



## The Principals' Partnership

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

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# Research Brief

## Mathematics

**Question:** What are some exceptional high school math programs?

**Summary of Findings:** Research into how students learn mathematics indicate that although factors outside of school can greatly impact student achievement, classroom practices also impact student achievement. It appears that the various aspects of teacher quality are related to student achievement when class size and SES are taken into account. In particular, the following 5 variables are positively associated with achievement (Wenglinsky, 2002):

- Teacher major
- Professional development in higher-order thinking skills
- Professional development in diversity
- Hand-on learning
- Higher-order thinking skills

Further, exceptional high school math programs seem to share some or all of the following characteristics:

- Connected to standards
- Reflect high expectations
- Connected to students' lives & cultures
- Make learning interactive
- Connect math to other disciplines
- Teach math in context
- Use mathematical modeling

### Quality Math Programs:

#### **How Schools Matter: The Link Between Teacher Classroom Practices and Student Academic Performance**

Citation: Wenglinsky, H. (2002, February 13). How schools matter: The link between teacher classroom practices and student academic performance. *Education Policy Analysis Archives*, 10(12). Retrieved 12/22/03 from <http://epaa.asu.edu/epaa/v10n12/>

This study explores the link between classroom practices and student academic performance by applying multilevel modeling to the 1996 National Assessment of Educational Progress in mathematics. The study finds that the effects of classroom practices, when added to those of other teacher characteristics, are comparable in size to those of student background, suggesting that teachers can contribute as much to student learning as the students themselves.

<http://epaa.asu.edu/epaa/v10n12/>

#### **NSF-funded High School Math Programs**

Links to information on 5 exemplary math curricula: Contemporary Mathematics in Context; Interactive Mathematics Program; SIMMS Integrated Mathematics; Math Connections: A Secondary



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Mathematics Core Curriculum; Mathematics: Modeling Our World Each of these curriculum programs approaches Standards-based mathematics instruction in a unique way.

<http://www.enc.org/features/focus/archive/nsfmathhigh/>

#### **NCTM Illuminations**

The NCTM Illuminations Web site is designed to illuminate the new vision for school mathematics presented in NCTM's *Principles and Standards for School Mathematics*.

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

#### **Math Problem Solving Model**

The NWREL Mathematics Problem-Solving Model helps educators meet the challenges of teaching and assessing open-ended problem solving. The model includes a scoring guide for problem solving, open-ended tasks, and examples of student work for practice in scoring.

<http://www.nwrel.org/msec/mpm/index.html>

#### **WebQuests as Powerful Teaching Tools for Mathematics and Science**

If you're looking for a way to use the Internet for dynamic, inquiry-based instruction, then you might want to consider developing your own webquests. More than just an interesting meander through the web, webquests are guided explorations that require students to interact with the material they encounter and do something with it. Includes links to exemplary Math webquests.

<http://www.enc.org/features/focus/archive/webquests/>

#### **The Interactive Mathematics Program**

The Interactive Mathematics Program (IMP) is a growing collaboration of mathematicians, teacher-educators, and teachers who have been working together since 1989 on both curriculum development and professional development for teachers. IMP has created a four-year program of problem-based mathematics that replaces the traditional Algebra I-Geometry-Algebra II/Trigonometry-Precalculus sequence.

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

#### **Northwest Teacher**

Developed by NWREL's Mathematics and Science Education Center, *Northwest Teacher* presents engaging and research-based articles on key topics in math and science education, highlighting classrooms from around the Northwest. Each issue is theme-based, exploring such topics as science inquiry, math problem solving, the effect of the standards movement in math and science classrooms, and other issues of significance to Northwest educators.

<http://www.nwrel.org/msec/nwteacher/index.html>



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## Online Resources:

### National Council of Teachers of Mathematics

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

### NCTM – High School Highlights

<http://www.nctm.org/high/index.asp>

### K-12 Partnership Online Materials

#### Mathematical Explorations Using the Internet

<http://k12science.ati.stevens-tech.edu/k12partner02/9-12math.html>

### Northwest Regional Educational Laboratory – Math Tutor

<http://www.nwrel.org/learns/resources/math/index.html>

### Eisenhower National Clearinghouse for Mathematics and Science Education (ENC) Math Lessons & Activities

<http://www.enc.org/weblinks/lessonplans/math/>

### High School Hub.org Math Guide

<http://highschoolhub.org/hub/math.cfm>

### Cornell Theory Center Math Gateway

<http://www.tc.cornell.edu/CTC->

[Main/Services/Education/Gateways/Math and Science/mathematics.htm](http://www.tc.cornell.edu/CTC-Main/Services/Education/Gateways/Math%20and%20Science/mathematics.htm)

### ENC Digital Dozen

Each month, staff from ENC select 12 high quality mathematics and science web sites.

<http://www.enc.org/features/dd/?ls=fe>

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