

Magnificent Math Sites

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From an educational standpoint, STEM (Science, Technology, Engineering, and Mathematics) continues to be a concern on the state and national level, and more attention than ever is focused on improving teacher and student abilities in these areas. Our government has committed capital to the effort, spending federal dollars on professional development and public resources for teachers in those fields. Included in the efforts have been some outstanding Web-based resources, and this article will take a look at several excellent sites designed to assist math teachers. Sites with good multimedia math content, offering classroom interactions and lesson plans, will also be examined.

State-Specific Sites

Grant money was made available from federal funds through the Texas Higher Education Coordinating Board (THECB) and Texas Education Agency (TEA) to foster partnerships between institutes of higher education and the K-12 community. Teacher Quality grants were designed to provide training opportunities to state math and science teachers. The grants followed the “P-16” approach, which seeks to initiate collaborations among educational entities, making education more seamless from early childhood through college. Teacher Quality Type A grants were awarded to Texas universities to develop training modules for teachers in math and science. The results of these efforts were outstanding, and the material is now being delivered to educators in the state through Teacher Quality Type B grants, which provide professional development based on the modules.

The exciting thing is, all materials developed for teacher training in the Type A grants are freely available on the Web. Teachers desiring access to the material do not need to be involved in a training program. Because the materials are based on state standards, teachers and pre-service teachers needing to brush up for competency exams have discovered the modules make excellent study guides. In addition, teachers already serving in math and science may find many of the classroom deliverables highly useful. The Charles A. Dana Center at the University of Texas, Austin has a page devoted to all the Teacher Quality Type A math modules here: <http://www.utdanacenter.org/highered/tqm.php>. Modules are available for middle school math, Algebra I and II, geometry, and pre-calculus.

The module development undertaken by math departments at various universities have produced outstanding online products designed to assist teachers new to the subject area. A case in point is the pre-calculus “course in a box” at Texas A&M University, College Station. The site is designed for teachers new to pre-calculus. The modules include a host of interactive online features. Adjusting variables in a graph, for instance, will automatically readjust graph lines. Along with interactive course modules, the site contains streaming instructive videos, links to useful software, pre-tests to discern areas of need, links to the TEKS, and a rich set of online resources. The URL for Texas A&M’s pre-calculus site is http://distance-ed.math.tamu.edu/Precalculus_home/index.htm.

Teacher Quality grants stem from the older Eisenhower Professional Development Grant Program. Fortunately, much of the work developed by teachers in years past through the Eisenhower program has been saved and remains useful in the classroom. Professors at Texas A&M, Corpus Christi maintain sets of math projects posted by teachers in Eisenhower workshops at the Math Integration Laboratory: <http://falcon.tamucc.edu/~nduran/mil/>.

Additionally, The Math Page has several tools for teaching teachers how to teach mathematics:
<http://falcon.tamucc.edu/~nduran/INTRO.htm>.

Resources, Manipulatives, and Interactive Sites

Teacher Quality and Eisenhower Grant materials continue to prove excellent resources for new math teachers, as well as teachers brushing up on their skills. Sometimes, however, math teachers need sites providing information or materials for use in the classroom. Finding additional resources does not have to be hard, as the U.S. Dept. of Education (ED) has a site dedicated to just that. Federal Resources for Educational Excellence (FREE) is available here: <http://www.ed.gov/free/>. The section for mathematics offers a host of links to sites providing quality online materials from 35 federal agencies. ED also sponsors the Gateway to Educational Materials, a site hosting massive numbers of lesson plans at <http://thegateway.org/>. Searching under the mathematics topic yields over 5500 lessons plans for math. Finally, ED hosts the What Works Clearinghouse at <http://whatworks.ed.gov>. This compilation of research for classroom practices is highly useful to teachers. Look under the Math topic to find research directly related to classroom practice. Their report, *Curriculum-based Interventions for Increasing K-12 Math Achievement—Middle School*, looks at studies of commercial interventions such as Saxon Math and the I Can Learn® products.

One of the best sites for classroom use is the National Library of Virtual Manipulatives for Interactive Mathematics. This site is hosted by Utah State University, and was funded by the National Science Foundation (NSF). All virtual manipulatives on the site are free to use. Manipulatives are sorted by numbers and operations, algebra, geometry, measurement, and data analysis and probability. They are further subdivided by grade. Clicking on the link for Algebra, Grades 6-8, for instance, will lead to a page listing 16 online manipulatives featuring graphing,

patterns, algebra tiles, and more. This excellent resource is available at <http://nlvm.usu.edu/en/nav/index.html>. For those desiring a more traditional approach, a set of templates for handmade manipulatives that can be printed off the page resides at <http://mason.gmu.edu/%7Emmankus/Handson/manipulatives.htm>. Simply click on the link with the desired handmade manipulatives, and print.

Additional sites for classroom use include www.coolmath.com. This kid-oriented site hosts a variety of online educational math games such as Lemonade Stand and Fractal Gallery. The site is ad-supported. A great source for educational videos to introduce and support lessons is www.brainpop.com. A variety of videos on various topics exist on this site, including math. Brainpop is subscription-supported, and is student-oriented. The videos are designed to quickly introduce students to the topic, and a wide variety of educational materials back up the videos. For a long list of online math problems and classroom activities, visit King's List of On-line Math Activities at <http://www.k111.k12.il.us/king/math.htm#Math>. This page is hosted by King Middle Grade School in Kankakee, Illinois.

The Math Forum at Drexel University (www.mathforum.org) provides a rich resource set to teachers. Particularly interesting is the "Ask Dr. Math" feature, which offers answers to general math problems. The "Teacher2Teacher" feature on the Math Forum offers teachers and parents resources for teaching mathematics.

Another great resource site is the Math Pathway at the Middle School Portal for the Eisenhower National Clearinghouse (ENC) for Mathematics and Science Education located at Ohio State University. The Middle School Portal was developed by the National Science Digital Library (NSDL), and seeks to offer "pathways" in math, science, and technology leading to high quality middle school resources on the Web. The Math Pathway is located at:

<http://nsdl.enc.org/math.aspx>. ENC (www.enc.org) is also a math-friendly resource center, offering many curricular resources. Future portals from the NSDL (<http://nsdl.org>) will include more that will focus exclusively on mathematics.

The Geometry Center at the University of Minnesota offers online interactive programs for teaching geometry: <http://www.geom.uiuc.edu/>. Users can choose between Web-based programs or Java-based programs. Also at the site are papers, geometrical images, downloadable software, and video clips for teaching geometry. The U.S. Mint's Kids Site has interactive games and lessons designed to teach money concepts to children. Other teaching resources are also listed at the site: <http://www.usmint.gov/kids/>.

Conclusion

Of course, these sites only scratch the surface of the wealth of resources on the Web. However, they do represent some of the best materials designed for teaching math currently online. Of particular importance, the Teacher Quality modules are specifically designed for state standards. Hopefully this list will prove to be useful for teachers in Texas as the 2005-2006 school year approaches.

Sites listed in this article:

Dana Center Teacher Quality Type A math modules
<http://www.utdanacenter.org/highered/tqm.php>

Texas A&M's pre-calculus "course in a box"
http://distance-ed.math.tamu.edu/Precalculus_home/index.htm

Math Integration Laboratory at Texas A&M Corpus Christi
<http://falcon.tamucc.edu/~nduran/mil/>

The Math Page at Texas A&M Corpus Christi
<http://falcon.tamucc.edu/~nduran/INTRO.htm>

Federal Resources for Educational Excellence (FREE)
<http://www.ed.gov/free/>

Gateway to Educational Materials
<http://thegateway.org/>

What Works Clearinghouse
<http://whatworks.ed.gov>

National Library of Virtual Manipulatives for Interactive Mathematics
<http://nlvm.usu.edu/en/nav/index.html>

Hand Made Manipulative Instructions
<http://mason.gmu.edu/%7Emmankus/Handson/manipulatives.htm>

CoolMath.com
<http://www.coolmath.com>

Brainpop.com
<http://www.brainpop.com>

King's List of On-line Math Activities
<http://www.k111.k12.il.us/king/math.htm#Math>

The Math Forum
<http://www.mathforum.org>

The Math Pathway at the Middle School Portal
<http://nsdl.enc.org/math.aspx>

Eisenhower National Clearinghouse for Mathematics and Science Education
<http://www.enc.org>

National Science Digital Library
<http://nsdl.org>

The Geometry Center
<http://www.geom.uiuc.edu/>

U.S. Mint's Kids Site
<http://www.usmint.gov/kids/>

John Rice serves as a program coordinator for the Texas Center for Educational Technology. He can be reached by e-mail at j7r7@hotmail.com