

Londonderry School District

The Importance of Mathematics

At all levels grades preK-12, the Londonderry School District has placed *mathematics* as a top priority along with reading. Why mathematics? Mathematics is the foundation for success in a variety of content areas during a child's educational experience. According to a U.S. Department of Education's *Mathematics Equals Opportunity White Paper – October 1997*, the authors concluded the following:

- Students who take a rigorous K-12 mathematics sequence are more likely to go to college than those who do not.
- Students of all income levels who take rigorous math courses in high school are more likely to go to college.
- In the job market, students who have strong mathematics backgrounds are more likely to be employed and earn 38% more per hour than those with insufficient skills in algebra, geometry, measurement, and probability.

Mathematics is crucial not only for success in school, but in being an informed citizen, being productive in one's chosen career, and in personal fulfillment. In today's technology driven society, greater demands have been placed on individuals to interpret and use mathematics to make sense of information and complex situations. As a result, the Londonderry School District places the understanding, application of numbers and operations, algebra, geometry, measurement, data analysis, problem-solving, and reasoning skills as a top priority.

During the students' primary years, our focus is on *learning number and operations, basic measurement, and basic understanding of data*. As students move into the intermediate and middle school years, a greater emphasis is placed on the *practice and reinforcement* of basic math facts and operations while at the same time increasing the depth of understanding of skills in *algebra and geometry*. At the high school level, while our focus remains on fundamental mathematical concepts and skills to prepare all students to be productive members of society, students encounter new perspectives in algebra and geometry as well as new ways of analyzing data within formal mathematics courses and other high school courses in science, social studies, business, and other electives. Our high school academic expectations are clear:

- *Students will be able to formulate, critically analyze, and solve a variety of problems.*
- *Students will be able to use various forms of communication to accurately receive, process, and deliver information.*

Through their experiences at Londonderry High School, students are expected to have a strong understanding of mathematical computation, concepts and processes, problem-solving, reasoning and analysis while using mathematics to make sense of, and to solve complex problems in a variety of applications.

The Joy of Mathematics – Tips for Parents

1. **There is nothing to fear but fear itself.** Regardless of your own experience with school mathematics, you can encourage your child to develop a love of math through supporting their performance, helping with school projects, and discussing their homework. Help them appreciate how a strong foundation in math can lead to great opportunities in the future.
2. **Stay informed.** Keep yourself apprised of the specific academic standards that children are required to meet at each grade level. Let school administrators know that you support professional development for teachers so that all students can be taught by instructors who are well prepared in content and technique of mathematics training and current technology.
3. **Make sure your kids are taking advanced courses.** Encourage your child to master Algebra and Geometry by the end of ninth grade. The mathematics students study in the middle grades has a strong effect on whether they will be able to take the higher levels of mathematics necessary for admission to college and for an increasing number of jobs.
4. **Be a champion for challenge.** A challenging math curriculum can stimulate children to learn and can positively influence growth in other areas of their education. Advocate for mathematics reform efforts that focus on raising expectations for student performance.
5. **Make math fun.** Spend time with kids on simple board games, puzzles, and activities that encourage better attitudes and stronger math skills. Even everyday activities such as playing with toys in a sandbox or in a tub at bath time can teach children math concepts like weight, density, and volume. Check your television listings for shows that can reinforce math skills in a practical and fun way.
6. **Mix in math.** The kitchen is filled with tasty opportunities to teach fractional measurements, like doubling and dividing cookie recipes.
7. **Use real world examples to teach math.** Point out ways that people use math every day to pay bills, balance their checkbooks, figure out their net earnings, make change, and tip at restaurants. Involve older children in projects that incorporate geometric and algebraic concepts like planting a garden, building a bookshelf, or figuring how long it will take to drive to your family vacation destination.
8. **Prepare them for a profession.** Let kids know what vocations require a sound base in mathematics. Careers in carpentry, landscaping, medicine, pharmacy, aeronautics, and meteorology all require strong math skills. Let them know that they too can be successful in math. Ask local employers to sponsor school-to-work programs and career fairs.
9. **Tune into technology.** Encourage your child to use computers and the Internet at home, your local library, and after-school programs for tasks like developing charts, graphs, maps, and spreadsheets.

10. **Encourage children to solve problems.** Provide assistance, but let them figure it out themselves. Problem solving is a lifetime skill.

Source: “Every Child Mathematically Proficient: Top Ten Tips for Parents” from the Learning First Alliance Website, <http://www.learningfirst.org>

Elementary Schools – Programs/Texts

Scott Foresman Addison Wesley *Mathematics* (c. 2004)

Matthew Thornton, Moose Hill, North and South Schools use Scott Foresman-Addison Wesley Mathematics. This program is the core curriculum for students at all levels in Grade K through grade 5. The program supports students’ understanding of key math concepts and skills, and covers a wide range of mathematical content across the grades. The focus is on key ideas in mathematics such as questioning strategies, problem-solving skills, embedded assessment, and differentiated instructional options to meet the needs of varied learners. The program provides explicit problem-solving instruction, hands-on activities, and opportunities to extend students’ mathematical understanding through reading and writing connections. The Scott Foresman Addison Wesley *Mathematics* is aligned to the National Council of Teachers of Mathematics Standards for elementary grades. In addition, Londonderry teachers incorporate other materials and resources that offer additional practice, reinforcement and enrichment for all students.

For more information about the Scott Foresman *Mathematics* Program, please go to www.scottforesman.com. Additional information on the program’s effectiveness may be found at the U.S. Department of Education What Works Clearinghouse at www.whatworks.ed.gov.

Source: Pearson Scott Foresman, U.S. Department of Education What Works Clearinghouse.

Middle School – Courses

MATHEMATICS 6

The Connected Mathematics curriculum is organized around engaging, hands-on problems. The curriculum is rich in connections of core ideas of mathematics, between mathematics and its applications in other school subjects, and mathematics and its applications outside the classroom in real world settings. Areas covered in sixth grade Connected Mathematics are:

- Number theory using factors, multiples, primes, and composites.
- Reasoning about two dimensional shapes and relationships among length, angle measure, and how shaped fit together.
- Understanding and using rational numbers; using fractions, decimals, and percents; equivalence and order.

- Data investigation by comparing data using a variety of tables, charts and graphs and reading and analyzing bar, line and coordinate graphs-
- Reasoning about two-dimensional shapes and measurement; understanding area and perimeter.
- Characteristics, properties, surface area and volume of three-dimensional figures

HIGH MATH 6

This CMP based program will cover all the Mathematics 6 concepts as well as probability, an introduction to algebra, and exposure to integers.

ADVANCED PLACEMENT MATH 6

The CMP program will cover the Mathematics 6 concepts, as well as, introducing algebra, understanding and using integers, linear relationships, equivalent expressions, and solutions of linear equations. This program is taught by the special curriculum teacher.

MATHEMATICS 7

The Connected Mathematics curriculum is organized around engaging, hands-on problems. The curriculum is rich in connections of core ideas of mathematics, between mathematics and its applications in other school subjects, and mathematics and its applications outside the classroom in real world settings.

Areas covered in the seventh grade Connected Mathematics are:

- Number sense
- Using rational numbers to solve problems.
- Using variables and finding relationships in tables, graphs, and simple symbolic terms. Proportional reasoning; using ratios, proportions, and percents.
- Understanding and using negative numbers.

PRE-ALGEBRA 7

This fast-paced course is intended for only the most able math students. It requires that students have achieved mastery of whole number, fraction and decimal operations. Emphasis is on number theory and the mathematical application of that theory as it relates to the integers and algebraic equations. Topics include: variables, order of operations, number properties, rational expressions, equations, integers, proportions, percents, and word problems.

MATHEMATICS 8 ALGEBRA CONCEPTS

The Connected Mathematics curriculum is organized around engaging, hands-on problems. The curriculum is rich in connections of core ideas of mathematics, between mathematics and its applications in other school subjects, and mathematics and its applications outside the classroom in real world settings.

Areas covered in the eighth grade Connected Mathematics are:

- Explaining and applying the order of operations.
- Collecting, analyzing, and interpreting data using graphs, tables and charts.
- Reasoning with equivalent expressions.
- The Pythagorean Theorem
- Three-dimensional measurement

ALGEBRA I (GRADE 7 AND 8)

This course is for students who intend to take four years of mathematics at the high school level and who have demonstrated above average ability.

There will be extensive work in: integer operations, solving equations, order of operations, linear equations, transforming linear equations, factoring, rational expressions, exponents, inequalities, graphing functions and relations, solving systems of equations, probability, and rational and irrational numbers. The course is designed to cover the material at a moderate pace. Considerable time must be spent outside of class to successfully meet course requirements.

High School – Courses (From HS Program of Studies)

INTEGRATED MATH I

CRS 415/416 GRADES 9-12 S1/2

This course is the first in the Integrated Algebra/Geometry curriculum sequence. Integrated Math I will focus on developing the student's basic understanding of algebraic concepts through the manipulation of algebraic quantities, graphing, and the solution of equations. Real life problem solving with the use of algebraic equations will be stressed.

INTEGRATED MATH II

CRS 417/418 GRADES 10-12 S1/2

This course is the second in the Integrated Algebra/Geometry curriculum sequence. The focus of the course is to develop the student's understanding of basic Geometry while reinforcing the algebra concepts learned in Integrated Math I. Topics will include but not be limited to the terms of Geometry, angles, perpendicular and parallel lines, congruency, similar polygons, right triangles, circles, area, volume, quadrilaterals, and transformations.

Prerequisite: Integrated Math I or Pre-Algebra

INTEGRATED MATH III

CRS 401/402 GRADES 11-12 S1/2

This course is the third in the Integrated Algebra/Geometry curriculum sequence. The course will focus on expanding upon the student's knowledge of algebra by using geometry to reinforce new concepts. Topics will include but not be limited to ordering and comparing rational numbers, graphing equations, functions, and identifying and predicting patterns and sequences.

Prerequisite: Integrated Math II

APPLIED CONSUMER MATHEMATICS

CRS 405/406 GRADES 11-12 S1/2

This course will provide students the opportunity to apply basic math skills in everyday situations, including running a business. Topics include, but are not limited to, percents, income, personal banking, consumer credit, income tax, budgeting, record keeping, personnel, production, marketing, warehouse and distribution, and accounting records.

PRE-ALGEBRA

CRS 409/410 GRADES 9-12 S1/2

This course is designed for students who have mastered basic skills, but require additional experience with algebraic concepts in preparation for Algebra I. This course will introduce pre-algebra topics and will develop various geometric principles. Topics include variables, factors and exponents, equations, problem solving, formulas, organizing data, statistics, ratio and proportions, integers, polynomials, and geometry.

ALGEBRA I

CRS 413/414 GRADES 9-12 S1/2

This course prepares the student to continue studies in mathematics and aids the analytical thought process. The focus will be on solving and applying algebraic equations. The course includes the following topics: review of basic math skills, rational numbers, inequalities, polynomials, factoring, graphing linear equations, solving a system of equations, radical expression, statistics, probability, and percents.

Prerequisite: Pre-Algebra or recommendation from 8th grade teacher

INFORMAL GEOMETRY

CRS 419/420 GRADES 10-12 S1/2

This course will be an informal development of Euclidean geometry. The emphasis will be placed on the practical applications of geometric definitions, postulates, theorems and corollaries. Computer software will be used where appropriate. Topics will include the organization of geometry, undefined terms, angles, perpendicular lines, congruent triangles, triangles and inequalities, parallel lines, quadrilaterals, similarity, right triangles, polygons, space figures, circles, coordinate geometry, transformations, and right triangle trigonometry.

Prerequisite: Algebra I

GEOMETRY

CRS 421/422 GRADES 9-12 S1/2

This course stresses the development of the student's ability to solve problems using a systematic and structured process. Emphasis will be on applying the theorems, corollaries, definitions, and postulates in applications. Topics include defined and undefined terms, angles, perpendicular lines, parallel lines and planes, congruent triangles, similar polygons, right triangle trigonometry, circles, area and volume, quadrilaterals, coordinate geometry and transformations.

Prerequisite: Algebra I

ADVANCED GEOMETRY

CRS 427/428 GRADES 9-10 S1/2

This course will be a formal deductive development of geometry using definitions, postulates, theorems, and corollaries, based on the relationships of points, lines, and planes in a two and three dimensional space. There will be extensive work in deriving and proving theorems and corollaries and their applications. Topic include defined and undefined terms, inductive and deductive reasoning, angles, perpendicular lines, parallel lines and planes, congruent triangles, quadrilaterals, similar polygons, right triangles, circles, area and volume, constructions, coordinate geometry, and transformations.

Prerequisite: Algebra I in the 8th grade

INFORMAL ALGEBRA II

CRS 429/430 GRADES 11-12 S1/2

This course develops and extends concepts learned in Algebra I with emphasis on teaching equations and their application to real world problems. The course will start with an extensive review of Algebra I topics. Topics will include vocabulary and operations of Algebra I, properties of real numbers, linear open sentences, functions and polynomials, factoring polynomials, rational expressions, radicals and irrational numbers, quadratic equations and functions, quadratic relations and systems, and exponential functions.

Prerequisite: Algebra I & Geometry

ALGEBRA II

CRS 431/432 GRADES 10-12 S1/2

Algebra II is the formal development and extension of Algebra I. The emphasis of this course is on teaching equation solving and its application in solving word problems. Topics include: vocabulary and operations of algebra, properties of real numbers, inequalities, linear equations and functions, polynomials, factoring, rational expression, irrational and complex numbers, quadratic equations, conic sections, exponential and logarithmic functions and sequences, series, matrices, and set theory. Graphing calculators are recommended.

Prerequisite: Algebra I & Geometry (either 421 or 427)

ALGEBRA II/ TRIGONOMETRY

CRS 437/438 GRADES 10-11 S1/2

This course stresses both the structure and computations necessary to solve problems in algebra and trigonometry. The pace of the course is demanding and students should have a strong background in algebra and geometry. Topics include: vocabulary and operations of Algebra I, linear functions and relations, inequalities, determinants, conic sections, rational expressions, factoring, sequences and series, radicals and irrational numbers, complex numbers, polynomial functions, quadratic equations and systems, exponents and logarithms, trigonometric functions, identities, and right triangle trigonometry. Graphing calculators are recommended.

Prerequisite: Advanced Geometry

INFORMAL TRIGONOMETRY

CRS 439/ GRADE 12 S1/2

This course is a study of basic trigonometry. Topics include: angles and their trigonometric functions, trigonometry of the right triangle, reference angles, graphs of trigonometric functions, identities, trigonometric equations, inverse relations, and the solution of right and oblique triangles. Graphing calculators will be used where appropriate.

Prerequisite: Algebra II (either 429 or 431)

PRE-CALCULUS

CRS 441/444 GRADES 11-12 S1/S2

Students choosing this course should enjoy mathematical challenges and have a solid background in both Algebra II and Geometry. The course presents and develops topics usually included in an introductory trigonometry and analysis course. Topics include angles, their trigonometric functions and equations, coordinate geometry, linear functions and inequalities, domain and range, inverse of functions, logarithmic and polynomial functions, parametric and polar equations, vectors, matrices, and determinants, and solving systems of equations using matrices. Graphing calculators are recommended.

Prerequisite: Algebra II or Algebra II/Trigonometry

CALCULUS

CRS 455/456 GRADES 11-12 S1/S2

Calculus is the branch of mathematics used to develop theories, solve practical problems, and help understand and predict natural phenomena. This course will ask students to investigate problems that cannot be solved by using algebra, geometry, or trigonometry alone. Coursework will include but not be limited to an integrated pre-calculus review (advanced algebra topics, limits and the continuity of a function), differential and integral calculus. Graphing calculators will be used extensively.

Prerequisite: Pre-Calculus or Honors Pre-Calculus

FINITE MATHEMATICS

CRS 443/442 GRADE 12 S1/2

This course will deal with various advanced mathematics topics. Topics will include linear equations, matrices, linear programming, graphing and simplex method, finance, sets and counting, game theory, and logic. Graphing calculators and computer software are used when appropriate.

Prerequisite: Algebra II

PROBABILITY AND STATISTICS

CRS 447/448 GRADES 11-12 S1/2

This course introduces the student to probability and statistics. Topics include measures of center and variability, probability, permutations and combinations, normal distributions, samples, confidence intervals for means, proportions, linear regression and correlation, and binomial distributions. Students will learn how to use these concepts in related fields.

Prerequisite: Algebra II

ADVANCED PLACEMENT STATISTICS

CRS 453/454 GRADES 11-12 S1/2

The purpose of AP Statistics is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students achieving honor grades in this course are expected to participate in the Advanced Placement Examination sponsored by the College Board. Graphing calculators will be used extensively.

Prerequisite: Algebra II or Algebra II/Trig

HONORS PRE-CALCULUS

CRS 449/450 GRADES 11-12 S1/2

This course is the study of advanced mathematical topics needed as preparation for AP Calculus. Graphing calculators are used, when appropriate. Topics include linear and quadratic functions, polynomial functions, inequalities, functions and graphs, exponents and logarithms, analytic geometry, trigonometric functions, trigonometric formulas, polar coordinates and complex numbers, vectors and determinants, matrices, curve fitting and models, and limits of functions.

Prerequisite: Algebra II/Trigonometry

ADVANCED PLACEMENT CALCULUS AB

CRS 451/452 GRADE 11-12 S1/2

This course involves advanced algebra topics, limits and continuity of a function, and differential and integral calculus. Students achieving honor grades in this course are expected to participate in the Advanced Placement Examination sponsored by the College Board. Graphing calculators will be used extensively.

Prerequisite: Honors Pre-Calculus

Mathematics Support Services at the Elementary Schools

Special Curriculum Math Services

The Londonderry School District offers a continuum of educational options for all students at the elementary school level. Listed below is a summary of services delivered by highly qualified and trained teachers:

- Enrichment Math – Grades 1 – 5 (all students)

Enrichment Math provides general math enrichment for all students in all elementary classrooms. For Grades 1 – 3, Special Curriculum teachers work with each classroom once a week for approximately 50 minutes. In Grades 4 – 5, teachers work with students about every two to three weeks.

The goal of Enrichment Math is to make the subject fun, interesting, and challenging for each student, and to provide extension activities of lessons in the regular classroom. Math topics are covered over the course of a few to several weeks.

- Pull-Out Mathematics – Grades 4 – 5 (identified students)

Pull-Out Mathematics is a faster paced program for 4th and 5th grade students who demonstrate high levels of mathematical reasoning, problem solving, and computation skills. Screening for prospective students takes place in spring and early fall. Students identified for the program are selected based on the classroom teacher's evaluation of a child's work habits and personal traits and the results of TOMAGS, Iowa Test of Basic Skills (ITBS), Math Facts Test, New England Math League Test, work habits, and teacher recommendation.

Students identified for the program are provided instruction daily for one hour by a special curriculum teacher. Pacing of subjects and benchmarks is accelerated.

Supplemental Math Services

Matthew Thornton, North, and South Schools, offer support services in mathematics for students who score below the 30th National Percentile Rank (NPR) on any area on the Iowa Tests of Basic Skills (ITBS) in Mathematics, and/or who score “partially”/“below proficient” on the New England Common Assessment Program (NECAP) in Mathematics, or a student who may have a deficiency in a particular math concept or skill. Supplemental math teachers provide additional support in the reinforcement of math concepts and skills to our most at-risk students.

Special Education Math Services

In the elementary schools, students who require specialized instruction or curriculum in math receive services from special education according to their math levels and IEP :

- General education program with accommodations/special ed. tutoring. Students participate fully in the grade appropriate Scotts Foresman Program.
- General education program with specialized instruction in supported or team taught classroom. Students participate fully in the grade appropriate Scotts Foresman Program.
- Specialized instruction in a replacement/resource room setting. Students are exposed to the same mathematical topic areas of the general curriculum utilizing a variety of specialized learning materials, including Scott Foresman materials as appropriate, at the student's mathematical level.

Mathematics Support Services at LMS

Accelerated and Special Curriculum Math Services

LMS offers a variety of levels to challenge students of varying abilities. From the rich curriculum of the Connected Mathematics Program, High CMP, and Advanced Math in Grade 6 to Pre-Algebra, Algebra I and Advanced Geometry opportunities at Grade 8, the middle school math program provides a strong foundation for students' continued growth and acceleration as they start mathematics at Londonderry High School.

Additionally, students are offered enrichment opportunities, in-class school-wide exploratory activities, labs, and extra-curricular activities in mathematics provided by special curriculum teachers. For more information on middle school mathematics offerings, please link to Londonderry Middle School Program of Studies. To arrange an appointment with the curriculum coordinator, please call 432-6925.

Special Education Math Services

At Londonderry Middle School, support services are provided for all students in mathematics within the classroom environment. This support is provided not only by the classroom teacher but also by the Special Education staff. The Special Education teachers and assistants rotate throughout the team schedule working in conjunction with the content area teachers for the purpose of providing a differentiated, and academically as well as developmentally appropriate education for all students.

At Londonderry Middle School, the Special Education Team, comprised of the parents, team teachers, related service staff and others familiar with the students' needs determine together if a student requires an alternative mathematics program. This determination is

based on a number of factors and is addressed specifically in an Individual Education Plan.

These programs include both a co-taught as well as a pull-out model depending on the need of the students. Supports within the programs include accommodations such as pacing adjustments, a smaller student-teacher ratio and supports from the Special Education staff.

Mathematics Support Services at LHS

LHS provides support services in Mathematics to all students. Individual classroom teachers (General Ed and Special Ed.) offer after-school help to the students. During the school day, students are also able to access Math Lab, which is directed by Math teachers who are assigned to specific periods each day. General Ed. and Special Ed. Students access Math Lab daily.

In an effort to provide additional support to our students in the area of mathematics, LHS has created an after-school Math Lab specifically designed for Algebra and Pre-Algebra students. Students who have failed to grasp a key concept are recommended to attend after-school Math Lab by their classroom teachers. The Math teacher assigned to the after-school program provides additional instruction after which students are given the opportunity to retake a failed test in order to improve their average.

LHS offers a section of the both semesters of Algebra I out of sequence i.e. semester 1 of Algebra is offered during semester 2 and semester 2 of Algebra is offered during semester 1. Students who fail a semester of Algebra I can then immediately retake the course during the following semester.

College Prep and Honors Level Mathematics

Londonderry High School offers an array of college preparatory courses, honors courses, and advanced placement courses in mathematics for high ability students to excel. College Prep Courses offered include Algebra I, Geometry, Algebra II, Pre-Calculus, AP Statistics, Finite Math, and Probability and Statistics. At the Honors Levels, courses available include: Advanced Geometry, Algebra II/Trigonometry, Honors Pre-Calculus, AP Statistics, AP Calculus AB, and Independent Study options. For more information on course descriptions, please link to Londonderry High School Program of Studies. To arrange an appointment with a guidance counselor or curriculum coordinator, please call 432-6941.

Special Education Math Services

In addition to the support provided by the classroom teachers and Math Lab, Special Education students are also given additional support in the general education classrooms by qualified special education teachers and special educational assistants who are able to re-teach the concepts presented in the classroom setting. Additional direct teaching opportunities are also provided in Study Labs and in after-school settings.

For those students who are unable to keep up with the pace of the general education classroom, Math 9, 10, 11 and 12 are taught by a Special Education teacher who is HQT in mathematics. These courses offer small group instruction in general math skills as well as concepts in both Algebra and Geometry. The courses provide specific direct instruction and additional practice time with each concept taught. Activities which promote the use of math in everyday life are emphasized providing avenues for better generalization. Students can move from this level back into the general education classrooms when they have acquired the prerequisite skills needed.

Extended Learning Services

Elementary Summer School (exiting grade 1 to exiting grade 5): The Londonderry School District offers a four week summer school for students who are at academic risk in reading and/or **mathematics**. The purpose of the program is to boost skill development and improve retention of learned material for students scoring below the 30th NPR on the IOWA in either reading and/or **math**, a score of “at risk” on the DIBELS, “novice” on NECAP, and teacher recommendation. The expected outcome of the program is that students will improve their **math**/literacy skills as measured by DIBELS, IOWA, and NECAP assessments during the following year. Parents of targeted students receive additional information and registration materials for the program in the spring. There is a fee of \$60 for each session of the program. Scholarships and reduced rates are available to families who qualify.

Middle School Academies: The Londonderry School District offers support services in **math** and reading skills to identified grades 6 and 7 students during the year in Academies. The purpose of the program is to boost skill development and improve retention of learned material for students scoring below the 30% NPR on the IOWA in either reading and/or **math**, and a score of “novice on NECAP. The expected outcome of the program is that students will improve their skills as measured by IOWA and NECAP during the following year. Parents of identified students receive information for the program each fall.

Middle School Accelerated Summer Math: For students entering grades 7 and 8 who are identified through testing data and teacher recommendations as potential candidates for **accelerated math** offerings have the opportunity to complete a foundations course for pre-algebra and a compacted pre-algebra course to gain entrance to Algebra I in grade 8. There is a fee of \$60 for the program. Scholarships and reduced rates are available to families who qualify.

High School Alternative Education: Londonderry High School offers a variety of opportunities for students to gain a high school diploma or GED. For additional information, please go to www.schools.londonderry.org/lhs/altedu/.

Assessment

Critical to the success of the district's curriculum and the delivery of instruction and services in reading-language arts, and other core content areas such as **math**, science and social studies is the use of a variety of valid and reliable standardized measures and assessments. The Londonderry School District uses the following: Dynamic Indicators of Early Literacy Skills (DIBELS), The Iowa Tests of Basic Skills (ITBS), The Iowa Tests of Educational Development (ITED), The New England Common Assessment Program (NECAP), The New Hampshire Educational Improvement and Assessment Program (NHEIAP), and the Six Traits of Writing Prompts.

Iowa Test Series: Approved in 2003 by the School Board for use in the Londonderry School District, the *Iowa Tests of Basic Skills (ITBS)* and the *Iowa Tests of Educational Development (ITED)*, developed at The University of Iowa, provide comprehensive information both about the development of students' skills and about their ability to think critically. Grades 1-8 students each spring are assessed on the *ITBS* in word analysis (1-3), reading/reading comprehension, vocabulary, language arts, **math concepts, estimation, problem solving, data interpretation, computation**, science (4) and sources of information (3-8). At grade 9, students were assessed on the *ITED* in reading comprehension, language arts, **mathematics concepts & problem solving, mathematics computation**, sources of information and analysis of science materials. *ITBS/ITED* provides the Londonderry School District and its staff longitudinal data of student achievement from early elementary to high school. The district tracks individual student progress over time, evaluating whether a student has made at least a year's worth of growth. Classroom teachers, reading teachers, supplemental math teachers, special curriculum teachers, content area teachers, and special educators are using the results to assist in identifying students who may need additional services in order to improve reading, language arts, and math skills.

It is important to understand that *ITBS/ITED* are nationally recognized norm-reference assessments given to millions of students across the United States. The assessment provides us with a snapshot of how our students compare nationally. The results also provide the district additional information about our academic programs as the bar continues to move upward through adequate yearly progress (AYP) under No Child Left Behind Act (NCLB) and the New England Common Assessment Program (NECAP). While NECAP will continue to provide Londonderry and schools around the state information about what a student understands, knows or can accomplish in relation to the New Hampshire Curriculum Frameworks and Grade Level Expectations, it can not determine how an individual student's performance compares to that of an appropriate peer group like *ITBS/ITED*. This kind of longitudinal data provides our classroom teachers and administrators the information necessary to improve their delivery of instruction to all students.

For additional information about the Iowa Tests, please go to www.education.uiowa.edu/itp/itbs/. For Londonderry assessment results, please go to the link at the district website – *Accent on Achievement*.

New England Common Assessment Program: The New England Common Assessment Program (NECAP) is the replacement for the New Hampshire Educational Improvement and Assessment Program (NHEIAP). The series of tests are “common” because the tests were developed in collaboration with Vermont, Rhode Island, and New Hampshire. The assessments given for grades 3 through 8 are designed to meet the federal requirements of the No Child Left Behind Act (NCLB). Londonderry North School South School, Matthew Thornton, and Londonderry Middle School administer the NECAP each October.

The NECAP tests are designed to measure what our students understand, know, or can accomplish in reading and **math** based on New Hampshire’s Grade Level Expectations, or GLEs. The GLEs define the knowledge and skills a student should have mastered by the end of each school year. The grade 4 test, for example, measures what a student should know and be able to do after completing third grade, and so on. Skills measured include both reading and **mathematics** for all grades 3-8. In grades 5 and 8, writing skills are also measured.

The new standardized criterion-referenced NECAP provides parents, teachers, administrators, and schools additional information from year to year about what students know and are able to do based on grade level expectations. Our school district, as well as many others around the state, continues to spend time and effort in aligning our district curriculum and high state expectations outlined in the NH Curriculum Frameworks and Grade Level Expectations.

For further information about NECAP tests, please go to the New Hampshire Department of Education website at www.ed.state.nh.us/education/.

Computation Assessment (Grades 3-8)

The Londonderry School District not only emphasizes the importance of skills such as problem solving, concepts, interpretation, estimation, and statistic, but also values continuous practice and reinforcement of the basic mathematical operations in timed computation assessments without the aid of a calculator.

Londonderry students in grades 3-8 are provided frequent timed computation assessments throughout the year that are appropriate to the grade level. Like other assessments, teachers use the information not only to improve the delivery of instruction of computational skills to students, but also to monitor how well students are retaining basic skills over time.

Common Assessments

Begun in the fall of 2006, Londonderry School District is in the process of developing common assessments in **mathematics** and other areas to monitor student progress during the year. The purpose is twofold. First, the results will assist our classroom teachers in

adjusting instruction. Second, the results will provide a snapshot of how well our students are doing each trimester, quarter, or semester.

These tests will address the areas of: Numbers and Operations; Geometry and Measurement; Data, Statistics and Probability; Functions and Algebra; and Concepts and Problem-Solving.

The tests will correlate with the skills that have been defined to be taught each trimester or quarter. Further, the tests will provide additional data to enable teachers to determine a child's proficiency in each of the major mathematical strands. The tests will provide the schools and School Board with a snapshot of what has been retained over time.

Common Assessments at various grade levels K-12 are expected to be piloted spring 2007 and fall 2007.

Professional Development in Mathematics

The district's elementary teachers received extensive professional development during the piloting and implementation of the SFAW Mathematics adoption during the 2003-2004 and 2004-2005 school years. Additionally, elementary teachers at grades 3-5 participated in workshop sessions on reading in the content for mathematics in the 2005-2006 school year. All new teachers receive training by Scott Foreman and the district's elementary teachers on the math program, math benchmarks, and math trimester guidelines. Teachers meet regularly to discuss math content in school grade level meetings and cross-grade level meetings.

At LMS, teachers received extensive professional development during the pilot and implementation of the Connected Mathematics Program. Additionally, the entire LMS staff is involved in professional trainings in math literacy-thinking strategies as well as all content areas. Londonderry Middle School Mathematics Department Teachers continually take coursework in mathematics to maintain certification requirements of the State of New Hampshire as well as to fulfill the federal Highly Qualified Teacher requirements of the No Child Left Behind Law.

Like the middle school, Londonderry High School Math Department Teachers have been involved in professional trainings in math literacy-thinking strategies since 2005. With any new adoptions Londonderry High School Math Teachers are provided training during the implementation of new math texts. Londonderry High School Mathematics Department Teachers continually take coursework in mathematics to maintain certification requirements of the State of New Hampshire as well as to fulfill the federal Highly Qualified Teacher requirements of the No Child Left Behind Law.

Library, Media & Technology Services Role in Mathematics

Our school libraries provide materials related to the study of mathematics as part of the library collection. Of particular note are grade level trade books purchased and

integrated into the collection at the elementary schools in support of the math text book series. All of these items, and those at the middle and high school, may be accessed from home or school via our web-based catalog and checked out by students and teachers. These materials provide students with opportunities to relate mathematical concepts to everyday situations for, as noted by Andrea K. Balas in discussing the **impact of reading on mathematical process and skills** in the ERIC Digest Article *The Mathematics and Reading Connection* (June 1997):

“Reading provides both context and motivation for the mathematics students. Reading from a text book, trade book, or newspaper article can provide the students with a shared basis for receiving and sharing information. Reading can supply a common setting, environment, and details for application of students' mathematical skills. Reading provides an interesting context that students can explore. This exploration can occur either in a group with many students or with one student. In general, the integration of math and reading creates a relevant context for the formal and abstract mathematical processes.

The use of either fiction or non-fiction material can create the context for discussion and set the stage for mathematical skills.”

In addition, the school library media centers provide content resources for instructional use by teachers such as DVD's and various equipment used to teach mathematical concepts. These include graphing calculators and projection devices that assist teachers with the visual elements of math. Library Media Specialists and the District Trainer/Integrationist also identify quality web-based resources and services for students and teachers. Additionally, a number of software programs are also available through library media and technology services for use on classroom and lab computers while software such as *Geometer's Sketchpad* is also available on library computers at the high school and middle school for students to access throughout the day. The district technology trainer/integrationist designs and delivers professional development opportunities in the use of many of these programs (example - spreadsheets and graphic organizers) (and) coordinates the use of online math textbook resources for the district. K-5 Mathematics text books are available online at <http://www.pearsonsuccessnet.com/> and the feature eTools (electronic manipulatives) is also available at this site. The Algebra One textbook (taught at LMS & LHS) is available online at <http://www.classzone.com/>.

Benchmarks

For a complete listing of all of the district's mathematics benchmarks, please go to www.schools.londonderry.org.