits of mind to solve problems, and employ safe and effective use of laboratory technologies. (Courses must do this by providing instruction in the sub-topics covered by: SC.H.1.4.1; SC.H.1.4.2; SC.H.1.4.3; SC.H.1.4.4; SC.H.1.4.5; SC.H.1.4.6; SC.H.1.4.7; SC.H.2.4.1; SC.H.2.4.2)

2. Demonstrate understanding of matter, its classification, structure, and changes. (Courses must do this by providing instruction in the sub-topics covered by: SC.A.1.4.1; SC.A.1.4.3)

3. Demonstrate understanding of atomic theory. (Courses must do this by providing instruction in the sub-topics covered by: SC.A.2.4.1; SC.A.2.4.3; SC.A.2.4.4; SC.A.2.4.6; SC.C.2.4.4)

4. Demonstrate understanding of the application of the periodic table. (Courses must do this by providing instruction in the sub-topic covered by SC.A.2.4.5)

5. Demonstrate understanding of covalent and ionic bonding. (Courses must do this by providing instruction in the sub-topics covered by: SC.A.1.4.2; SC.A.1.4.5; SC.C.2.4.2; SC.C.2.4.5)

6. Use chemical formulas to write balanced equations and predict reaction products. (Courses must do this by providing instruction in the sub-topics covered by: SC.A.2.4.2; SC.B.1.4.2)

7. Explain the behavior of gases in terms of gas laws and kinetic molecular theory. (Courses must do this by providing instruction in the sub-topic covered by: SC.B.1.4.3)

8. Demonstrate understanding of reaction rates and equilibrium. (Courses must do this by providing instruction in the sub-topics covered by: SC.A.1.4.4; SC.G.2.4.2)

9. Demonstrate understanding of the dynamics of energy. (Courses must do this by providing instruction in the sub-topics covered by: SC.B.1.4.1; SC.B.1.4.6; SC.B.1.4.7; SC.G.2.4.1)

10. Demonstrate understanding of the interactions of chemistry with technology and society. (Courses must do this by providing instruction in the sub-topics covered by: SC.B.1.4.5; SC.H.3.4.1; SC.H.3.4.2; SC.H.3.4.3; SC.H.3.4.4; SC.H.3.4.5; SC.H.3.4.6)

C. FDOE Standards – Chemistry 2

The FDOE description of Chemistry 2 (standard track only) requires that the following content be covered:

- implementation of scientific habits of mind
- application of scientific knowledge, methodology, and historical context to solve problems
- use of laboratory technologies
- terminology
- oxidation and reduction
- pH and ionic equilibria
- reaction mechanisms and rates
- nuclear chemistry
- organic chemistry applications and nomenclature
- biochemistry
- molecular geometry
- thermodynamics and equilibrium
- chemical analysis
- connections between chemistry, technology, society, and the environment

In addition, a Chemistry 2 course must comply with Sunshine State Standards and cover material that will ensure that a student who has successfully completed the course will:

- 1. Demonstrate effective implementation of scientific habits of mind.**
- 2. Apply knowledge of the nature of science, scientific methodology, and historical context to solve problems, and employ safe and effective use of laboratory technologies.** (Courses must do this by providing instruction in the subtopics covered by SC.H.1.4.1; SC.H.1.4.2; SC.H.1.4.3; SC.H.1.4.4; SC.H.1.4.5; SC.H.1.4.6; SC.H.1.4.7; SC.H.2.4.1; SC.H.2.4.2)
- 3. Demonstrate use of relevant terminology.**
- 4. Analyze oxidation/reduction reactions and solve problems in electrochemistry.**
- 5. Analyze and evaluate qualitative and quantitative problems in acid/base and ionic equilibria.**
- 6. Analyze reaction mechanisms and rates of reactions.**(Courses must do this by providing instruction in the sub-topics covered by SC.A.1.4.1; SC.A.1.4.4)
- 7. Demonstrate basic knowledge of nuclear chemistry and solve transmutation and decay problems.** (Courses must do this by providing instruction in the sub-topics covered by SC.A.2.4.3; SC.A.2.4.4; S.C.2.4.4)
- 8. Demonstrate understanding of the applications of organic chemistry and its nomenclature (e.g., polymerization, hydrogenation, catalysis).**
- 9. Demonstrate fundamental knowledge of biochemistry.** (Courses must do this by providing instruction in the sub-topics covered by SC.B.1.4.1; SC.F.1.4.1; SC.G.1.4.3)
- 10. Demonstrate understanding of the geometry of molecules and the implications of their structures.** (Courses must do this by providing instruction in the sub-topic covered by SC.A.1.4.2)
- 11. Analyze and evaluate problems in thermodynamics and equilibrium.** (Courses must do this by providing instruction in the sub-topic covered by SC.A.1.4.3; SC.B.1.4.6; SC.B.1.4.7)
- 12. Investigate various and common methods of qualitative and quantitative chemical analysis.**

13. Demonstrate understanding of the connections of chemistry with technology, society, and the environment. (Courses must do this by providing instruction in the sub-topics covered by SC.B.1.4.5; SC.G.2.4.6; SC.H.3.4.1; SC.H.3.4.2; SC.H.3.4.3; SC.H.3.4.4; SC.H.3.4.5; SC.H.3.4.6)

D. CCCPS “Regular & Honors Chemistry Pacing Guide”

The district has a Pacing Guide which covers both Chemistry 1 and Chemistry 1 Honors. Both courses teach students the same material in the same order. The only difference between the two courses (based on this document) is that the Honors course includes two additional labs (Lab 17: Precipitation Reactions; and Lab 22: Precipitation.) In addition, students in the standard track course study only the “Limiting Reagent Concept” portion of Chapter 12 of their text, while the Honors students apparently study Chapter 12 in its entirety.

Although no teacher syllabi or course materials for regular Chemistry were available for review, the pacing guide suggests that the course is structured in a way that all required content is being taught.¹⁵

A syllabus by Ms. Allison Chapman (Palmetto Ridge) for Honors Chemistry 1 was available for review, and reveals that all topics listed in the FDOE description are covered in the Honors Chemistry course, and that additional topics are covered as well (e.g. Nuclear Chemistry).

E. The District’s High School Course Offering Booklet

1. Chemistry 1 / Chemistry 1 Honors

The High School Course Offerings booklet provides identical descriptions for Chemistry 1 and Chemistry 1 Honors:

The purpose of this course is to study the composition, properties, and changes associated with matter, and their applications. The content should include, but not be limited to, the following: the nature of science; matter, its classification, structure and changes; atomic theory, the periodic table, bonding, chemical formulas, chemical reactions, balanced equations, stoichiometry, reaction rates, equilibrium, acids, bases, oxidation, reduction, behavior of gases, dynamics of energy, and chemistry of life.

¹⁵ As with the FDOE descriptions for some of the other science courses, certain required standards would be impossible to evaluate based on review of a syllabus, pacing guide, or other teacher-provided materials due to their conclusory nature. (i.e. SC.H.1.4.2: “know that from time to time, major shifts occur in the scientific view of how the world works, but that more often, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge.” As with the other science courses, it is unclear whether students are taught about “the interactions of chemistry with technology and society” (see item 10 above)

2. Chemistry 2 Honors

As with Calculus Honors, Biology 2 Honors, and Physics 2 Honors, the district has taken the state's numerical designation for Chemistry 2 (2003360) and changed its title to "Chemistry 2 Honors." In addition to this mis-labeling, the FDOE does not recognize Chemistry 2 Honors as a course for which students may earn credit toward graduation. Rather, the state recognizes Chemistry 2 only as a standard track course.

The district's High School Course Offerings booklet describes Chemistry 2 Honors as follows:

The purpose of this course is to provide an experience that goes beyond the regular honors curriculum. The course would provide an in-depth look at Chemistry similar to the Advanced Placement but without the lab components and demands of the Advanced Placement program. This course should be used to pair up with AP Chemistry if the student has already taken Chemistry Honors.

3. AP Chemistry

The district describes AP Chemistry as a college level course whose content will include but not be limited to: "structure of matter, states of matter, chemical reactions, and descriptive chemistry." The course is described as including laboratory investigations concerning the course content, which will include "use of the scientific method, measurement, laboratory apparatus and safety."

F. AP Chemistry

The FDOE standard provides that the purpose of this course is "to study the development and application of chemistry principles and concepts." The content is to include the material specified and tested by the College Board for the Advanced Placement program. A student who has successfully completed the course must be able to:

- Use the scientific method to solve problems, employ metric measurements, and demonstrate safe and effective use of laboratory instruments.
- Discuss atomic theory and structure.
- Compare the types of binding forces in chemical bonding, the geometry of molecules, and the molecular model theory.
- Demonstrate knowledge of nuclear chemistry.
- Describe the various states of matter.
- Discuss numerous types of chemical reactions.
- Demonstrate knowledge of equations and advanced stoichiometry.
- Describe chemical equilibrium qualitatively and quantitatively.

- Investigate reaction rates.
- Analyze thermodynamic processes.
- Develop an understanding of systematic nomenclature.
- Illustrate the principles of descriptive chemistry.
- Analyze the interactions of chemistry, technology, and society.

G. Chemistry Course Content as Revealed in Teachers' Syllabi and Coursework

1. Chemistry 2 Honors

No district materials were available for this course inasmuch as this course exists solely for the purpose of providing a vehicle whereby students who have already studied Chemistry can earn 2 credits for the AP Chemistry Course. Without this mechanism, a student who previously studied and received credit for Chemistry 1 Honors would not be able to earn an additional Chemistry credit for the first term of AP Chemistry (inasmuch as the program awards 1 credit for Chemistry 1 Honors to students for the first term of AP Chemistry, and a student can't receive credit for Chemistry 1 Honors twice.) Thus, a student who successfully passes Chemistry 1 Honors as a stand-alone course can later enroll in AP Chemistry and receive credit for Chemistry 2 Honors, while his classmates in the course receive credit for Chemistry 1 Honors for the same work.¹⁶

2. AP Chemistry

Syllabi and/or course materials for AP Chemistry from Ms. Chapman (Palmetto) and from an unidentified teacher/school were reviewed for compliance with FDOE and AP requirements.

Ms. Chapman's syllabus precisely tracks the AP Course content as outlined on the College Board's AP webpage. Every AP content item is covered in her syllabus. The design of the course meets the FDOE standard, which expressly incorporates the College Board AP standard.

The syllabus from the identified instructor also tracks the content of the College Board's description for an AP Course, although this syllabus is somewhat less detailed than the Chapman syllabus, precluding a point-by-point comparison. All of the themes and concepts are present.

H. Conclusion – Chemistry

As in the other science courses that have been reviewed, all chemistry courses for which course descriptions and syllabi were reviewed suggest that the required material is being covered and that the FDOE course content requirements are being met. The school district has improperly assigned the title "Chemistry 2 Honors" to FDOE course number 2003360. In addition, the course description in the Course Offerings booklet for Chemistry 2 Honors is deficient in that does not accurately describe the course content being delivered inasmuch as it

¹⁶ Notably, as discussed below, AP Chemistry students cover all required topics of Chemistry 2.

indicates that the course is similar to AP Chemistry “without the lab component.” However, labs are in fact included in the course. The district should address these shortcomings.

The district should also address the incongruity of awarding credit for Chemistry 2 Honors to some (but not all) students who successfully complete the first term of AP Chemistry. Similar to Biology 2 and Physics 2, the current practice was implemented in order to allow students who have already successfully completed Chemistry 1 Honors to receive Chemistry 2 Honors credit (with AP bonus points) for their work during the first term of AP Chemistry, while most of their classmates, who are learning the same material for the first time and who do the same homework, take the same quizzes and exams, and work the same labs, receive credit for Chemistry 1 Honors.