

**Birmingham Public Schools**  
College Preparatory Mathematics (CPM) – Integrated Math  
**Program Analysis Summary**  
Review and Recommendation

## **INTRODUCTION**

This detailed summary provides an overview of the implementation, modifications, and recommendations regarding the implementation of College Preparatory Mathematics (CPM), also known as Integrated Math in Birmingham Public Schools. A historical perspective is provided, as well as key findings from a study conducted in May 2018, and recommendations for moving forward into the 2018-2019 school year.

## **HISTORICAL PERSPECTIVE**

In January 2017, the Birmingham Public Schools (BPS) Board of Education approved the administration’s recommendation to move from a high school mathematics curriculum sequence of Algebra 1, Geometry, and Algebra 2 to an Integrated Mathematics 1, 2, and 3. In addition, the Board approved the expenditure for the first set of resources: Core Connections Integrated 1 for implementation during the 2017-2018 school year. This decision also involved approving the heterogeneous grouping of students in these classes rather than tracking students in honors and non-honors courses, phasing the new curriculum in over three years, and requiring a three-trimester experience (previously two) for the first level of high school math, Integrated Mathematics 1. The instructional resources selected for this curriculum were the College Preparatory Mathematics (CPM) – Integrated Math: Core Connections 1, 2, and 3.

This change was in response to curricular and instructional needs resulting from the Michigan K-12 Standards for Mathematics and ongoing state and national assessments. Utilizing the process detailed in the district’s Framework for Curriculum, Instruction, and Assessment, the Teaching and Learning Department convened a High School Mathematics Curriculum Action Team (CAT) that studied these needs, developed curriculum, and recommended solutions, including the pilot and selection of instructional resources. When this work was completed, the curriculum and associated resources were presented and approved by the Mathematics Subject Area Leadership Team (SALT), District Learning and Development Council, Superintendent’s Learning and Character Development Council, Central Budgeting Committee, middle school and high school mathematics teachers, and middle school and high school building administrators.

The first course, College Preparatory Mathematics – Integrated Math began in the fall of the 2017-2018 school year. In preparation for the launch of this new curriculum, a number of parent information sessions were provided at district school buildings in January 2017 through

November 2017. Total attendance at all of these sessions was estimated at 150 parents and community members.

In January 2018, the district brought to the Board of Education a recommendation to approve the next two series of textbooks, Core Connections Integrated 2 and 3 for implementation during the 2018-2019 school year. At that time, community members voiced concerns about the implementation of CPM-Integrated Math and the lack of honors options for Integrated Math 2 and 3. It was suggested that the Board of Education not move forward on the recommendation. After discussion with the administration, the Board approved the expenditure and two listening sessions – public forums were scheduled to receive more input from parents and students.

In February 2018, two sessions were held and were organized with a panel of district staff who gathered and responded to comments and questions. Total attendance at all of these sessions was estimated at 300 parents, students, and community members. In addition, the district surveyed students participating in this curriculum (n=639) and responses were analyzed for themes.

In response to this feedback, staff implemented a number of program modifications and instructional adjustments in March 2018 to improve both student attitudes toward and success with CPM-Integrated Math. These adjustments included removing group grading; increasing the ratio of direct instruction to group work; increasing whole-class, teacher-directed instruction at key lesson points; implementing relearn/retake options for unit and final exams; offering before and after school credit grade recovery classes; providing summer school and online grade recovery classes; distributing CPM parent guides to each home; and making available district-paid after school tutors for students. In addition, more professional development and coaching sessions were provided for CPM-Integrated Math teachers.

In response to the ongoing concern regarding the lack of honors options for students in both math and science classes, BPS administration reinstated honors courses for CPM-Integrated Math 2 and 3, as well as for biology, chemistry, and anatomy & physiology.

Parents also continued to voice concerns around the possible purchase of CPM-Integrated Math 2 and 3 materials and suggested the Board take formal action to rescind its action to authorize the purchase of these textbooks. In April 2018, the Board rescinded its January 2018 decision.

In May 2018, a formal review of the impact of the program modifications and instructional adjustments was conducted by district staff to help inform the Administration and Board of Education as they consider CPM-Integrated Math for the 2018-2019 school year and subsequent years. Data from this study included responses from teacher and student surveys deployed in May 2018, student course grades, and available data from district NWEA and PSAT 8/9 assessments. These data were analyzed and disaggregated, yielding insight for program recommendations.

## KEY FINDINGS

### Alignment

**1. CPM – Integrated Math has substantial alignment to the District’s Strategic Plan, SMART GOAL, Mission, Math Vision, Framework for Global Competence, and Learner Profile.**

Review of the CPM program, lesson design, and content confirms direct alignment to many of the elements present in district-adopted goals and measurements of progress against those goals. For instance, the CPM program promotes student problem solving in ways that align with state expectations for competency in mathematics as well as with district-developed goals. The foundation of CPM focuses on problem-solving real-world problems. That foundation is also at the core of the BPS Learner Profile that describes students in their communities contributing in creative and productive ways.

**2. CPM – Integrated Math has substantial alignment to Michigan’s Department of Education’s Mathematics Standards for High School.**

The CPM – Integrated Math program aligns more consistently to the State of Michigan requirements for high school students around math foundations, problem solving, and abilities to support decisions made during problem solving.

A review of the District’s previous math program and the CPM – Integrated Math program also resulted in favorable outcomes for material and instructional support to students as outlined by CPM.

**3. The instructional approach of CPM – Integrated Math is consistent with expectations detailed in the 5 Dimensions of Teaching and Learning, the District-adopted framework for classroom instruction and student learning.**

This framework for teaching and learning has been the focus of the District in all classrooms for the past four years. Teachers have received professional learning around assessment processes to inform instruction, student engagement through student-to-student talk and student-to-teacher talk, and increased rigor with higher levels of student thinking. The CPM lesson structure builds these practices into daily lessons, and students in Birmingham have participated in learning through these methods.

**4. The previous program, Prentice Hall Mathematics – Algebra 1 has minimal alignment to Michigan’s Department of Education’s Mathematics Standards for High School as well as District initiatives, and the 5 Dimensions of Teaching and Learning.**

The same process used to review CPM – Integrated Math applied to a review of the Prentice Hall Mathematics program previously used in the District. Prentice Hall offered some matches to the State of Michigan Standards, and the district Learner Profile, 5 Dimensions of Teaching and

Learning, and District SMART Goal. However, it fell short of having overall alignment in these key areas.

## **Student Achievement**

### **1. The majority of student grades remain consistent with the previous Algebra program.**

An analysis of all students in College Preparatory Math showed 76% of the students who responded to the survey item self-report that they are currently earning an A or B in the course. Actual grades reflect 60% of all students enrolled in CPM are receiving an A or a B, with some grades not yet recorded.

A comparison of grades at the end of the first term of CPM- Integrated Math 1 in the 2017-18 school year to Algebra 1 students grades at the end of the first term in the 2016-17 school year showed no statistically significantly difference at the high school level.

### **2. Middle school advanced students show improved growth compared to the previous year on a national assessment.**

Analysis of NWEA MAP Growth data indicated that students in CPM – Integrated Math 1, overall, showed growth of 3.93 RIT points, compared to typical growth of 1.5 to 2.0 for the RIT scores at which these students started the year.

### **3. Middle school advanced students demonstrate college and career readiness on a national assessment.**

Grade 8 Advanced Math CPM students who took the Spring 2018 PSAT 8/9 state assessment performed at an average score of 525 in math. This score compares to a district grade 8 average score of 473. The District SMART goal seeks the cut score for College and Career Readiness as determined by College Board, which is 430. Both groups, those in CPM and those in grade 8 mathematics, overall reached College and Career Readiness while the CPM group scored much higher. This difference in scores should be carefully considered, as homogenous grouping still exists for this grade.

### **4. National assessment data has not yet been released for high school students.**

The State of Michigan will not release College Board PSAT 8/9 scores for grade 9 until summer. These tests must first be processed through the State of Michigan Secure Site.

## **Teacher Perspective**

### **1. Teachers note the positive alignment of CPM – Integrated Math compared to the previous Algebra program.**

A total of 14 CPM teachers responded to a survey question seeking their perception of the extent to which the previous math program and the new math program (CPM) aligned to Michigan State Mathematics Standards. On a 100-point scale, there was a 28.2 point difference with CPM rated at 94.1/100 and the previous program at 65.9. On the same scale, CPM scored higher than the previous program in representing Standards for Mathematical Practice, 95.1/100 and 25.5/100, respectively.

### **2. Teachers observe positive student effects compared to the previous Algebra program.**

Rating student engagement with mathematical practices, teachers (n=14) noted a 55.1-point improvement this year with CPM (86.6/100) compared to last year with Algebra (31.5/100). Additionally, all teachers reported that student engagement overall has increased moderately (29%) or greatly (71%). When asked how often the programs support student participation, 12 of 14 teachers indicated a consistent opportunity in each lesson of CPM and responses from 3 to 7 teachers for often, sometimes, or rarely supported in the Algebra program.

Teachers reported a decrease in student frustration with the CPM program over the course of the 2017-18 school year, with 70.4/100 to 25.07/100 rankings at the beginning and end of the year, respectively.

### **3. Current CPM – Integrated Math teachers believe the program should be continued next year.**

All teachers (14/14) responded positively to continuing CPM – Integrated Math.

## **Student Perspective**

### **1. Student attitudes toward CPM – Integrated Math have improved very slightly.**

A total of 518 students responded to a survey item in which they ranked their feelings about their math class using a 100-point scale. Results were compared to the same question from the mid-year review. Averages changed from 47.2 at the beginning of the year, to 49.1 at mid-year, to 54.3 in May (during the final trimester or quarter of this school year). The change in ranking, overall, was an increase of 7.1 points. The 54.3/100 ranking for May 2018 compares to a reported ranking of 71.6/100 of how students felt about their math classes last year.

**2. Some students report increased familiarity with PSAT assessment items as a result of the CPM - Integrated Math program.**

While 46% of 518 students report similarity of questions on the PSAT 8/9 test, 207 of those students are in grade 8 and have not experienced the PSAT in the past. It is difficult to say with certainty that there is a direct relationship between CPM and these results.

**3. Students report an increase in their confidence with math skills.**

In comparing beginning-of-year and current confidence in specific mathematics skills, 57.1% (305 of 534) reported more or much more confidence in using graphs, tables, and equations to solve problems. Between 34.6% and 40.8% of the 534 students responding to the item ranked themselves more or much more confident in three others skills since the beginning of the year.

**4. Students report the average time devoted to whole class direct teacher instruction has increased, and prefer additional instruction time.**

At the beginning of the year, students reported an average of 41% of class time spent with teacher-directed, whole-class instruction; and they reported a preference for 70% whole-class instruction to be successful. At the end of the year, students (n=518) reported an average of 52% of class time is devoted to whole-class direct instruction; and they reported a preference of 61% whole-class instruction to be successful. These data show an increase in teacher instruction, and a decreased perceived need for more instruction.

**5. Student use of available math supports during the school day and after school remain low.**

At a total district cost of \$41,400, most students responded to never using the additional district supports provided during the two months preceding the survey, specifically in-school lunch-time help, after-school student or BPS teacher tutors, outside of school adult tutors, and the CPM parent guide examples and practice problems.

**6. Student open-end comments continue to be very critical, although some students express the benefits of their experience.**

The greatest area of criticism among students is the use of group work for learning. This result is consistent with earlier survey data. Students who do well in CPM expressed feelings of being depended upon to assist struggling students and expressed preference in being allowed to work at a fast pace. Some students expressed discomfort in working in groups, while others in the same situations felt less intimidated speaking to peers than speaking to the teacher. Some students found success with group learning.

## RECOMMENDATION

Three proposals are presented for consideration by the Board of Education.

Proposal 1 involves returning to the previous Algebra 1, Geometry, and Algebra 2 curriculum sequence and traditional teaching approach. This option includes honors opportunities for Geometry and Algebra 2 and maintains a three-trimester experience for Algebra 1. In addition, a full K-12 curriculum alignment process would restart in the 2019-2020 school year.

Proposal 2 involves continuing with the College Preparatory Mathematics – Integrated Math resource with the original vendor-recommended instructional approach. This option also includes honors opportunities for CPM-Integrated Math 2 and CPM - Integrated Math 3 and maintains a three-trimester experience for Integrated Math 1. This option relies heavily on structuring lessons around student collaborative teams, redirecting student questions back to groups, and providing minimal teacher direct instruction.

**Proposal 3 is the administration’s recommended option for implementation for the 2018-2019 school year and beyond.** This option continues with the College Preparatory Mathematics – Integrated Math resource with a number of instructional modifications implemented during the second half of the 2017-2018 school year and some additional modifications. These include:

- Provide honors course options for CPM - Integrated Math 2 and 3
- Provide high school math lab options for all trimester
- Offer an enrichment/extension 3<sup>rd</sup> Trimester pilot class for CPM – Integrated Math 2 & 3
- Continue instructional adjustments implemented in the 2017-2018 school year relative to lesson structure and pacing with an average of 50-70% teacher-led direct instruction
- Continue the practice of exempting group grades from student term grade calculations
- Encourage and increase student access to and use of supports available before, during, and after the school day. These include X-Block, lunchtime help, teacher help, CPM online help, and co-teaching opportunities with Specialized Instruction and Student Services (SISS) staff.
- Continue the opportunity to relearn concepts and retake unit tests
- Enhance the partnerships between our community, parents, students and BPS staff to work together to achieve positive student outcomes with the CPM – Integrated Math program. Future sessions to engage stakeholders could include providing tutorials for the CPM parent guides, parent seminars, and information sessions
- Offer for the 2019-2020 school year only a Geometry A/B option for students who have participated in online Algebra 1 courses during the 2017-2018 school year.

It is important to note the administration recommends phasing out additional modifications that were put in place for the second half of the 2017-2018 school year. These opportunities were enacted to increase the likelihood of success of students, and they should not be required moving forward. They include options to retake final exams and substitute the new grades for the previous trimester grades, Zero Hour and 6<sup>th</sup> Hour grade recovery classes, paid summer school and online grade recovery classes, as well as after school paid district tutors for students.

The administration also recommends continuing, during the 2018-2019 school year, intensive professional learning for CPM – Integrated Math teachers with a focus on the use of small group instruction, teacher instructional roles, questioning strategies, and assessments for learning. This will be accomplished during the summer and throughout the school year.

In summary, teachers maintain, despite the initial implementation challenges during the 2017-2018 school year, that CPM – Integrated Math provides a superior high school mathematics experience for students in comparison to the previous program that does not align well with Michigan State Standards for Mathematics and other priority areas of focus for the District. The administration recommends continuing with the program as outlined in Proposal 3, and believes this option provides continued achievement advantages for students at all academic levels.