

Internet Math Resources for Middle Grade Mathematics Teachers

This is a compilation of Internet math resource sites. It is divided into three broad areas for use in the classroom. The first section is devoted to links to websites dealing with math standards. The second section is a breakdown of the Georgia Mathematics Performance Standards for grades six through eight with sites suggested for each performance standard. The last section contains a list of all the sites that have been reviewed. The need for classroom teachers to have websites at their fingertips is critical in assisting students understanding different mathematics concepts. This is designed as a daily use resource for the Middle Grades mathematics teacher. The book is designed for teachers of mathematics in Georgia, but since Georgia has adopted the National Mathematics Standards, the material is adaptable anywhere in the country. Mathematics Standards originated with an intention to improve Mathematics Instruction in 1989. It was widely revised in 1998 after discussions with mathematics faculty. Currently there is a Principles and Standards for School Mathematics (PSSM published by the National Council of Teachers of Mathematics (NCTM) in 2000. This replaces three other publications by NCTM.

There are ten standards of mathematics, five are content standards, and five are process standards for the teaching of mathematics.

CONTENT STANDARDS:

Standard 1	Number and Operations
Standard 2	Algebra
Standard 3	Geometry
Standard 4	Measurement
Standard 5	Data Analysis and Probability

PROCESS STANDARDS:

Standard 6	Problem Solving
Standard 7	Reasoning and Proof
Standard 8	Communication
Standard 9	Connections
Standard 10	Representations

SECTION I: STANDARDS

National Standards:

National Council of Teachers of Mathematics: <http://www.nctm.org/>

Education World Standards:

<http://www.education-world.com/standards/national/math/index.shtml>

State Standards:

Alabama:

<http://www.alsde.edu/html/sections/documents.asp?section=54&sort=3&footer=sections>

Alaska: <http://www.eed.state.ak.us/tls/assessment/GLEHome.html>

Arizona: <http://www.ade.az.gov/standards/math/articulated.asp>

Arkansas: <http://arkansased.org/teachers/frameworks2.html#math>

California: <http://score.kings.k12.ca.us/standards.matrix.html>

Colorado: <http://www.cde.state.co.us/cdeassess/documents/OSA/standards/math.htm>

Connecticut: <http://www.sde.ct.gov/sde/cwp/view.asp?a=2618&q=320872>

Delaware: www.doe.k12.de.us/files/pdf/pcs_MathClarification.pdf

Department of Defense: <http://www.dodea.edu/curriculum/standards.cfm>

District of Columbia: <http://www.k12.dc.us/dcps/Standards/Math.htm>

Florida: <http://www.fldoestem.org/center13.aspx>

Georgia: <http://www.georgiastandards.org/>

Hawaii: <http://standardstoolkit.k12.hi.us/index.html>

Idaho: <http://www.sde.idaho.gov/ContentStandards/mathstandards.asp>

Illinois: <http://www.isbe.state.il.us/ils/math/standards.htm>

Indiana:

<http://www.indianastandardsresources.org/standardSummary.asp?Subject=math&Grade=>

Iowa: <http://www.iowamodelcore.org/content/Mathematics>

Kansas: <http://www.ksde.org/Default.aspx?tabid=141>

Kentucky:

<http://www.education.ky.gov/KDE/Instructional+Resources/Curriculum+Documents+and+Resources/Program+of+Studies/default.htm>

Louisiana: <http://www.doe.state.la.us/lde/saa/1222.html>

Maine: <http://www.maine.gov/education/lres/pei/index.html>

Maryland: <http://www.mdk12.org/instruction/curriculum/index.html>

Massachusetts: www.doe.mass.edu/frameworks/math/2000/final.pdf

Michigan: www.michigan.gov/documents/Mathematics_Standards_122074_7.pdf

Minnesota: http://isd742.org/StaffNET/Standards/1_Math.pdf

Mississippi: <http://www.mde.k12.ms.us/acad/id/curriculum/math/index.htm>

Missouri: <http://dese.mo.gov/divimprove/curriculum/GLE/>

Montana: www.opi.state.mt.us/pdf/Standards/ContStds-Math.pdf

Nebraska: www.nde.state.ne.us/ndestandards/documents/mathematicsStandards.pdf

Nevada:

<http://www.leg.state.nv.us/interim/nonlegcom/academicstandards/Misc/Standards/Math.htm>

New Hampshire:

<http://www.ed.state.nh.us/education/doe/organization/curriculum/Math/Math.htm>

New Jersey: www.nj.gov/education/cccs/s4_math.pdf

New Mexico: <http://www.ped.state.nm.us/MathScience/mathStandards.html>

New York: <http://www.emsc.nysed.gov/msc/>

North Carolina: <http://www.dpi.state.nc.us/curriculum/mathematics/>

North Dakota: www.dpi.state.nd.us/standard/content/math.pdf

Ohio:

<http://www.ode.state.oh.us/GD/Templates/Pages/ODE/ODEDetail.aspx?page=3&TopicRelationID=1704&ContentID=801&Content=50719>

Oklahoma: <http://www.sde.state.ok.us/Curriculum/PASS/>

Oregon: <http://www.soeds.k12.or.us/Page.asp?NavID=1260>

Pennsylvania: www.pde.state.pa.us/k12/lib/k12/MathStan.doc

Rhode Island: <http://www.ride.ri.gov/Instruction/gle.aspx>

South Carolina: <http://ed.sc.gov/agency/Standards-and-Learning/Academic-Standards/old/cso/standards/math/>

South Dakota: <http://doe.sd.gov/contentstandards/math/standards.asp>

Tennessee: <http://www.tennessee.gov/education/ci/curriculum.shtml>

Texas: <http://www.tea.state.tx.us/index4.aspx?id=3449>

Utah: <http://www.usoe.k12.ut.us/curr/math/elem/core.htm>
<http://www.schools.utah.gov/curr/Math/Sec/core.htm>

Vermont: http://education.vermont.gov/new/html/pgm_curriculum/mathematics/gle.html

Virginia: <http://www.doe.virginia.gov/go/Sols/math.html>

Washington: <http://www.sbe.wa.gov/mathstandards.htm>
Or <http://www.k12.wa.us/CurriculumInstruct/Mathematics/default.aspx>

West Virginia: http://wvde.state.wv.us/policies/p2520.2_ne.pdf

Wisconsin: <http://www.dpi.state.wi.us/standards/matintro.html>

Wyoming: http://web.ccsd.k12.wy.us/techcurr/math/math3_6.html

From Helping with Math at
http://www.helpingwithmath.com/by_grade/education_depts.htm

SECTION II
GEORGIA PERFORMANCE STANDARDS (GPS)

Sixth Grade Mathematics:

M6A1

Students will understand the concept of **ratio** and use it to represent quantitative relationships.

Definition of **ratio**

Go to the site and choose the **r** section and then choose ratio.

<http://www.teachers.ash.org.au/jeather/maths/dictionary.html>

On **ratios**:

From Cynthia Lanus at Rice University:

For the teacher:

<http://math.rice.edu/~lanus/proportions/proptea.html>

For the student:

<http://math.rice.edu/~lanus/proportions/>

From the Math Forum at Drexel

http://mathforum.org/library/drmath/sets/mid_ratio.html

<http://www.math.com/school/subject1/lessons/S1U2L1GL.html>

M6A2

Students will consider relationships between varying quantities.

- a. Analyze and describe patterns arising from mathematical rules, tables, and graphs.
- b. Use manipulatives or draw pictures to solve problems involving proportional relationships.
- c. Use proportions ($a/b = c/d$) to describe relationships and solve problems, including percent problems.
- d. Describe proportional relationships mathematically using $y = kx$, where k is the constant of proportionality.
- e. Graph proportional relationships in the form $y = kx$ and describe characteristics of the graphs.
- f. In a proportional relationship expressed as $y = kx$, solve for one quantity given values of the other two. Given quantities may be whole numbers, decimals, or fractions. Solve

problems using the relationship $y = kx$.

g. Use proportional reasoning ($a/b = c/d$ and $y = kx$) to solve problems.

Definition of **proportion**

Go to the following site, choose the **p** section, and select **proportion**.

<http://www.teachers.ash.org.au/jeather/maths/dictionary.html>

Ratio and proportions.

<http://www.math.com/school/subject1/lessons/S1U2L2GL.html>

Fractions

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=11>

M6A3

Students will evaluate algebraic expressions, including those with exponents, and solve simple one-step equations using each of the four basic operations.

Solving equations.

<http://www.algebrahelp.com/lessons/equationbasics/>

Solving equations.

<http://www.algebrahelp.com/calculators/equation/>

Inequalities

<http://library.thinkquest.org/10030/3solutio.htm>

Solving equations

<http://www.mathleague.com/help/algebra/algebra.htm#solutionofanequation>

Operations on equations

<http://www.mathsisfun.com/algebra/add-subtract-balance.html>

Solving equations

<http://www.helpalgebra.com/onlinebook/solutionsofalgebraicequations.htm>

Solving equations

<http://www.math.com/school/subject2/lessons/S2U3L1GL.html>

Algebraic equations

<http://www.math.com/homeworkhelp/Algebra.html>

M6D1

Students will pose questions, collect data, represent and analyze the data, and interpret results.

- a. Formulate questions that can be answered by data. Students should collect data by using samples from a larger population (surveys), or by conducting experiments.
- b. Using data, construct frequency distributions, frequency tables, and graphs.
- c. Choose appropriate graphs to be consistent with the nature of the data (categorical or numerical). Graphs should include pictographs, histograms, bar graphs, line graphs, circle graphs, and line plots.
- d. Use tables and graphs to examine variation that occurs within a group and variation that occurs between groups.
- e. Relate the data analysis to the context of the questions posed.

Data operations

<http://www.mathsisfun.com/probability/index.html>

M6D2

Students will use experimental and simple theoretical probability and will understand the nature of sampling. They will also make predictions from investigations.

- a. Predict the probability of a given event through trials/simulations (experimental probability), and represent the probability as a ratio.
- b. Determine, and use a ratio to represent, the theoretical probability of a given event.
- c. Discover that experimental probability approaches theoretical probability when the number of trials is large.

Probability

<http://www.mathsisfun.com/probability/index.html>

A probability calculator

http://www.math.com/tables/stat/distributions/prob_calc.htm

Another probability calculator

https://www.covariable.com/lp_prob.html?av=3

M6G1

Students will further develop their understanding of plane figures.

- a. Determine and use lines of symmetry.
- b. Investigate rotational symmetry, including degree of rotation.
- c. Use the concepts of ratio, proportion, and scale factor to demonstrate the relationships between similar plane figures.
- d. Interpret and sketch simple scale drawings.
- e. Solve problems involving scale drawings.

Polygons

<http://www.mathleague.com/help/geometry/polygons.htm>

Rotation

<http://www.mathleague.com/help/geometry/coordinates.htm#rotation>

Reflection

<http://www.mathleague.com/help/geometry/coordinates.htm#reflection>

Folding

<http://www.mathleague.com/help/geometry/coordinates.htm#folding>

Symmetry

<http://www.mathleague.com/help/geometry/coordinates.htm#symmetricfigure>

M6G2

Students will further develop their understanding of solid figures.

- a. Compare and contrast right prisms and pyramids.
- b. Compare and contrast cylinders and cones.
- c. Interpret and sketch front, back, top, bottom, and side views of solid figures.
- d. Construct nets for prisms, cylinders, pyramids, and cones.

<http://www.mathleague.com/help/geometry/3space.htm>

M6M1

Students will convert from one unit to another within one system of measurement (customary or metric) by using proportional relationships.

Metric measurements

<http://www.mathleague.com/help/metric/metric.htm>

M6M2

Students will use appropriate units of measure for finding length, perimeter, area, and volume and will express each quantity using the appropriate unit.

- a. Measure length to the nearest half, fourth, eighth, and sixteenth of an inch.
- b. Select and use units of appropriate size and type to measure length, perimeter, area, and volume.
- c. Compare and contrast units of measure for perimeter, area, and volume.

Measurement

<http://www.mathsisfun.com/measure/index.html>

M6M3

Students will determine the volume of fundamental solid figures (right rectangular prisms, cylinders, pyramids, and cones).

- a. Determine the formula for finding the volume of fundamental solid figures.
- b. Compute the volumes of fundamental solid figures, using appropriate units of measure.
- c. Estimate the volumes of simple geometric solids.
- d. Solve application problems involving the volume of fundamental solid figures.

Volume

<http://www.mathleague.com/help/geometry/3space.htm#volume>

Cubes

<http://www.mathleague.com/help/geometry/3space.htm#cube>

Cylinders

<http://www.mathleague.com/help/geometry/3space.htm#cylinder>

Spheres

<http://www.mathleague.com/help/geometry/3space.htm#sphere>

Cones

<http://www.mathleague.com/help/geometry/3space.htm#cone>

Pyramids

<http://www.mathleague.com/help/geometry/3space.htm#pyramid>

Tetrahedrons

<http://www.mathleague.com/help/geometry/3space.htm#tetrahedron>

Prisms

<http://www.mathleague.com/help/geometry/3space.htm#prism>

M6M4

Students will determine the surface area of solid figures (right rectangular prisms and cylinders).

- a. Find the surface area of right rectangular prisms and cylinders using manipulatives and constructing nets.
- b. Compute the surface area of right rectangular prisms and cylinders using formulae.
- c. Estimate the surface areas of simple geometric solids.
- d. Solve application problems involving surface area of right rectangular prisms and cylinders.

Surface area of a square

<http://www.mathleague.com/help/geometry/area.htm#areaofasquare>

Surface area of a rectangle

<http://www.mathleague.com/help/geometry/area.htm#areaofarectangle>

Surface area of a parallelogram

<http://www.mathleague.com/help/geometry/area.htm#areaofaparallelogram>

Surface area of a trapezoid

<http://www.mathleague.com/help/geometry/area.htm#areaofatrapezoid>

Surface area of triangles

<http://www.mathleague.com/help/geometry/area.htm#areaofatriangle>

Surface area of a circle

<http://www.mathleague.com/help/geometry/area.htm#areaofacircle>

Spatial figures

<http://www.mathleague.com/help/geometry/3space.htm#spacefigures>

Surface area

<http://www.mathleague.com/help/geometry/3space.htm#surfacearea>

M6N1

Students will understand the meaning of the four arithmetic operations as related to positive rational numbers and will use these concepts to solve problems.

- a. Apply factors and multiples.
- b. Decompose numbers into their prime factorization (Fundamental Theorem of Arithmetic).
- c. Determine the greatest common factor (GCF) and the least common multiple (LCM) for a set of numbers.
- d. Add and subtract fractions and mixed numbers with unlike denominators.
- e. Multiply and divide fractions and mixed numbers.
- f. Use fractions, decimals, and percents interchangeably.
- g. Solve problems involving fractions, decimals, and percents

Dictionary

<http://www.teachers.ash.org.au/jeather/maths/dictionary.html>

Greatest Common Factor (GCF)

<http://www.mathsisfun.com/greatest-common-factor.html>

Prime numbers

<http://www.mathleague.com/help/fractions/fractions.htm#primenumbers>

Least Common Multiple (LCM)

<http://www.mathsisfun.com/least-common-multiple.html>

Tool for finding Least Common Multiple

<http://www.mathsisfun.com/least-common-multiple-tool.html>

M6P1

Students will solve problems (using appropriate technology).

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

Logic games, etc.

<http://www.mathsisfun.com/puzzles/index.html>

M6P2

Students will reason and evaluate mathematical arguments.

- a. Recognize reasoning and proof as fundamental aspects of mathematics.
- b. Make and investigate mathematical conjectures.
- c. Develop and evaluate mathematical arguments and proofs.
- d. Select and use various types of reasoning and methods of proof.

Proofs, mathematical arguments, etc.

<http://www.mathforum.org/>

M6P3

Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- c. Analyze and evaluate the mathematical thinking and strategies of others.
- d. Use the language of mathematics to express mathematical ideas precisely.

Communicating mathematical ideas.

<http://www.mathforum.org/>

M6P4

Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- c. Recognize and apply mathematics in contexts outside of mathematics.

Applying mathematical concepts.

<http://www.mathforum.org/>

M6P5

Students will represent mathematics in multiple ways.

- a. Create and use representations to organize, record, and communicate mathematical ideas.
- b. Select, apply, and translate among mathematical representations to solve problems.
- c. Use representations to model and interpret physical, social, and mathematical phenomena.

Representing and modeling mathematical concepts.

<http://www.mathforum.org/>

M6RC1

Students will enhance reading in all curriculum areas by:

- a. Reading in All Curriculum Areas
 - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
 - Read both informational and fictional texts in a variety of genres and modes of discourse.
 - Read technical texts related to various subject areas.

Seventh Grade Mathematics:**M7A1**

Students will represent and evaluate quantities using algebraic expressions.

- a. Translate verbal phrases to algebraic expressions.
- b. Simplify and evaluate algebraic expressions, using commutative, associative, and distributive properties as appropriate.
- c. Add and subtract linear expressions.

Evaluating equations

<http://www.algebrahelp.com/lessons/equationbasics/>

Equation calculator

<http://www.algebrahelp.com/calculators/equation/>

Algebra activities

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=10>

Solving equations

http://mathforum.org/library/drmath/sets/select/dm_solve_equation.html

M7A2

Students will understand and apply linear equations in one variable.

- a. Given a problem, define a variable, write an equation, solve the equation, and interpret the solution.
- b. Use the addition and multiplication properties of equality to solve one- and two-step linear equations.

Solving equations

http://mathforum.org/library/drmath/sets/select/dm_solve_equation.html

Solving linear equations

http://mathforum.org/library/drmath/sets/mid_equations.html

M7A3

Students will understand relationships between two variables.

- a. Plot points on a coordinate plane.
- b. Represent, describe, and analyze relations from tables, graphs, and formulas.
- c. Describe how change in one variable affects the other variable.
- d. Describe patterns in the graphs of proportional relationships, both direct ($y = kx$) and inverse ($y = k/x$).

Graphing

<http://www.mathforum.org/>

Graphing equations

<http://www.math.com/school/subject2/lessons/S2U4L1GL.html>

Graphing equations

<http://www.math.com/school/subject2/lessons/S2U4L3GL.html>

M7D1

Students will pose questions, collect data, represent and analyze the data, and interpret results.

- a. Formulate questions and collect data from a census of at least 30 objects and from samples of varying sizes.
- b. Construct frequency distributions.
- c. Analyze data using measures of central tendency (mean, median, and mode), including recognition of outliers.
- d. Analyze data with respect to measures of variation (range, quartiles, interquartile range).
- e. Compare measures of central tendency and variation from samples to those from a census. Observe that sample statistics are more likely to approximate the population parameters as sample size increases.
- f. Analyze data using appropriate graphs, including pictographs, histograms, bar graphs,

line graphs, circle graphs, and line plots introduced earlier, and using box-and-whisker plots and scatter plots.

g. Analyze and draw conclusions about data, including a description of the relationship between two variables.

Graphs

<http://www.mathsisfun.com/graph/index.html>

Mean

<http://www.mathsisfun.com/mean.html>

Median

<http://www.mathsisfun.com/median.html>

Mode

<http://www.mathsisfun.com/mode.html>

Normal distribution

<http://www.mathsisfun.com/probability/standard-normal-distribution-table.html>

Using data

<http://www.mathleague.com/help/data/data.htm>

Box and whisker plot

<http://www.purplemath.com./modules/boxwhisk.htm>

M7G1

Students will construct plane figures that meet given conditions.

a. Perform basic constructions using both compass and straight edge, and appropriate technology. Constructions should include copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

b. Recognize that many constructions are based on the creation of congruent triangles.

Geometry basic terms

<http://www.mathleague.com/help/geometry/basicterms.htm>

Angles

<http://www.mathleague.com/help/geometry/angles.htm>

Using a protractor

<http://www.mathsisfun.com/geometry/protractor-using.html>

Using a ruler and triangle

<http://www.mathsisfun.com/geometry/construct-ruler-triangle.html>

Using a compass

<http://www.mathsisfun.com/geometry/construct-ruler-compass-1.html>

M7G2

Students will demonstrate understanding of transformations.

- a. Demonstrate understanding of translations, dilations, rotations, reflections, and relate symmetry to appropriate transformations.
- b. Given a figure in the coordinate plane, determine the coordinates resulting from a translation, dilation, rotation, or reflection.

Coordinate system

<http://www.mathleague.com/help/geometry/coordinates.htm>

Transformations

<http://www.mathsisfun.com/geometry/transformations.html>

Symmetry

<http://www.mathsisfun.com/geometry/symmetry.html>

M7G3

Students will use the properties of similarity and apply these concepts to geometric figures.

- a. Understand the meaning of similarity, visually compare geometric figures for similarity, and describe similarities by listing corresponding parts.
- b. Understand the relationships among scale factors, length ratios, and area ratios between similar figures. Use scale factors, length ratios, and area ratios to determine side lengths and areas of similar geometric figures.
- c. Understand congruence of geometric figures as a special case of similarity: The figures have the same size and shape.

Area

<http://www.mathsisfun.com/area.html>

Congruency

<http://www.mathsisfun.com/geometry/congruent.html>

Resizing

<http://www.mathsisfun.com/geometry/resizing.html>

M7G4

Students will further develop their understanding of three-dimensional figures.

- a. Describe three-dimensional figures formed by translations and rotations of plane figures through space.
- b. Sketch, model, and describe cross-sections of cones, cylinders, pyramids, and prisms.

3 dimensional figures

<http://www.math.com/school/subject3/lessons/S3U4L1GL.html#>

Prisms

<http://www.math.com/school/subject3/lessons/S3U4L2GL.html>

Pyramids

<http://www.math.com/school/subject3/lessons/S3U4L3GL.html>

Cylinders, cones, and spheres

<http://www.math.com/school/subject3/lessons/S3U4L4GL.html>

M7N1

Students will understand the meaning of positive and negative rational numbers and use them in computation.

- a. Find the absolute value of a number and understand it as the distance from zero on a number line.
- b. Compare and order rational numbers, including repeating decimals.
- c. Add, subtract, multiply, and divide positive and negative rational numbers.
- d. Solve problems using rational numbers.

Algebra definitions

<http://www.math.com/school/subject2/lessons/S2U1L1DP.html>

Signed integers

<http://www.math.com/school/subject1/lessons/S1U1L10GL.html>

Properties of integers

<http://www.math.com/school/subject1/lessons/S1U1L13GL.html>

M7P1

Students will solve problems (using appropriate technology).

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

Problem solving

<http://www.mathforum.org/>

M7P2

Students will reason and evaluate mathematical arguments.

- a. Recognize reasoning and proof as fundamental aspects of mathematics.
- b. Make and investigate mathematical conjectures.
- c. Develop and evaluate mathematical arguments and proofs.
- d. Select and use various types of reasoning and methods of proof.

Mathematical reasoning

<http://www.mathforum.org/>

M7P3

Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- c. Analyze and evaluate the mathematical thinking and strategies of others.
- d. Use the language of mathematics to express mathematical ideas precisely.

Communicating mathematical concepts

<http://www.mathforum.org/>

M7P4

Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- c. Recognize and apply mathematics in contexts outside of mathematics.

Interdisciplinary math

<http://www.mathforum.org/>

M7P5

Students will represent mathematics in multiple ways.

- a. Create and use representations to organize, record, and communicate mathematical ideas.
- b. Select, apply, and translate among mathematical representations to solve problems.
- c. Use representations to model and interpret physical, social, and mathematical phenomena.

Record data, represent math concepts

<http://www.mathforum.org/>

M7RC1

Students will enhance reading in all curriculum areas by:

a. Reading in All Curriculum Areas

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- Read both informational and fictional texts in a variety of genres and modes of discourse.
- Read technical texts related to various subject areas.

Eighth Grade Mathematics:

M8A1

Students will use algebra to represent, analyze, and solve problems.

- a. Represent a given situation using algebraic expressions or equations in one variable.
- b. Simplify and evaluate algebraic expressions.
- c. Solve algebraic equations in one variable, including equations involving absolute values.
- d. Solve equations involving several variables for one variable in terms of the others.
- e. Interpret solutions in problem contexts.

Algebra equations basics

<http://www.algebrahelp.com/lessons/equationbasics/>

Solving equations

<http://www.mathleague.com/help/algebra/algebra.htm#solutionofanequation>

Absolute value

<http://library.advanced.org/10030/2absolu.htm>

Equation solver

<http://www.algebrahelp.com/calculators/equation/>

M8A2

Students will understand and graph inequalities in one variable.

- a. Represent a given situation using an inequality in one variable.
- b. Use the properties of inequality to solve inequalities.
- c. Graph the solution of an inequality on a number line.
- d. Interpret solutions in problem contexts.

Inequalities

<http://library.advanced.org/10030/3inequa.htm>

Solving inequalities

<http://library.advanced.org/10030/3solutio.htm>

<http://library.advanced.org/10030/6gleai.htm>

M8A3

Students will understand relations and linear functions.

- a. Recognize a relation as a correspondence between varying quantities.
- b. Recognize a function as a correspondence between inputs and outputs where the output for each input must be unique.
- c. Distinguish between relations that are functions and those that are not functions.
- d. Recognize functions in a variety of representations and a variety of contexts.
- e. Use tables to describe sequences recursively and with a formula in closed form.
- f. Understand and recognize arithmetic sequences as linear functions with whole-number input values.
- h. Interpret the constant difference in an arithmetic sequence as the slope of the associated linear function.
- i. Identify relations and functions as linear or nonlinear.
- j. Translate among verbal, tabular, graphic, and algebraic representations of functions.

Graphing

<http://library.advanced.org/10030/6gleai.htm>

Relations and functions

<http://library.advanced.org/10030/7relafun.htm>

Arithmetic progression

<http://library.advanced.org/10030/11snsap.htm>

M8A4

Students will graph and analyze graphs of linear equations and inequalities.

- a. Interpret slope as a rate of change.
- b. Determine the meaning of the slope and y-intercept in a given situation.
- c. Graph equations of the form $y = mx + b$.
- d. Graph equations of the form $ax + by = c$.
- e. Graph the solution set of a linear inequality, identifying whether the solution set is an open or a closed half-plane.
- f. Determine the equation of a line given a graph, numerical information that defines the line, or a context involving a linear relationship.
- g. Solve problems involving linear relationships.

Graphing

<http://www.mathforum.org/>

M8A5

Students will understand systems of linear equations and inequalities and use them to solve problems.

- a. Given a problem context, write an appropriate system of linear equations or inequalities.
- b. Solve systems of equations graphically and algebraically, using technology as appropriate.
- c. Graph the solution set of a system of linear inequalities in two variables.
- d. Interpret solutions in problem contexts.

Linear equations

<http://www.mathforum.org/>

M8D1

Students will apply basic concepts of set theory.

- a. Demonstrate relationships among sets through use of Venn diagrams.
- b. Determine subsets, complements, intersection, and union of sets.
- c. Use set notation to denote elements of a set.

Set theory

<http://www.mathforum.org/>

M8D2

Students will determine the number of outcomes related to a given event.

- a. Use tree diagrams to find the number of outcomes.
- b. Apply the addition and multiplication principles of counting.

Combinatorics, probability, counting theory.

<http://www.mathforum.org/>

M8D3

Students will use the basic laws of probability.

- a. Find the probability of simple independent events.
- b. Find the probability of compound independent events.

Probability

<http://www.mathforum.org/>

M8D4

Students will organize, interpret, and make inferences from statistical data.

- a. Gather data that can be modeled with a linear function.
- b. Estimate and determine a line of best fit from a scatter plot.

Inferences, statistics

<http://www.mathforum.org/>

M8G1

Students will understand and apply the properties of parallel and perpendicular lines and understand the meaning of congruence.

- a. Investigate characteristics of parallel and perpendicular lines both algebraically and geometrically.
- b. Apply properties of angle pairs formed by parallel lines cut by a transversal.
- c. Understand the properties of the ratio of segments of parallel lines cut by one or more transversals.
- d. Understand the meaning of congruence: that all corresponding angles are congruent and all corresponding sides are congruent.

Geometry

<http://www.mathforum.org/>

M8G2

Students will understand and use the Pythagorean theorem.

- a. Apply properties of right triangles, including the Pythagorean theorem.
- b. Recognize and interpret the Pythagorean theorem as a statement about areas of squares on the sides of a right triangle.

Pythagorean theorem.

<http://www.mathforum.org/>

M8N1

Students will understand different representations of numbers including square roots, exponents, and scientific notation.

- a. Find square roots of perfect squares.
- b. Recognize the (positive) square root of a number as a length of a side of a square with a given area.
- c. Recognize square roots as points and as lengths on a number line.
- d. Understand that the square root of 0 is 0 and that every positive number has two square roots that are opposite in sign.
- e. Recognize and use the radical symbol to denote the positive square root of a positive number.
- f. Estimate square roots of positive numbers.

- g. Simplify, add, subtract, multiply, and divide expressions containing square roots.
- h. Distinguish between rational and irrational numbers.
- i. Simplify expressions containing integer exponents.
- j. Express and use numbers in scientific notation.
- k. Use appropriate technologies to solve problems involving square roots, exponents, and scientific notation.

Exponents, scientific notation, etc.

<http://www.mathforum.org/>

M8P1

Students will solve problems (using appropriate technology).

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

Problem solving

<http://www.mathforum.org/>

M8P2

Students will reason and evaluate mathematical arguments.

- a. Recognize reasoning and proof as fundamental aspects of mathematics.
- b. Make and investigate mathematical conjectures.
- c. Develop and evaluate mathematical arguments and proofs.
- d. Select and use various types of reasoning and methods of proof.

Mathematical arguments

<http://www.mathforum.org/>

M8P3

Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- c. Analyze and evaluate the mathematical thinking and strategies of others.
- d. Use the language of mathematics to express mathematical ideas precisely.

Communicating mathematically.

<http://www.mathforum.org/>

M8P4

Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- c. Recognize and apply mathematics in contexts outside of mathematics.

Mathematical connections, contexts.

<http://www.mathforum.org/>

M8P5

Students will represent mathematics in multiple ways.

- a. Create and use representations to organize, record, and communicate mathematical ideas.
- b. Select, apply, and translate among mathematical representations to solve problems.
- c. Use representations to model and interpret physical, social, and mathematical phenomena.

Representing mathematical concepts

<http://www.mathforum.org/>

M8RC1

Students will enhance reading in all curriculum areas by:

- a. Reading in All Curriculum Areas
 - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
 - Read both informational and fictional texts in a variety of genres and modes of discourse.
 - Read technical texts related to various subject areas.

SECTION III The Websites

Algebra.help

Lessons, worksheets, equation solvers.

<http://www.algebrahelp.com/>

A Math Dictionary for Kids 2007 by Jenny Eathers

Defines algebra, geometry, and other terms.

<http://www.teachers.ash.org.au/jeather/maths/dictionary.html>

Ask Dr. Math from The Math Forum at Drexel University

This is a huge site with all kinds of resources and links. Dr. Math answers questions on a large variety of subjects.

<http://mathforum.org/dr.math/>

Cut the Knot: Interactive Miscellany and Puzzles

Math puzzles, games, and interesting topics.

<http://www.cut-the-knot.org/content.shtml>

Fibonacci numbers – Dr. Ron Knott

The best site on the Golden Ratio, Golden Section, and all things Fibonacci.

<http://www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/>

Figure This: Math Challenges for Families

Math challenges and puzzles.

<http://www.figurethis.org/index.html>

Illuminations – from the National Council of Teachers of Mathematics

Activities, lessons, and, links to hundreds of useful sites.

<http://illuminations.nctm.org/>

Columbia Education Center Mathematics Lessons Plans

Lesson plans

<http://www.col-ed.org/cur/math.html>

CoolMath4Kids.com

Math games, lessons, math dictionary, algebra, geometry, etc.

<http://www.coolmath4kids.com/>

Cynthia Lanus at Rice University

Good site for a variety of lessons, activities, etc. Covers algebra, geometry, math, statistics, etc.

<http://math.rice.edu/~lanus/Lessons/index.html>

EdHelper.com
Middle Grades Math Worksheet Generator
http://www.edhelper.com/middle_school_math.htm

The Educators Reference Desk
Lesson plans
<http://www.eduref.org/cgi-bin/lessons.cgi/Mathematics/>

The Educators Network
Resources
<http://www.theeducatorsnetwork.com/>

Exploring Data: Math Forum
A module on data and graphing.
<http://mathforum.org/workshops/usi/dataproject/>

Fractals by Cynthia Lanus
A good interactive fractal module by Cynthia Lanus.
<http://math.rice.edu/~lanus/frac/>

FreeMathHelp.com
Algebra, geometry, lessons, math games, graphing tools, etc.
<http://www.freemathhelp.com/>

Lesson Plans 4 Teachers
Lesson plans
<http://www.lessonplans4teachers.com/mathematics.php>

Math Central at University of Regina
Glossary and resources.
<http://mathcentral.uregina.ca/index.php>

Math.com: The world of math online
Lessons, definitions, etc.
<http://www.math.com/>

Math is Fun
Definitions, lessons, and activities. A good comprehensive site.
<http://www.mathsisfun.com/>

Math Glossary
<http://www.wtv1.net/honda/glossaryal.htm>

RHL School
Word problems, worksheets.
<http://www.rhlschool.com/math.htm>

The Math Forum at Drexel University
The most comprehensive free online math site.
<http://www.mathforum.org/library/>

Mrs. Glosser's Math Goodies
Lessons
<http://www.mathgoodies.com/lessons/>

The Math League
Lessons and activities.
<http://www.mathleague.com/>

Mid-Continent Research for Education and Learning
Lesson plans.
<http://www.mcrel.org/lesson-plans/math/mathlessons.asp>

New York Times Math Lesson Plans
Lesson plans.
<http://www.nytimes.com/learning/teachers/lessons/mathematics.html>

A Probability Calculator
https://www.covariable.com/lp_prob.html?av=3

PurpleMath.com – site index.
Algebra lessons, quizzes, and resources.
<http://www.purplemath.com/>

PurpleMath.com – math modules.
More math topics.
<http://www.purplemath.com/modules/index.htm>

Schools of California Online Resources for Education (SCORE) Mathematics Lessons
Lesson plans.
<http://score.kings.k12.ca.us/lessons.html>

Sites for Teachers
Hundreds of sites for teachers with lesson plans, etc.
<http://www.sitesforteachers.com/index.html>

SoftSchools.com
Interactive quizzes for the middle grades
http://www.softschools.com/grades/6th_and_7th.jsp

MCA Online, Victoria University, Melbourne.
Lessons, tutorials, math, algebra, geometry.
<http://www.staff.vu.edu.au/mcaonline/units/index.html>

Teacher Planet

Teacher resources.

<http://www.teacherplanet.com/calendar/calendar.php?op=cal&month=7&year=2007>

Teachnology

http://www.teach-nology.com/teachers/lesson_plans/math/

ThinkQuest Library

<http://www.thinkquest.org/library/>

Zona Land Geometry

Geometry lessons.

<http://id.mind.net/~zona/mmts/geometrySection/geometrySection.html>