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K-5 Math and Technology Resources

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K-5 Math and Technology Resources

K-5 Math and Technology Resource Links

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1. Foundations of Mathematics

Common Core Georgia Performance Standards for Mathematics

- **Mathematics K-5**

Explanation of K-5 performance standards' domains

<https://www.georgiastandards.org/Georgia-Standards/Pages/Math-K-5.aspx>

High Quality Math Instruction

- **High Quality Mathematics Instruction: What Teachers Should Know**

A video explanation of high-quality math instruction including teaching conceptual understanding of math and the ability to make connections between math topics

<http://iris.peabody.vanderbilt.edu/module/rti-math/challenge/>

- **Evidence-Based Practice Summaries**

A collection of evidence-based research studies on instructional strategies and intervention effectiveness for specific age groups

http://iris.peabody.vanderbilt.edu/ebp_summaries/

National Council of Teachers of Mathematics (NCTM)

- **Teaching Math: A Video Library K-4**

A video demonstration of NCTM standards being implemented in elementary classrooms across America

<http://www.learner.org/resources/series32.html>

Constructivist Theory

- **Constructivism and Education: A Shopper's Guide**

Introduction of Constructivism and a brief overview of its influential thinkers and relation to science and technology Studies

<http://www.math.upatras.gr/~mboudour/articles/constr.html>

Sociocultural Theory

- **Sociocultural Theory**

Explanation of Sociocultural Theory and its history and educational implications

<http://www.education.com/reference/article/sociocultural-theory/>

- **Vygotsky Sociocultural Development**

A video describing Vygotsky's Sociocultural Development focusing on the interactions between people and the period of life called the Zone of Proximal Development

https://www.youtube.com/watch?v=-p_-0n2f35o

2. Problem Solving

Problem Solving Process

- **Polya's Problem Solving Techniques**

Overview of George Polya's four basic principles in problem solving

<http://math.berkeley.edu/~gmelvin/polya.pdf>

Problem Solving Strategies

- **Classroom Cognitive and Meta-Cognitive Strategies for Teachers**

A report on research-based strategies for mathematical problem-solving by understanding the problem, devising a plan, implementing a solution, and then reflecting on the problem

<http://floridarti.usf.edu/resources/format/pdf/Classroom%20Cognitive%20and%20Metacognitive%20Strategies%20for%20Teachers%20Revised%20SR%2009.08.10.pdf>

- **Word Problems Solving Strategies**

Example word problems and step by step explanations of how to solve them

<http://www.mathstories.com/strategies.htm>

- **The Singapore Maths Teacher: Problem Solving Strategies**

Video demonstrations of alternative math problem-solving strategies such as draw a picture, look for a pattern, guess and check, and logical reasoning.

<http://thesingaporemaths.com/stratf.html>

- **Teaching Channel: Problem Solving Tools**

Video of a math teacher's strategies for solving math problems

<https://www.teachingchannel.org/videos/math-problem-solving-strategies>

Example of Problems

- **Interpreting a Two-Step Word Problem**

An interactive tool demonstrating two-step word problems with teacher's notes on how to walk students through approaching and solving each word problem

https://learnzillion.com/lesson_plans/335

Problem-Based Lessons

- **Elementary School Lesson Plans: Pre-K–5 grades**

Database of problem-based lessons plans for Pre-K–5 grades

http://www.gulfcoast.edu/pbl/elementary_school/ElementarySchoolLessonPlans.htm

- **Resources for Teaching Math**

List of various lesson plans for teaching math topics such as counting, subtraction and addition

[http://illuminations.nctm.org/Search.aspx?view=search&type=ls&kw=problem based &st=n a g m d&gr=Pre-K-2 3-5](http://illuminations.nctm.org/Search.aspx?view=search&type=ls&kw=problem%20based%20&st=n%20a%20g%20m%20d&gr=Pre-K-2%203-5)

3. Assessment

Types of Assessment in Mathematics

- **Games that could be Used as Assessments**

Website of interactive games for teaching math on various mathematical topics

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

- **Internet Mathematics Library**

Database of resources on various mathematical topics

<http://mathforum.org/library>

- **Assessment Rubrics: Math**

A collection of rubrics from standards-based math rubric to Pre K-K rubric

<http://www.exemplars.com/resources/rubrics/assessment-rubrics>

- **Rick Wormeli: Formative and Summative Assessment**

Video of Rick Wormeli explaining the difference between Formative and Summative Assessments and how the Formative Assessment helps you to offer better feedback to students

https://www.youtube.com/watch?v=rJxFXjfB_B4

Feedback on Assessment in Mathematics

- **Using Common Formative Assessments to Help Teachers Reflect on Their Practice**

Video of Kenneth Williams discussing use of common formative assessments and how it helps teachers to reflect on their practice

www.youtube.com/watch?v=FIdnHUGiTcM

- **Effective Feedback and Formative Assessment**

Video discussing how Formative Assessment can be used to obtain effective feedback in order to improve student outcomes

www.youtube.com/watch?v=1Tihrg7nBos

Student Self-Assessment in Mathematics

- **Exemplars K-12 Tools for Students: Peer- and Self-Assessment**

List of peer and self-assessment resources such as rubrics, checklists, and guidelines

<http://www.exemplars.com/resources/formative-assessment/tools-for-students-peer-and-self-assessment>

- **Google Search of Student Self-Assessment in Math**

A Google search for math self-assessments

https://www.google.com/?gws_rd=ssl%20-%20q=student+self-assessment+in+math#q=student+self-assessment+in+math

- **Capacity Building Series: Student Self-Assessment**

Report on the importance of student self-assessment and how it can be used to raise student achievement

<http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/studentselfassessment.pdf>

- **Scotch Plains-Fanwood Public Schools: Student Self-Assessment**

List of self-assessment examples and an article explaining purpose of self-assessments

<http://www.spfk12.org/Page/5960>

- **Student Math Survey**

An example student survey for gaining feedback on a math class

http://www.bc.edu/research/intasc/PDF/opd_bat_StudentPost_fall06.pdf

4. Equitable Teaching of Mathematics

Student with Special Needs in Mathematics

- **Response To Intervention (RTI): Mathematics**

Staff at Lyle Elementary School focused on using high-quality mathematics techniques and wondered if RTI can make a positive difference on students' interest and motivation in math

<http://iris.peabody.vanderbilt.edu/module/rti-math/challenge/>

- **Effective Mathematics Instruction - How Disabilities can Affect Math Achievement**

Explanation of learning disabilities and how that can impact learning math

http://www.parentcenterhub.org/wp-content/uploads/repot_items/eemath.pdf

- **Mathematics Instruction for Students with Learning Disabilities or Difficulty Learning Math**

Report on strategies and recommendations on how to teach students with learning disabilities or students with mathematical learning difficulties

<http://www.centeroninstruction.org/files/Mathematics%20Instruction%20LD%20Guide%20for%20Teachers.pdf>

English Language Learners and Mathematics Instruction

- **Regular Classroom Modifications for ELL Students**

Check list of regular classroom modifications for ELL students

<http://www.gustine.esc14.net/users/0001/docs/Accommodations%20Checklist%20from%20TEA%20from%20TELL-IT.pdf>

- **Suggested Accommodations for Bilingual/ESL Students**

A numbered list of suggested accommodations for bilingual/ESL students

<http://gtpdx.wikispaces.com/file/view/accommodations%20ESL.pdf/378926664/accommodations%20ESL.pdf>

- **Supporting ELLs in Mathematics**

List of resources "to illustrate how Common Core aligned math tasks can be used to support math instruction and language development for ELLs" in elementary, middle, and high school

http://ell.stanford.edu/teaching_resources/math

- **Improving Mathematics Problem Solving Skills for English Language Learners with Learning Disabilities**

Implications and tips for teachers teaching mathematical problem-solving skills to ELLs with learning disabilities

<http://www.colorincolorado.org/article/12907/>

Gender-friendly Mathematics Instruction

- **Gender Equity in Mathematics Education**

Report describing teachers' roles in addressing gender equity in mathematics including an activity sheet

<http://ncisla.wceruw.org/publications/articles/Gender.pdf>

Gifted Students and Math Instruction

- **Mathematically Gifted Students: How Can We Meet their Needs?**

Article discussing characteristics of gifted math students and challenges for school districts and teachers to differentiate instruction

http://www.davidsongifted.org/db/Articles_id_10514.aspx

- **Meeting the Needs of Gifted Students: Differentiating Math and Science Instruction**

Report on meeting the needs of gifted students by differentiating math and science instruction through identifying these gifted students and differentiating content, process, and learning environment

<http://educationnorthwest.org/sites/default/files/12.99.pdf>

- **Hoagies' Gifted Education Page**

List of resources for teaching mathematics to gifted students

http://www.hoagiesgifted.org/math_gifted.htm

- **Gifted Resources: Curriculum**

List of resources for teaching gifted students including lesson plans and math involving the use of a Rubik's Cube

<http://www.exquisite-minds.com/gifted-resources-lessons-and-curriculum/>

- **Differentiating the Curriculum for Elementary Gifted Mathematics Students**

Report discussing how gifted math students need a differentiated curriculum with example activities to use

http://www.soe.vt.edu/tandl/pdf/Wilkins/Publications_Wilkins_Differentiating_curriculum_Elementary_Gifted_Mathematics_students.pdf

- **Online Math Resources for Gifted Children**

List of resource materials for teaching math to gifted children including worksheets and word problems

<http://www.homeschoolmath.net/online/gifted.php>

Low-Achievers in Mathematics Instruction

- **Effective Math Instruction for Low Achievers**

Summary of studies completed demonstrating methods and techniques that work best for teaching students with low achievement

<http://www.ernweb.com/educational-research-articles/effective-math-instruction-for-low-achievers/>

- **Characteristics of High and Low Achievers**

Information for teachers about high and low achievers and effective study skill strategies to help students

<http://iris.peabody.vanderbilt.edu/module/ss1/perspectives-and-resources/q1/p01/>

5. Technological Tools for Mathematics

Calculators

- **Talking Calculator**

Interactive calculator that verbalizes user's interactions with the calculator

<http://pbskids.org/cyberchase/math-games/calculator/>

- **Cool math's Online Math Calculators**

Various math and financial calculators to help calculate annuity, loans, percentage problems, sales tax, etc.

<http://www.coolmath.com/calculators/index.html>

- **Math.com Online Calculators**

Several interactive calculators available for users such as calculators for solving basic, scientific, circle, percent, and quadratic equation functions

<http://www.math.com/students/calculators/calculators.html>

- **The Calculator Home Page**

An interactive scientific calculator with functions such as sin, cos, and tan

<http://www.calculator.org/jcalc98.aspx>

- **Online Calculator**

An interactive basic calculator for addition, subtraction, multiplication and division

<http://www.online-calculator.com/>

Digital Tools for Mathematics

- **Digital Tools for Mathematics: Web-Based Apps**

Interactive math apps to learn various topics such as telling time, fractions, and geometry

http://k-12.pisd.edu/currinst/elementary/math/SOL_2013/index.htm

Instructional Applications for Mathematics

- **Games and Interactives**

Links to webpages that hold many teaching resources such as interactive games and materials

<http://www.thinkport.org/ECE/technology/interactive.tp>

- **Podcasts and Mobile Downloads**

Links to webpages that hold teaching resources such as videos, podcasts, and mobile downloads

<http://www.thinkport.org/ECE/technology/apps.tp>

Guidelines for Selection of Technological Resources

- **10 Tips for Software Selection for Math Instruction**

Tips on software selection for math instruction to students with learning disabilities

http://www.idonline.org/article/10_Tips_for_Software_Selection_for_Math_Instruction/6243

- **Preparing Teachers to Teach Mathematics with Technology**
Article discussing components related to preparing teachers to teach math such as type of technology use, attitudes, beliefs, and barriers
<http://www.citejournal.org/articles/v6i2mathematics1.pdf>
- **Differentiating in Math Using Computer Games**
A video on differentiation in math classrooms due to the use of technology
<https://www.teachingchannel.org/videos/differentiating-in-math>

Internet Resources for Mathematics Instruction

- **National Council of Teachers of Mathematics (NCTM)**
Website full of classroom resources for teachers teaching mathematics
<http://www.nctm.org/>
- **The Math Forum @ Drexel**
Website full of mathematical resources such as online mentoring, puzzles, and problem solving for teachers and students
<http://mathforum.org/>
- **PBS Learning Media**
Website full of resources for students and teachers alike
<http://www.pbslearningmedia.org/>

6. Numbers, Number Systems, and Operations

- **Numbers and the Number System: Place Value**
Webpage with lists of mathematical resources about numbers and the number system such as place value
<http://www.primaryresources.co.uk/maths/mathsB4.htm>
- **Teaching Math: A Video Library, K -4**
A video demonstration of NCTM standards being implemented in elementary classrooms across America
www.learner.org/resources/series32.html
- **Place Value Game**
An interactive game to help children learn about place value
<http://education.jlab.org/placevalue/index.html>

Early Number Concepts and Number Sense

- **The History of Numbers**
Information about the history and back ground of numbers
<http://www.vedicsciences.net/articles/history-of-numbers.html>

Addition

- **Addition with Manipulatives**
Interactive game helping children practice addition
<http://www.abcya.com/addition.htm>

Subtraction

- **Comparing Connecting Cubes**

List of various lesson plans helping students learn 5 models of subtraction such as balanced equations and the number line using connecting cubes

<http://illuminations.nctm.org/unit.aspx?id=6142>

Multiplication

- **All About Multiplication**

List of various lesson plans for teaching multiplication

<http://illuminations.nctm.org/unit.aspx?id=6099>

Division

- **Conceptualizing Division with Large Numbers**

Lesson plan teaching the strategies behind division and how the strategies can be translated into mathematical steps

<http://illuminations.nctm.org/Lesson.aspx?id=3807>

- **Illustrated Division**

Interactive game teaching division

http://nlvm.usu.edu/en/nav/frames_asid_193_g_1_t_1.html

Basic Math Facts

- **Math Fact Café**

Resource that enables math teachers to produce pre-made or customized math worksheets

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

- **Basic Math Facts**

Information about when students should have certain math skills

<http://everydaymath.uchicago.edu/parents/understanding-em/facts/>

- **Math Games and Learning Activities by Topic**

Interactive games for children on various math topics such as addition, fractions, and geometry

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

- **Sheppard Software: Interactive Math Games**

Interactive games for children on various math topics such as telling time, money, and percentages

<http://www.sheppardsoftware.com/math.htm>

- **Interactive Educational Games**

Provides many preschool and kindergarten activities that enhance their desire to learn

<http://www.sheppardsoftware.com/preschool/preschool.htm>

- **Play Free Math Games: Grades 1-5**

Enhance student's desire to learn with educational games. Select desired subject and grade level for appropriate math games.

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

Whole-Number Place Value Concepts

- **Building Sets of 19 and 20**

This resource allows students to explore building sets of 19 and 20. They count up to 20, construct and decompose sets up to 20, and record the decompositions.

<http://illuminations.nctm.org/Lesson.aspx?id=1788>

Computation

- **Planning a Trip to Disneyland or Disney World**

Use this source for students to collect data to plan a trip to a particular destination. Students will determine elapsed time and distance and use problem solving skills to calculate meals, lodging, and air travel.

<http://illuminations.nctm.org/Lesson.aspx?id=1355>

7. Measurement

- **Measure Me!**

In this task, students work with partners to measure themselves. This lesson allows students to see why accurate measurements are important.

www.oercommons.org/courses/measure-me

- **Measuring Blocks**

Provides a lesson plan to highlight the importance of accurate measurements

www.oercommons.org/courses/measuring-blocks

- **Twizzler Measurement**

Provides a lesson plan that encourages students to use technology, hands-on interaction, and active participation to compare and measure different heights of objects

www.oercommons.org/courses/twizzler-measurement

- **Measurement Mania: Series of Measuring lessons**

Provides a series of lesson plans that actively involve students in several measurement activities in order to gain hands-on practice while working in small groups

www.oercommons.org/courses/measurement-mania

- **Group Activity of Measuring Non-standard Units**

Provides lesson plans for teachers in order to enhance students' understanding of non-standard unit of measurement concepts

www.oercommons.org/courses/measurement-centers

- **Quiz: Can You Measure?**

Provides many self quizzes for students divided into primary and post primary levels

www.oercommons.org/courses/can-you-measure-quiz

- **Measurement**

A measuring activity lesson plan for children to work with a partner to measure hands, feet, and smiles to the nearest inch and centimeter

www.oercommons.org/courses/measurement

- **Measurement & Geometry Activity Resources for Teaching Math**

Provides interactive and recent news related lessons for all age groups. Easily search lessons by NCTM Standards or Common Core Math Standards.

<http://illuminations.nctm.org/Search.aspx?view=search&type=ls&st=g&gr=Pre-K-23-5>

8. Geometry

- **Measurement & Geometry Activity Resources for Teaching Math**

Provides interactive and recent news related lessons for all age groups. Easily search lessons by NCTM Standards or Common Core Math Standards.

<http://illuminations.nctm.org/Search.aspx?view=search&type=ls&st=g&gr=Pre-K-23-5>

- **Dynamic Paper: Interactive App**

Create patterns, number lines, and many different shapes and convert to PDF for printing

<http://illuminations.nctm.org/Activity.aspx?id=3509>

- **Interactives: Geometry 3D Shapes**

Provides interactive ways to learn about three-dimensional geometric shapes. Provides lessons about terminology, calculating surface volume/area, and mathematical properties.

www.learner.org/interactives/geometry/index.html

- **Shape and Space in Geometry**

Provides geometry lessons using new instructive and practical ways of learning. Divides geometry into 2 simplified categories on “shape” and “space.”

www.learner.org/teacherslab/math/geometry

9. Data Analysis and Probability

- **Resources for Teaching Math**

Select appropriate grade level or age group in order to find lessons on many skills. Choose from activities age appropriate for students Pre-K through 12th grade.

<http://illuminations.nctm.org/Search.aspx?view=search&type=ls&st=g&gr=Pre-K-23-5>

- **Create a Graph**

Create many different types of graphs and charts. This source provides information as to which graph/chart to use for different types of data.

<http://nces.ed.gov/nceskids/createagraph/>

- **Data Grapher**

Can be used to analyze data with bar graphs, line graphs, pie charts, and pictographs

<http://illuminations.nctm.org/Activity.aspx?id=4098>

- **Advanced Data Grapher**

Can be used to analyze data with box plots, bubble graphs, scatterplots, histograms, and stem-and-leaf plots

<http://illuminations.nctm.org/Activity.aspx?id=3476>

- **Marble Mania!**

Interactive resource that uses marbles to illustrate probability

www.sciencenetlinks.com/interactives/marble/marblemania.html

- **Data Analysis and Probability: Grades Pre-K–5th**

Interactive simulations for grades Pre-K–12th

http://nlvm.usu.edu/en/nav/topic_t_5.html

10. Algebraic Thinking and Patterns

- **Resources for Teaching Math**

Provides lesson plan ideas for Pre-K-12th grade for various mathematical topics, such as number & operations, algebra, geometry, and measurement for both NCTM Standards and Common Core Math Standards

http://illuminations.nctm.org/Search.aspx?view=search&type=ls&mp%3Bmp%3Bst=a&mp%3Bmp%3Bgr=Pre-K-2_3-5

- **Virtual Manipulatives for Algebra**

Interactive algebra simulations for Pre-K-12th grade

http://nlvm.usu.edu/en/nav/topic_t_2.html

- **Inside Mathematics**

“A professional resource for improving students’ math learning and performance”

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

- **Interactive Linear Equation**

Resource provides an interactive graph to illustrate the relationship between line equation and the graph

http://www.mathwarehouse.com/algebra/linear_equation/linear-equation-interactive-activity.php

- **Learning Math: Patterns, Functions, and Algebra**

Video and web-based course on basic concepts of algebra for K-8 grade teachers

www.learner.org/resources/series140.html

- **PBS Kids: Math Games**

Interactive games for students to apply mathematical skills

<http://pbskids.org/cyberchase/math-games>

11. Estimation

- **Teaching Elementary Mathematics: Estimation**

Brief explanation of estimation, how it can be applied, and also lists additional estimation resources

<https://mathteachingstrategies.wordpress.com/2009/04/02/big-idea-estimation/>

- **The Math Forum - Estimation**

Includes questions Gail Englert (T2T Associate) has responded to from elementary and middle school teachers, parents, and students

<http://mathforum.org/t2t/faq/gail/>

- **Estimation Unit of Activities and Games**

Provides a three day lesson plan for grades 3-4 to help students to learn how to strategically make estimates

https://www.nsa.gov/academia/files/collected_learning/elementary/arithmetic/reasonable_estimates.pdf

- **Estimation Introduction**

This resource provides a brief introduction to the importance of estimation and includes examples of situations where estimations are helpful

<http://www.mathsisfun.com/numbers/estimation.html>

- **Estimating Volume by Counting on Frank**

"In this lesson, students read the book 'Counting on Frank'. They use information in the book to make estimates involving volume. In particular, students explore the size of humpback whales."

<http://illuminations.nctm.org/Lesson.aspx?id=837>

12. Error Analysis/Error Patterns

- **Error Patterns in Computation**

This article discusses how to detect the systematic errors many students make when computing with paper and pencil

http://www.pearsonhighered.com/assets/hip/us/hip_us_pearsonhighered/samplechapter/0135009103.pdf

- **Misconceptions and Error Patterns**

This source discusses improvement of mathematic instruction through diagnosing the issue

http://ptgmedia.pearsoncmg.com/images/9780135009109/downloads/Ashlock_Ch1_MisconceptionsandErrorPatterns.pdf

- **Error Pattern Analysis**

Provides an explanation of the importance of error pattern analysis and a process for how to gather data to be analyzed

<http://www.specialconnections.ku.edu/~speconn/page/instruction/math/pdf/patternanalysis.pdf>

- **Error Analysis**

This resource provides a list of common errors and definitions concerning error analysis, as well as a step by step example of how to analyze data

<http://k6.boardofstudies.nsw.edu.au/wps/portal/go/mathematics/support-students-special-needs/assessment/error-analysis>

13. Mathematics Literature Connections

- **Math Literature Connections**

Resource listing books relating to mathematic topics, including worksheets to download

<http://mathwire.com/literature/literature.html>

14. Glossary for Mathematics Concepts and Terminology

- **Glossary for Math Terminology**

Resource that provides mathematic terms and simple definitions

<http://www.math.com/school/glossary/glossindex.html>

- **Illustrated Mathematics Dictionary**

Over 750 mathematic terms are included with definitions and illustrations

<http://www.mathsisfun.com/definitions/>

- **Math Dictionary**

A resource that organizes various mathematic terms and definitions in a searchable format

<http://www.didax.com/mathdictionary/>

- **Math Dictionary for Kids**

An animated, interactive online math dictionary for students which explains over 600 common mathematical terms and math words in simple language; also includes math charts covering a variety of mathematic topics

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