MIDDLE SCHOOL MATHEMATICS COURSE SEQUENCE AND THE MATH PLACEMENT PROCESS

Mathematics placement in grades 6, 7 and 8 includes both achievement data indicative of the student's acquired knowledge, skills and mathematical practices; and measures of aptitude or ability predictive of the student's potential for successful development of abstract/algebraic thinking and learning/achievement in Algebra. Placement criteria is weighted and placed on a matrix for each grade level and for each student. The decision-making process for placement **is not** about "how many places are available in the scheduled math sections" or "limiting the number of students ***we think*** should be taking accelerated math classes". Rather, a child's placement is data-driven and sets them up with the greatest potential for success in the middle school with opportunities in an appropriately challenging math environment.

Procedures for parental waivers are part of the math placement process. Parents can "waive" a student into specific courses only if that student falls within the waiver criteria. Students who are waived into a class are done so with the understanding that the student will remain on probationary status and must maintain specific criteria during marking period 1 to remain in that placement.

Aptitude/Ability Testing in Placement Criteria:

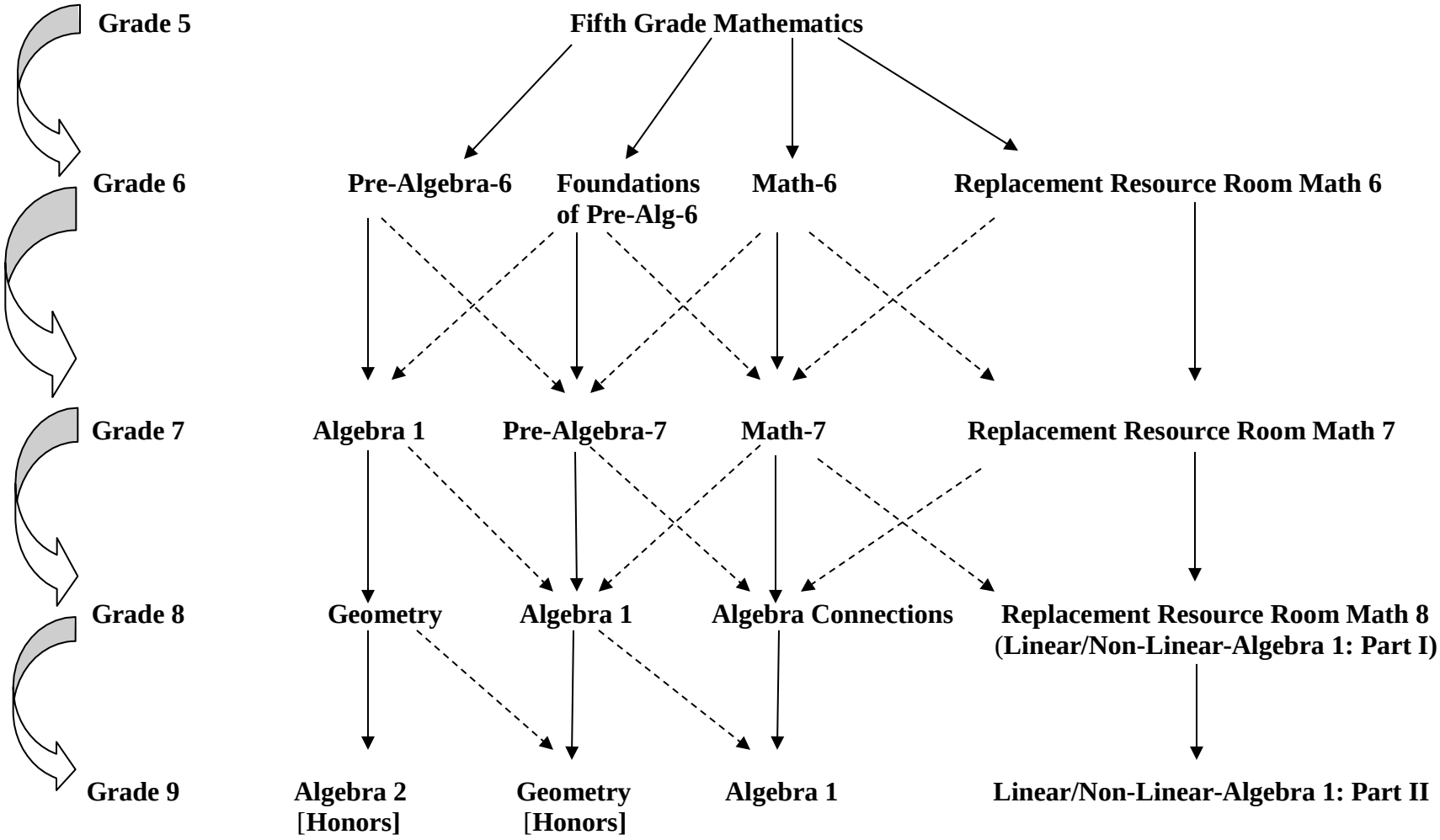
Successful performance in higher levels of mathematics at the middle school level (for example, pre-algebra for a 10 to 11 year old; algebra for an 11 to 12 year old) require students to apply ***quantitative and abstract reasoning*** rather than learned mathematics skills. In addition, students who enter advanced levels of math do so having achieved a higher level of proficiency in achieving grade level expectations than their same-age peers.

The development of abstract reasoning occurs at different rates and times for each student during early adolescence and adolescence. This is a developmental process during which individual learners grow from concrete thinkers to abstract "reasoners" over time much in the same way that children learn to walk or read. Therefore, student aptitude is a critical component that will be given significant consideration when making decisions for appropriate placement of middle school students in mathematics programs and courses.

Cumulative Tests and Unit Test Averages in Placement Criteria:

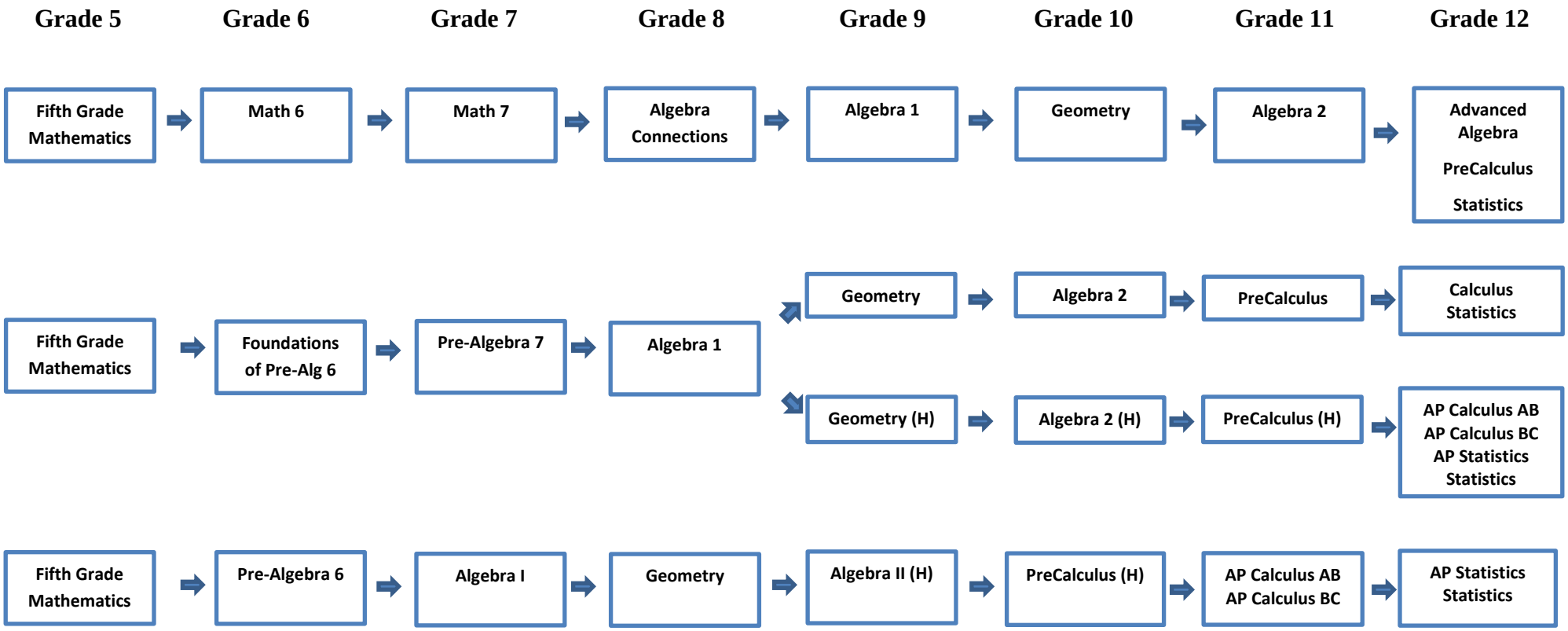
In addition to aptitude/ability placement criteria, Unit Tests, a Mid-Year Cumulative Assessment and an End of Year Cumulative Assessment are administered to students to measure grade level achievement. Unit Tests occur throughout the year on a regular ongoing basis, the Mid-Year Cumulative Assessment is administered in late January and the End of Year Cumulative Assessment is administered in the late spring. These tests are used to determine the degree to which students have met grade-level expectations and benchmarks, retained essential skills over time, and whether or not students have the knowledge-base to successfully transition from grade level mathematics to an accelerated mathematics course at their grade level.

BRANCHBURG GRADE 5-8 MATH SEQUENCE



Grade 5-12 Math Sequence

Students may change levels at year's end based on performance



	Matrix Score Components (Student Achievement/Aptitude)	Percentage
1)	**Standardized Aptitude Testing** Grade 5: InView-Assessment of Cognitive Abilities (Total Non-Verbal Score) Grade 6: Orleans-Hanna Algebra Prognosis Test Grade 7: IOWA Algebra Aptitude Test	**30%**
2)	**Unit Test Average** **Average** of student's scores on end of unit mathematics tests including Mid-Year Assessment score	**35%**
3)	**Cumulative Test** **End of Year Mathematics Cumulative Test** to measure retention, integration of grade level mathematical concepts	**35%**

Entering 6th Grade

5th Grade Everyday Math → Pre-Algebra 6

Matrix Score of 93 or greater

5th Grade Everyday Math → Pre-Algebra 6 with parent waiver

Matrix Score: 91-92.9

Parent waiver with probation only if the Grade 5 Cumulative Test score was 90% or higher

Students must maintain a Marking Period 1 (MP1) average of 90%

5th Grade Everyday Math → Foundations of Pre-Algebra 6

Matrix Score: 80 – 92.9

5th Grade Everyday Math → Foundations of Pre-Algebra 6 with parent waiver

Matrix Score: 75-79.9

Parent waiver with probation only if the Grade 5 Cumulative Test score was 70% or higher

Students must maintain a Marking Period 1 (MP1) average of 85%

5th Grade Everyday Math → Math 6

All other students go to Math 6

Entering 6th Grade

5th Grade Everyday Math

Matrix Score: 93 or greater

Yes

No

Parent Waiver:

Matrix Score:

91-92.9 AND

Gr. 5 Cumulative Test Score: 90%

Probation for MP1 (must earn 90% average to remain in class)

Pre-Algebra 6

Matrix Score: 80 – 92.9

Yes

No

Parent Waiver:

Matrix Score:

75-79.9 AND

Gr. 5 Cumulative Test Score: 70%

Probation for MP1 (must earn 85% average to remain in class)

Foundations of Pre-Algebra 6

Matrix Score: Below 80

Math 6

Matrix Score:
Unit Test Average & Mid-Year → 35%
Cumulative Test → 35%
5th Grade InView → 30%

Note: "MP1" = Marking Period 1

Entering 7th Grade

Pre-Algebra 6 → Algebra 7

Matrix Score: 85 or greater
AND
6th Grade Algebra Prognosis: 80% or greater

Pre-Algebra 6 → Algebra 7 with parent waiver

Matrix Score: 82-84.9
Parent waiver with probation only if the Pre-Algebra 6 Cumulative Test score was 75% or higher
Students must maintain a Marking Period 1 (MP1) average of 85%

Pre-Algebra 6 → Pre-Algebra 7

All other Pre-Algebra 6 students go to Pre-Algebra 7

Foundations of Pre-Algebra 6 → Algebra 7 with parent waiver

Matrix Score: 92 or greater
Parent waiver with probation only if the 6th Grade Algebra Prognosis score was 80% or greater
Students must maintain a Marking Period 1 (MP1) average of 85%

Foundations of Pre-Algebra 6 → Pre-Algebra 7

Matrix Score: 80 or greater
6th Grade Algebra Prognosis: 75% or greater

Foundations of Pre-Algebra 6 → Pre-Algebra 7 with parent waiver

Matrix Score: 75 or greater
Parent waiver with probation only if the Foundations of Pre-Algebra 6 Cumulative Test score was 80% or greater
Students must maintain a Marking Period 1 (MP1) average of 85%

Foundations of Pre-Algebra 6 → Math 7

All other Foundations of Pre-Algebra 6 students go to Math 7

Math 6 → Pre-Algebra 7 with parent waiver

Matrix Score: 75-79.9
Parent waiver with probation only if the 6th grade Algebra Prognosis score was 75% or greater
Students must maintain a Marking Period 1 (MP1) average of 85%

Math 6 → Math 7

All other Math 6 students go to Math 7

Entering 7th Grade

Pre-Algebra 6

Matrix Score:

85 or greater AND

Algebra Prognosis:

80 or greater

Yes

No

Parent Waiver:

Matrix Score:

82-84.9
AND

Pre-Algebra 6 Cumulative Test Score: 75% or greater

Probation for MP1 (must earn 85% average to remain in class)

Algebra 7

Foundations of Pre-Algebra 6

Matrix Score:

80 or greater AND

Algebra Prognosis:

75 or greater

Yes

No

Parent Waiver:

Matrix Score:

92 or greater
AND

Algebra Prognosis: 80 or greater

Probation for MP1 (must earn 85% average to remain in class)

Parent Waiver:

Matrix Score:

75 or greater
AND

Found. of Pre-Alg 6 Cumulative Test Score: 80% or greater

Probation for MP1 (must earn 85% average to remain in class)

Pre-Algebra 7

Math 6

Parent Waiver:

Matrix Score:

75 -79.9
AND

Algebra Prognosis: 75 or greater

Probation for MP1 (must earn 85% average to remain in class)

Math 7

Matrix Score:
Unit Test Average & Mid-Year → 35%
Cumulative Test → 35%
6th Grade Algebra Prognosis → 30%

Note: "MP1" = Marking Period 1

Entering 8th Grade

Algebra 7 → Geometry

Matrix Score: 85 or greater

7th Grade Algebra Aptitude: 97% or greater

Algebra 7 → Geometry with parent waiver

Matrix Score: 82 – 84.9

Parent waiver with probation only if the Algebra 7 Cumulative Test score was 75% or greater

Students must maintain a Marking Period 1 (MP1) average of 85%

Algebra 7 → Algebra 8

All other Algebra 7 students go to Algebra 8

Pre-Algebra 7 → Algebra 8

Matrix Score: 80 or greater

7th Grade Algebra Aptitude: 85% or greater

Pre-Algebra 7 → Algebra 8 with parent waiver

Matrix Score: 75

Parent waiver with probation only if the Pre-Algebra 7 Cumulative Test score was 80% or greater

Students must maintain a Marking Period 1 (MP1) average of 80%

Pre-Algebra 7 → Algebra Connections

All other Pre-Algebra 7 students go to Algebra Connections

Math 7 → Algebra 8 with parent waiver

Matrix Score: 85

Parent waiver with probation only if the 7th Grade Algebra Aptitude score was 85% or greater

Students must maintain a Marking Period 1 (MP1) average of 80%

Math 7 → Algebra Connections

All other Math 7 students go to Algebra Connections

Entering 8th Grade

Algebra 7

Matrix Score:

85 or greater AND

Algebra Aptitude:

97 or greater

Yes

No

Parent Waiver:

Matrix Score:

82-84.9
AND

Algebra 7 Cumulative Test Score: 75% or greater

Probation for MP1 (must earn 85% average to remain in class)

Pre-Algebra 7

Matrix Score:

80 or greater AND

Algebra Aptitude:

85 or greater

Yes

No

Parent Waiver:

Matrix Score:

75 or greater
AND

Pre-Algebra 7 Cumulative Test Score: 80% or greater

Probation for MP1 (must earn 80% average to remain in class)

Math 7

Parent Waiver:

Matrix Score:

85 or greater

AND

Algebra Aptitude: 85 or greater

Probation for MP1 (must earn 80% average to remain in class)

Geometry

Algebra 8

Algebra Connections

Matrix Score:
Unit Test Average & Mid-Year → 35%
Cumulative Test → 35%
7th Grade Algebra Aptitude → 30%

Note: "MP1" = Marking Period 1

SOMERVILLE PUBLIC SCHOOLS: High School Mathematics

MATHEMATICS – Graduation Requirements - 15 credits
Must include Algebra I and Geometry or the content equivalent* and a third year of math that builds on the concepts and skills of algebra and geometry and prepares students for college and 21st century careers. Must also be aligned with New Jersey Student Learning Standards

> * "Content equivalent" means courses or activities that include the same or equivalent knowledge and skills as those found in traditionally titled courses which are required for high school graduation and which are aligned with State and local standards.

A minimum grade of "65%" for the year is necessary in a subject in order to be granted a diploma credit for that subject.

COURSE LEVEL OVERVIEW:

1) HONORS (H) /ADVANCED PLACEMENT (AP) LEVEL
   Honors level courses follow the content specific New Jersey Student Learning Standards, NextGen Science Standards, Core Curriculum Content Standards, and College Board Advanced Placement curriculum. They are designed to challenge highly motivated students with talent and expressed interest in a specific content curricular area.

2) COLLEGE PREPARATION (CP) LEVEL
   College preparation courses follow the content specific New Jersey Student Learning Standards, NextGen Science Standards and Core Curriculum Content Standards. They are designed to challenge motivated students in a specific content curricular area. These courses provide preparation for students who wish to enter a college and/or university program.

3) APPLIED and INTRODUCTORY LEVELS
   Applied level courses follow the content specific New Jersey Student Learning Standards, NextGen Science Standards and Core Curriculum Content Standards employing strategies that address the specific needs of diverse learners. These strategies provide preparation for students who wish to enter a college and/or university program.

HONORS PLACEMENT FOR INCOMING FRESHMEN IS BASED ON THE FOLLOWING CRITERIA:

- 90% average in subject area at mid-year of grade 8
- Student Self-Assessment Questionnaire
- Signed parent (guardian)/student honors program agreement form
- Students who do not meet the grade criteria of a 90% or better at mid-year of grade 8 may appeal to have his/her grades averaged at the end of the 3rd marking period. At such time, if the grade average is a 90% or above, the student will qualify for participation.

STUDENTS IN GRADE 9-11 MAY PETITION FOR ADMISSION TO THE HONORS PROGRAM BASED ON THE FOLLOWING CRITERIA:

- 90% average in subject area at the end of the school year
- Student Self- Assessment Questionnaire
- Signed parent (guardian)/student honors program agreement form

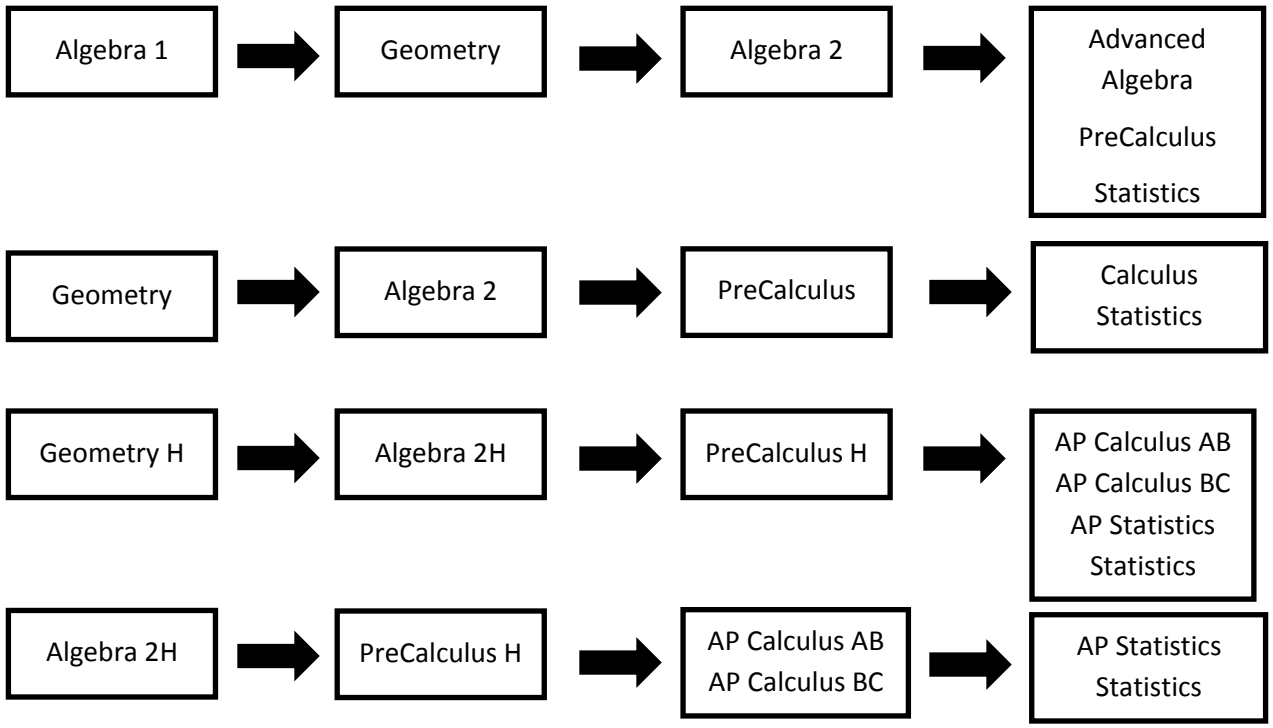
**** It is important for honors students to realize that the level of work expected in these courses is exceptionally high. Because the difficulty of the course will increase each year, it has been determined by Somerville Board of Education Policy that any student who does not maintain an 80% or higher average in an honors course will not be permitted to continue in the honors sequence. ****

MATHEMATICS

Somerville High School requires three years of mathematics for graduation. Elective courses are also available. The mathematics course sequence is aligned with the *Common Core State Standards for Mathematics*, district curricula and the statewide assessment system.

Mathematics Sequences

Students may change levels at year's end based on performance



ALGEBRA 1

Grade: 9 Length of Course: Academic Year

Algebra 1 is a foundation course for secondary and college level courses. The goals of the program include demonstration of real world applications of algebra and the integration of numeric, algebraic, geometric and graphic techniques. Among the topics studied are linear and quadratic equations, inequalities, exponents and exponential functions and polynomial, radical and rational expressions. The Algebra 1 course provides the framework of mathematical skills and knowledge needed for future study of mathematics.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Algebra 1	Grade 8 Mathematics	*5*	No
Algebra 1CP	Grade 8 Mathematics	*5*	Yes

GEOMETRY

Grade: 9, 10, 11 Length of Course: Academic Year

Geometry focuses on two- and three-dimensional geometry from theoretical and practical perspectives. Topics studied include deductive and inductive reasoning, coordinate geometry, parallel and perpendicular lines, trigonometry and transformations in the plane. Geometric theorems are proven and applied to the problem solving process.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Geometry	Algebra 1	*5*	No
Geometry CP	Algebra 1CP	*5*	Yes
Geometry H	Honors placement criteria	*5*	Yes

ALGEBRA 2

Grade 9,10,11,12 Length of Course: Academic Year

Algebra 2 is the second course in the algebra sequence. The goals of the program include the study and application of polynomial, exponential, logarithmic, rational equations and functions. In addition, students explore and apply principles of probability and combinations. The Algebra 2 course provides the framework of mathematical skills and knowledge needed for future study of mathematics.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Algebra 2	Algebra l and Geometry	5	No
Algebra 2CP	Algebra 1CP and Geometry CP	5	Yes
Algebra 2H	Honors placement criteria	5	Yes

ADVANCED ALGEBRA

Grade: 11,12 Length of Course: Academic Year

Advanced Algebra is designed to prepare students for high school Pre-Calculus or Freshman-level math courses at the collegiate level. Through the use of 21st century technology, the topics studied in this course include functions, right triangle trigonometry, probability, statistics, and consumer mathematics. The goals of the program include the study and application of these topics coupled with the real world mathematics encountered after high school.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Advanced Algebra	Algebra 2	5	Yes

PRE-CALCULUS

Grade: 10, 11,12 Length of Course: Academic Year

Pre-Calculus is designed to prepare students for High School or college Calculus. Topics include detailed study of composite functions and applications using exponential, logarithmic, and trigonometric functions and their applications. Sequences and series and the concept of limits are also studied.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Pre-Calculus CP	Algebra 1 CP, Geometry CP, Algebra 2CP, Advanced Algebra	5	Yes
Pre-Calculus H	Honors placement criteria	5	Yes

CALCULUS

Grade: 12 Length of Course: Academic Year

Calculus is designed for the student who will be taking calculus in college, but is not necessarily seeking advanced placement credit. The course builds upon concepts from Pre-Calculus, such as inverse functions, exponential functions, logarithms and limits, and applies them to a detailed study of differentiation and integration. Considerable time is spent on the applications of calculus to the fields of business, finance and physics through the study of related rates, optimization and analysis of curves and slopes. Students are also required to justify answers and conclusions using graphing calculators or Microsoft Excel spreadsheets and then effectively communicate their reasoning orally and in writing. Calculus provides students with the conceptual framework and analytical skills necessary for application to real world problems and to be successful in the college calculus course.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Calculus	Pre-Calculus	5	Yes

STATISTICS

Grade: 11,12 Length of Course: Academic Year

Statistics is designed as an alternative to Pre-Calculus for those students who have successfully completed Algebra 2. The course may also serve as an elective for those students who have taken Pre-Calculus, but choose not to take Calculus. Topics include, but are not limited to, a review of polynomial functions, inequalities and linear programming, application of exponential and logarithmic functions, modeling with trigonometric equations, matrix algebra, combinatorics, probability and statistics, and curve fitting.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Statistics CP	Algebra 2	5	Yes

ADVANCED PLACEMENT CALCULUS (AB/BC LEVELS)

Grade: 11,12 Length of Course: Academic Year

Advanced Placement (AP) Calculus is designed to be the equivalent of a first year college calculus course. The Advanced Placement Calculus course is for students who, upon success of this, seek college credit and/or placement from institutions of higher learning. Students are encouraged to take the AP Calculus examination in May. The AB level course is equivalent to one semester of college calculus, while the BC level course is equivalent to two semesters of college level calculus. Students are required to complete a summer assignment.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Advanced Placement Calculus	Honors placement criteria	5	Yes

ADVANCED PLACEMENT STATISTICS

Grade: 11,12 Length of Course: Academic Year

The purpose of the Advanced Placement (AP) Statistics course is to develop fundamental concepts and tools for collecting, organizing, analyzing, and using data to make decisions. In colleges and universities, an introductory statistics course is typically required for majors, such as in the social sciences, health sciences and business courses. Science, engineering and mathematics majors usually take an upper level calculus based course in statistics for which the Advanced Placement Statistics course is effective preparation. Students are exposed to broad conceptual themes, including exploring data, sampling and experimentation, anticipating patterns, and statistical inference. Students who successfully complete the course and the advanced placement examination may receive college credit, advanced placement, or both for a one semester introductory college statistics course.

Course Title	*Prerequisite Requirements*	*Credits Earned*	*NCAA Core*
Advanced Placement Statistics	AP Calculus AB or BC	5	Yes