

Technology Integrated Mathematics

Enhancing Teaching & Learning

During the past several years, access to technology in the classroom has increased significantly, as has its role in mathematics teaching and learning. This technology includes a range of hardware and software applications including personal computers, graphing calculators, hand-held devices such as personal digital assistants (PDAs), probes, sensors, specialized software, and online resources and tools. (Masalski & Elliott, 2005) In fact, the National Council of Teachers of Mathematics (NCTM) states that “technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students’ learning.” (NCTM, 2000, p. 24)

The online resources that are available have grown from static text content to interactive applets and tools that provide opportunities to visualize, conceptualize, reason and problem-solve. Many tools provide graphical representations quickly and easily allowing students to predict and check multiple examples and/or ideas in a very short period of time. (Sutton & Krueger, 2002) There are many sites that host these online tools. Descriptions of many of these websites are listed below:

Interactive Math Applets

Project Interactivate

<http://www.shodor.org/interactivate/>

The Project Interactivate website contains an extensive collection of lessons, interactive tools, activities, and teacher resources for middle level and upper elementary mathematics classrooms created and hosted by Shodor Education Foundation, Inc. While the original audience was middle level, many of the applets are very appropriate for topics covered in high school.

National Library of Virtual Manipulatives

<http://nlvm.usu.edu/en/nav/vlibrary.html>

The NLVM is an online library of virtual manipulatives aligned with national mathematics standards for grades PreK-12 in the areas of number, algebra, geometry, measurement, and data & probability. This project is hosted at Utah State University and was funded by the National Science Foundation.

Enhancing and Extending the National Library of Virtual Manipulatives

<http://enlvm.usu.edu>

The eNLVM tool is an online lesson creation tool. It provides an opportunity to create lessons that incorporate online tools and applets, text, and response types including open-ended text responses, selected response items, file uploads, and other response types. This project is hosted at Utah State University and was funded by the National Science Foundation.

NCTM Illuminations

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

The Illuminations website provides lessons, standards, interactive tools, and web resources that support the vision outlined in the Principles and Standards for School Mathematics document (NCTM, 2000). Illuminations is a partnership between the National Council of Teachers of Mathematics and MarcoPolo.

Seeing Math™ Interactives

http://seeingmath.concord.org/sms_interactives.html

This website hosts interactive, online tools for use in middle school and high school mathematics classrooms. The tools include qualitative, linear, and quadratic graphing, as well as, functional and data analysis applets. This site was created and hosted by The Concord Consortium.

WisWeb

<http://www.fi.uu.nl/wisweb/en/>

This website is hosted by the Freudenthal Institute which conducts research into mathematics education and is a part of Utrecht University in the Netherlands. The site contains many excellent interactive applets and software. Some of the applet instructions are in English while others are written in Dutch and other languages.

Analyze Math

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

The Analyze Math website contains java applets and tutorials for a number of secondary mathematics topics including those covered in Algebra I, Algebra II, Trigonometry, and Calculus.

Argyll Centre

<http://argyll.epsb.ca/jreed/>

This website includes a number of interactive math tools and movies written in Flash. There are also links to a number of other math related websites. The site is created and maintained by Jim Reed of Edmonton - Alberta, Canada.

Manipula Applets

<http://www.ies.co.jp/math/java/>

This website contains a number of interactive java applets related to middle school and high school mathematics topics including trigonometry, calculus, conics, and others.

ExploreLearning (Fee-based website)

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

ExploreLearning is a commercial website that hosts interactive learning tools for mathematics and science. The resources primarily target middle and high school mathematics content.

Arcytech Java Applets

<http://arcytech.org/java/>

This Web site contains Java applets to support mathematics teaching and learning. The site includes interactive Pattern Blocks, Base 10 Blocks, Integer Bars (or Cuisenaire Rods), Fraction Bars, and tools to explore the Pythagorean Theorem, the Value of Pi and Fractals. The site was developed by Jacobo Bulaevsky.

Mathematics Online Encyclopedias and Dictionaries

Mathworld™

<http://mathworld.wolfram.com/>

Mathworld is an online mathematics encyclopedia and resource that includes an extensive collection of definitions and explanations of mathematics topics. Many of the explanations and resources include interactive java applets. This resource was created by Eric W. Weisstein and is hosted and sponsored by Wolfram Research, Inc.

Intermath Interactive Mathematics Dictionary

<http://www.intermath-uga.gatech.edu/dictionary/>

The Intermath Interactive Dictionary is hosted by the Mathematics Department at the University of Georgia. It is designed for middle level students but is very appropriate for high school students as well. The definitions are clear and concise and often come with graphical representations or interactive illustrations.

Mathematics Skills Development Support

ThatQuiz

<http://www.thatquiz.com>

This website is designed to provide practice and testing of a number of mathematics skills. This is a free resource that can be used to manage and track student success with particular skills in the areas of Number and Operations, Algebra, and Geometry. The website only functions properly on specified browsers. On a PC you must use **Internet Explore 6, Firefox, Mozilla, or Netscape 7.1** or higher. On the Macintosh you must use **Firefox or Netscape 7.2**.

Math.com Website

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

This website contains an online glossary, homework help, mathematics calculators, skills reinforcement, worksheet generators, and more. While it contains a number of useful resources, it also includes advertisements and pop-ups.

References

- Masalski, W. J., & Elliott, P. C. (Eds.). (2005). *Technology-Supported Mathematics Learning Environments: Sixty-Seventh Yearbook*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- Sutton, J., & Krueger, A. (Eds.). (2002). *EdThoughts: What we know about mathematics teaching and learning: Mid-continent Research for Education and Learning*